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# *Analysis of Factors Affecting the Students' Acceptance Level of E-Commerce Applications in Yogyakarta Using Modified UTAUT 2*

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**Abstract— Yogyakarta is listed as the region with the highest number of residents engaging in e-commerce transactions. A total of 10.2% of the population are active e-commerce sellers, while 16.7% belong to the buyer category. Research by IDN Times showed that e-commerce application users have been dominated by students, with a percentage of 44.2%. The purpose of this study is to analyze the factors that influence students' level of acceptance of e-commerce applications in Yogyakarta using the modified UTAUT 2. This is quantitative research with multiple linear regression models using SPSS software version 25 with a sample size of 303 people. Data analysis in this study was conducted in a few steps, including descriptive analysis, validity test, reliability test, classical assumption test and hypothesis testing. The results of this study indicate that the student's level of acceptance of e-commerce applications is within good criteria. The variables that have a positive effect on the behaviour intention (BI) are performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), hedonic motivation (HM), habit (HB), price value (PV), perceived risk (PR), perceived security (PS), and trust (TR) are variables that negatively affect the variable behaviour intention (BI). All independent variables affect the dependent variable or behaviour intention (BI) with a total of 63.3% and the difference with a total of 36.7% is caused by other factors not examined by the researcher.**

***Keywords—e-commerce transaction; e-commerce sellers; independent variables; positive effect; quantitative research***

## 1 INTRODUCTION

In the current era of globalization, information and communication technology is becoming increasingly sophisticated and pervasive in various aspects of daily life, including business and transaction models. With the help of technology, business concepts are becoming more advanced. This includes easy access to information, the ability to obtain goods or services, socialisation through digital devices, the ability to obtain various learning materials at affordable prices, and the ability to conduct business operations to the point of development. Likewise, most shopping transactions are done online, and it gives various benefits such as time-saving, ease of access, convenience, and a large selection of different types of products [1][2].

Based on the continuous increase of e-commerce in this digital era, business through online media has become very popular today. E-commerce had a market share of 8.7% of worldwide retail sales in 2016 and increased to 10.1% in 2017. The overall amount of retail sales made through e-commerce was expected to reach $4.4 trillion by 2020. This business model became more favourable because it can be accessed from a variety of devices, not just computers or laptops, and can be done anytime, anywhere, whether as a key employee or subcontractor [3][4].

The report presented by Destinesia tries to measure the ranking by looking at the average in three years, namely the 2019-2021 period. Given the unequal population in 514 districts/cities, what is measured is the percentage of the population that conducts internet buying and selling transactions (e-commerce) to the total population in each. The city of Yogyakarta is listed as the region with the most residents who transact via e-commerce. Yogyakarta remains number one on the list of the highest percentage of sellers. A total of 10.2% of the population is active as sellers in e-commerce and 16.7% are in the buyer category. There are two districts tucked away in the list of the most sellers, namely Sleman and Bantul which are in one province. For the category of regions with the largest portion of buyers, Yogyakarta remains in first place [5] [6].

Students are expected to follow the development of technology and be literate about it so as not to be left behind. Their awareness of technological advances also becomes the study material in working and innovating. Students must also have sensitivity, critical thinking, and competitiveness to be able to live better. Based on the data obtained from the Central Bureau of Statistics (BPS) of Yogyakarta Special Region Province, the number of students under the auspices of the Ministry of Research, Technology, and Education and the Ministry of Religious Affairs on 2022, Yogyakarta is the only region with a large number of students, with a total of around 405,580 people, and is often called the center of learning.

UTAUT is a model that combines several human behaviour models that aim to analyze and evaluate the level of user acceptance of the application of information technology. UTAUT has 4 main constructs that influence the acceptance and behavior of technology users, namely: performance expectancy (PE), effort expectancy (EE), social influence (SE), and facilitating conditions (FC) [7]. Furthermore, it adds three new predictor variables that focus on the adoption received by consumers, namely Hedonic Motivation (HM), Price Value (PV) and Habit (HB) in the UTAUT 2 model [7] [8][9].

Nugroho [10] did research on the assessment of the degree of public acceptance of the Jogja Istimewa application using the Modified Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2). His main objective was to determine how widely the Jogja Istimewa application was accepted by the general population and what factors contributed to its acceptance. As a result, the Jogja Istimewa application received positive, popular approval. It is well established that BI, HA, and FC have an impact on UB. While HA, PR, SI, TR, and PE affect BI, FC and EE have no effect on it [10].

Research has been conducted by Evan, et.al. to analyze and evaluate the student's level of acceptance of e-money and the variables that influence it. The results showed that the threshold level of e-money used by students in Yogyakarta was within the good criteria. The behavioural intentions were positively influenced by perceived security, price value, habit, performance expectations, trust, facilitating conditions, and hedonic motivation, and negatively influenced by perceived risk, while effort expectations or social influence have no known impact on behavioural intentions [11].

Based on research conducted by Kilani on post-adoption consumers of electronic wallets: An extended UTAUT2 perspective with trust. This study aims to measure the extent to which the unified theory of acceptance and use of technology 2 (UTAUT2) variables can influence adoption behaviour towards e-wallets in Jordan. However, with an additional viewpoint, centred on internal influences, by replacing social influence factors with trust factors, to test the model with a focus on self-created individual perceptions. The results highlighted the significant influence of performance expectancy, effort expectancy, habit, price value, and trust on the intention to use e-wallets in Jordan. Moreover trust, in particular, was shown to have a remarkable effect on e-wallet Continued Use Intention, while also having an effect on the second most influential variable, performance expectancy. On the other hand, performance expectancy attempts continuous use of mobile wallets in the Jordanian setting. Finally, Continued Use Intention is shown to be a direct function of Continued Use behavior, followed by habit [9].

The UTAUT 2 model is a model that is widely used by researchers because it has proven successful and is the main reference in evaluating and analyzing factors that have an impact on information systems. The object of study in the current study is different from the research conducted by Evan [11], although the variable models used are similar. Their research found two variables that had no positive impact (business expectations and social influence). In the researcher's view, these two variables are very important for shaping behavioral intentions when using applications. In addition, the difference between this research and the

research of Nugroho [9] is in the object of research and modification of the variables used. Research conducted by Kilani [9] proved that the trust factor has a tremendous effect on the continued use of e-wallets, the difference with the current research is without having to eliminate the social influence factor. The UTAUT 2 model is highly recommended by researchers in analyzing and evaluating the use of information systems.

Based on the explanation above, it can be learned that the development of e-commerce in the Special Region of Yogyakarta is very good, and the number of students is very large. Of course, this is very interesting to find out the views of students on the e-commerce application used, and that is why this study uses the UTAUT 2 model which has been modified with the factors of risk perception, perceived security, and trust to evaluate the behavioral intentions of students in Yogyakarta Special Region in using e-commerce applications as a tool for conducting online buying and selling transactions and what factors influence the use of e-commerce. Moreover, the types of e-commerce used in the study are Shopee, Tokopedia and Lazada. It is hoped that this research can be used as evaluation material for the government in improving the digital economy in using e-commerce applications and e-commerce application companies to improve policies and innovate systems in e-commerce applications so as to increase the number of users/downloaders of e-commerce applications and increase interest in conducting trusted online shopping transactions so as to advance the economy, especially in the Special Region of Yogyakarta.

## 2 METHOD

The methodology used in this study is quantitative due to the nature of the data from this study which are in the form of values and numbers. The analysis was done using statistics and approaches that were based on the variance of any given subject [12]. Explanatory study is a research method that can provide an overview and show the causal relationship between one or more independent variables on the dependent variable using hypotheses and quantitative approaches. The purpose of the research conducted in order to test a theory or hypothesis in order to strengthen or even reject the theory or hypothesis of pre-existing research results and clarify how much influence the independent variable has on the dependent variable in the use of e-commerce application services by key stakeholders to be used as evaluation material in future system improvements. Explanatory research methodology is recommended so that data from a sample population can be used to test the relationship between variables and provide information about the problems that have been identified [13].

### *2.1 Research Population and Sample*

A population in research is a group of people who have a unique set of attributes and characteristics and qualities that the researcher is looking for. The term “variable” refers to these traits, personalities, and uniqueness. The population in this study were students in the Yogyakarta area, which are 405,580 people. The sample represents part of the characteristics of the population as a whole. The sample size or number of samples used in research involving quantitative analysis is very important to consider. In order to determine the minimum sample size, a calculation is made by utilizing the Slovin method [14]. The explanation can be seen below:

$$n = \frac{N}{1+N.e^2}$$

Where:
n = number of samples
N = total population
e = the level of error rate used is 10%

Then, it can be applied through the Slovin formula as follows:

$$n = \frac{405.580}{1+(405.580)(0.1)^2}$$

$n = \frac{405.580}{1+4055,8} = 99,97$ so rounded up to 100 people

Based on the calculation formula mentioned above, the minimum sample size of this study is around 100 people.

Non probability sampling is an approach to selecting the samples used in this study. Non probability sampling is a sampling method that does not guarantee that each sample will be given the same circumstances to become a sample [15]. The respondents were selected using purposive sampling, a sampling method using relevant criteria (categories). The conditions used as a reference in the survey were student respondents from Yogyakarta who used Shopee application, Tokopedia store, Lazada, and others as a method of online transactions and payments.

### *2.2 Data Collection*

The researcher used primary data, which had been slowly extracted from the original data. The primary data specifically designed to answer this question was generated by the participants. The data for the initial analysis of this study was collected through an online questionnaire via Google Form, and then provided to respondents via social media [16]. Surveys with a Likert scale were used to gauge someone's or a group's awareness of, perceptions about, and comprehension of social phenomena [17]. The scale from 1 to 5, with the following notations: 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree, was employed in this investigation.

In this study there were 10 (ten) independent variables and 1 (one) dependent variable. The independent variables in this study were PE, EE, SI, FC, PV, HM, HB, PR, PS, and TR. The dependent variable was the behavioural intention (BI) to use e-commerce applications [11].

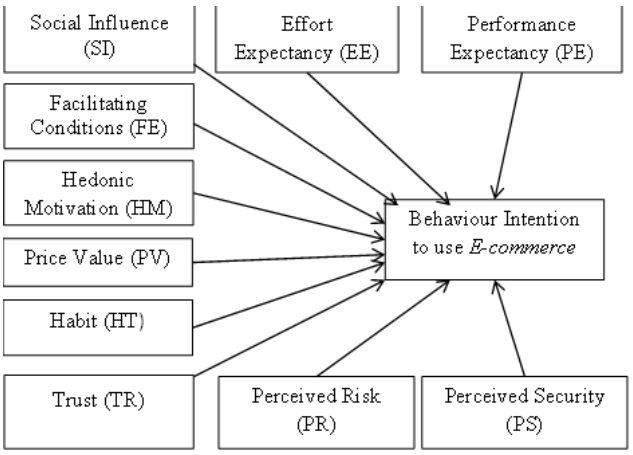


Figure 1. Modified UTAUT2 research model

*2.2.1* *Performance Expectancy:* Performance expectation is an action taken where a person states that utilizing technology is able to make it easier for users to carry out their duties, as said by Venkatesh in [9]. According to other statements, people will be more inclined and eager to utilize digital systems when they are able to have a good influence so that the belief will improve their daily lives and provide them with more benefits [9].

*2.2.2* *Effort Expectancy:* Consumer use of technology is a key factor in business perceptions of its effectiveness and efficiency, as said by Venkatesh in [18]. The use of e-commerce systems will increase very well when providers are able to provide convenience in its use. Technology systems will be favored by users when they are able to minimize the level of difficulty in using and are able to answer the problems of new system users or future systems [18].

*2.2.3* *Social Influence:* Consumer behavior is influenced by society through the idea of social influence. Venkatesh in [19][20] defines social influence as "the extent to which an individual considers it important that he or she should use a new system." In the context of mobile banking, social influence is defined as "the influence of neighborhood and social environment on customers' intention to adopt mobile banking" [19][20].

*2.2.4* *Facilitating Conditions:* Consumers' perceptions of using the facilities offered and encouragement of customer behavioral intentions are used to explain the conditions of the facilities. Using mobile shopping applications requires a variety of tools and abilities, including the ability to use a smartphone or tablet, connect to the Internet, install different applications, and have a good understanding of mobile service providers and security. According to the empirical research of Oliveira in [21], facility conditions have a favorable impact on mobile banking adoption. A healthy relationship between consumers and e-commerce is encouraged when the situation is favorable [21].

*2.2.5* *Hedonic Motivation:* Hedonic Motivation is a hedonic motivation related to a person's enjoyment in utilizing technology and the ease with which they accept it. Hedonic motivation in consumers is defined by Venkatesh in [18] as a sense of pleasure. According to Childers in [18], enjoyment is a type of intrinsic motivation that results from involvement in an activity and significantly impacts attitudes regarding online purchases. Online shoppers may be motivated by value, role, adventure, social, satisfaction, and ideas according to Arnold and Reynolds' 2003 study [18].

*2.2.6* *Price Value:* Prive Value is a price value that refers to how well the costs incurred and the benefits enjoyed by customers who use e-commerce technology for online purchases, as said by Venkatesh in [9]. When prices are higher and currency exchange rates are higher, the benefits of technology will increase. The price value signifies the favorable benefits for the country to adopt online and mobile banking [9].

*2.2.7* *Habit:* Habit is the fact that people will always perform tasks automatically because they learn. Habit is the most important predictor of behavioral intentions. As a result, there is a bias that makes it difficult to use technology either slowly or quickly, as said by Venkatesh in [21]. The habit of an action that is often carried out by users on the basis of trust and comfort from the technology system used so that it can have a good influence on the technology [21].

*2.2.8* *Trust:* The term "trust" relates to customer perceptions that the company's commitment to them is reliable and will result in benefits for both parties. While Kotler and Keller in [9] explain "Trust is the company's willingness to rely on business partners." There are many factors that can damage trust, thus making trust a multidimensional concept. If competence (capacity), kindness (benevolence), and honesty (integrity) can be demonstrated in society, then someone who has trust will be more easily trusted by others [9].

*2.2.9* *Perceived Risk:* Due to the risks involved, adopting a new technology requires an understanding of its positive and negative implications. This is because risk is the most important factor influencing consumer behavior. Perceived risk has a strong role in reducing consumer interest in taking part in electronic transactions so that risk perception is likely to have a negative effect on consumer interest in using information technology products. risk is a form of anxiety or consequence of a user for the product, whether it will have a negative impact or not, consumers need to think first before using it [19].

*2.2.10* *Perceived Security:* Perceived Security is the degree to which a person believes that the technology used to transmit sensitive information such as consumer data and financial transaction data is secure". According to Kalakota on 1997 as in [11], a hazard has the ability to lead to financially distressing events or circumstances. Information technology is accurately protected by security guarantees. Implementing appropriate controls is a step that leads to the achievement of information security. The nature of data confidentiality states that

information should not be known or accessed by individuals or organizations that are not authorized to do so [11].

Using statistical test tools, such as the SPSS 25 software, the data that have been gathered to support this research were then evaluated using multiple linear regression models [22]. Nevertheless, descriptive statistics, reliability tests, validity testing, and conventional assumption tests were also used to examine the data. While validity and reliability tests aimed to evaluate the quality of the data in this study, descriptive statistics aimed to characterize the distribution of the data, and the classical assumption test was used to evaluate the viability of the regression model employed. The data was assessed using the coefficient of determination (R2) test, partial significant test (T test), and simultaneous significant test (F test) once it was established that the regression model was functioning.

### *2.3 Instrument Testing*

2.3.1 *Descriptive Analysis:* Descriptive Statistics is a procedure for modifying the format of data from respondents using item-by-item questions and comments available to interviewers to make reading description statistics easy. A summary or description of data based on the average value (mean), variance, maximum, minimum, total, range, kurtosis, and skewness were also provided [23].

2.3.2 *Validity Test:* Validity comes from the word validity which shows the extent to which the accuracy and accuracy of a measuring instrument in performing its measuring function. In addition, validity is a measure that shows that the variable being measured really matches the variable that the researcher wants to explore [24].

2.3.3 *Reliability Test:* According to Ghozali [22], the reliability of a questionnaire can be measured to determine the indicated variable or structure. If the respondent's answer to a question is constant or stable over time, then the questionnaire is considered reliable. The level of stability, consistency, predictability, and accuracy is referred to as reliability test. A measurement that can produce reliable data is a measurement that has a high level of reliability [22].

2.3.4 *Normality Test:* The normality test is used to determine whether the distribution of the dependent variable is normally distributed for each value of a particular independent variable. This assumption is supported by the error value in the linear regression model, which is regularly distributed or close to it, making statistical testing possible. Data normality testing was carried out using the SPSS Kolmogorov-Smirnov Normality Test program [22].

2.3.5 *Multicollinearity Test:* Studying how the underlying variables are correlated is one of its tasks. The best research has no independent relationships among its variables. If the tolerance value is more than 0.10 and the variance inflation factor (VIF) value is 10, it can be said that there is no multicollinearity [22].

2.3.6 *Heteroscedasticity Test:* This test is conducted to determine whether there is a cross variance between two residual observations. Due to the large sample size (n> 30), the Glejser test is used in this study. If the analysis results display a significance level > 0.05, it means that there is no heteroscedasticity. However, heteroscedasticity may occur and the selected regression model may not be appropriate if the significance level is less than 0.05 [22].

### *2.4 Hypothesis Test*

2.4.1 *F test (simultaneous):* The F test is useful for evaluating the hypothesis simultaneously on the regression coefficient (slope) and determining whether or not the selected model can be used in evaluating the relationship between independent and dependent factors [22]. This test is very important because the findings of the t test are meaningless if it fails the F test.

2.4.2 *Test Coefficient of Determination (R2):* The quality of the R-Square model is described by the coefficient of determination, which takes into account the fact that a large number of factors (X) have an impact on the available regression random variable (Y). An indication of how much the independent variables are able to provide more variation in the dependent variable is a coefficient of determination value that is closer to 1. Conversely, the significance of the influence of the independent factors on the dependent variables decreases if (R2) falls below or close to 0 (zero) [22].

2.4.3 *T Test (Partial):* This test is conducted to see whether the independent variable separately affects the dependent variable. Assuming that the other independent variables are constant, the t statistical test determines the extent of the influence of one independent variable individually in explaining the dependent variable [22]. The significance level for this test is set at 0.05.

## 3 RESULT AND DISCUSSION

This section will discuss the results of data processing and their implications. Moreover, it will also provide the analysis of respondent decryption, analysis of variable data decryption, analysis of hypotheses and discussion results.

### *3.1 Descriptive Analysis of Respondents*

The data from the respondents were collected from January 7 to February 10, 2023. The total respondents who provided feedback for the survey were 312 people. 303 of them used e-commerce applications while 9 others did not use it, so the number of respondents who met the statistical threshold was 303 people, which is more than 100 people from the minimum number of respondents needed for this study.

This section includes information regarding gender, age, duration of e-commerce usage, transaction volume, and e-commerce applications used by respondents. An overview of the details of the majority of respondents can be seen in Table 1.

Table 1. Results of Descriptive Analysis of Respondents

| Respondents (N = 303) | | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 137 | 55% |
| | Female | 166 | 45% |
| **Age** | < 20 | 152 | 50% |
| | 20 - 30 | 147 | 49% |
| | 30 - 40 | 3 | 1% |
| | > 40 | 1 | 0% |
| **Type of *E-commerce*** | Shopee | 186 | 61% |
| | Tokopedia | 57 | 19% |
| | Lazada | 46 | 15% |
| | Others | 14 | 5% |
| **Length of Use** | 1-6 Month | 67 | 22% |
| | 7-12 Month | 26 | 9% |
| | 1-2 Year | 66 | 2% |
| | > 2 Year | 144 | 47% |
| **Transaction Volume** | < Rp. 100.000 | 47 | 16% |
| | Rp. 100.000 - Rp. 500.000 | 131 | 43% |
| | Rp.500.000-Rp. 1.000.000 | 43 | 14% |
| | > Rp 1.000.000 | 81 | 27% |

Based on Table 1. The results of data collection show that there are 166 people (55%) who fall into the female category, while 137 people (45%) are respondents who fall into the male category. respondents are classified based on the length of use of e-commerce applications, 1 to 6 months with a total of 67 people (22%), 26 people (9%) in 7 to 12 months, 66 people (22%) in 1 to 2 years, and 144 people (47%) more than 2 years. Age category respondents produce the following classification of e-commerce application user respondents: 152 people (50%) aged less than 20 years, 147 people (49%) aged 20 to 30 years, 3 people (1%) aged 31 to 40 years, and 1 person (0%) aged more than 40 years. The respondent data identified four categories: transactions below Rp 100,000 were made by 47 people (16%), transactions between Rp 100,000 to 500,000 were made by 131 respondents (43%), transactions between Rp 500,000 to Rp 1,000,000 were made by 43 respondents (14%), and transactions above Rp 1,000,000 were made by 81 respondents (27%). The research shows that only four e-commerce platforms are used by respondents, with Shopee having the largest user base at 186 (61%) followed by Tokopedia with 57 (15%), Lazada with 46 (15%), and the rest less than 14 (5%).

### *3.2 Descriptive Analysis of Variables*

To find out the percentage of e-commerce application activities by students in Yogyakarta, it is necessary to analyze the descriptive variables to determine the distribution of answers to the questions asked in the questionnaire. A scale from 1 (strongly disagree) to 5 (strongly agree) was in reference to the Likert scale. The variables in the analysis were determined by looking at the average number and giving the corresponding artifacts by making criteria based on the average interval of the class numbers [25]. The use of class intervals is based on the formula:

$$\text{Interval}=\frac{Highest\ Score-Lowest\ Score}{Class\ size}$$

And the results obtained are:

$$Interval = \frac{5-1}{5} = 0.8$$

The receiver frequency categories and class intervals for each scale used in this study were created based on the findings of the aforementioned analysis, as shown in Table 2.

Table 2. Acceptance Level Criteria

| Class Interval | Criteria |
|---|---|
| 1.00 – 1.80 | Very Bad |
| 2.81 – 2.61 | Bad |
| 2.62 – 3.42 | Fair |
| 3.43 – 4.23 | Good |
| 4.24 – 5.00 | Very Good |

Descriptive analysis of the variables in the modified UTAUT 2 model in determining the quality of acceptance of e-commerce applications in D.I. Yogyakarta students. The processed data results can be seen in Table 3.

Table 3. Variable Descriptive Analysis Results

| Code | Frequency | | | | | N | Score | Average |
|---|---|---|---|---|---|---|---|---|
| | STS | TS | N | S | SS | | | |
| | 1 | 2 | 3 | 4 | 5 | | | |
| PE01 | 3 | 13 | 47 | 114 | 126 | 303 | 1256 | 4.15 |
| PE02 | 7 | 22 | 88 | 126 | 60 | 303 | 1119 | 3.69 |
| PE03 | 7 | 11 | 48 | 110 | 127 | 303 | 1248 | 4.12 |
| PE04 | 3 | 17 | 73 | 128 | 82 | 303 | 1178 | 3.89 |
| EX01 | 5 | 13 | 47 | 108 | 130 | 303 | 1254 | 4.14 |
| EX02 | 8 | 14 | 66 | 131 | 84 | 303 | 1178 | 3.89 |
| EX03 | 5 | 13 | 81 | 113 | 91 | 303 | 1181 | 3.90 |
| EX04 | 8 | 16 | 48 | 124 | 107 | 303 | 1215 | 4.01 |
| SI01 | 8 | 38 | 90 | 101 | 66 | 303 | 1088 | 3.59 |
| SI02 | 13 | 37 | 90 | 85 | 78 | 303 | 1087 | 3.59 |
| SI03 | 17 | 22 | 82 | 107 | 75 | 303 | 1110 | 3.66 |
| FC01 | 12 | 22 | 59 | 126 | 84 | 303 | 1157 | 3.82 |
| FC02 | 10 | 13 | 70 | 137 | 73 | 303 | 1159 | 3.83 |
| FC03 | 3 | 14 | 76 | 128 | 82 | 303 | 1181 | 3.90 |
| FC04 | 11 | 18 | 77 | 124 | 73 | 303 | 1139 | 3.76 |
| HM01 | 8 | 11 | 74 | 106 | 104 | 303 | 1196 | 3.95 |
| HM02 | 7 | 17 | 93 | 101 | 85 | 303 | 1149 | 3.79 |
| HM03 | 6 | 17 | 88 | 116 | 76 | 303 | 1148 | 3.79 |
| PV01 | 11 | 24 | 119 | 86 | 63 | 303 | 1075 | 3.55 |
| PV02 | 1 | 14 | 63 | 123 | 102 | 303 | 1220 | 4.03 |
| PV03 | 9 | 24 | 71 | 116 | 83 | 303 | 1149 | 3.79 |
| HB01 | 7 | 45 | 95 | 90 | 66 | 303 | 1072 | 3.54 |
| HB02 | 15 | 40 | 104 | 82 | 62 | 303 | 1045 | 3.45 |
| HB03 | 48 | 61 | 90 | 60 | 44 | 303 | 900 | 2.97 |
| HB04 | 18 | 44 | 90 | 101 | 50 | 303 | 1030 | 3.40 |
| TR01 | 5 | 22 | 93 | 122 | 61 | 303 | 1121 | 3.70 |
| TR02 | 3 | 19 | 107 | 111 | 63 | 303 | 1121 | 3.70 |
| TR03 | 4 | 21 | 105 | 111 | 62 | 303 | 1115 | 3.68 |
| TR04 | 3 | 17 | 97 | 133 | 53 | 303 | 1125 | 3.71 |
| PR01 | 17 | 63 | 116 | 70 | 37 | 303 | 956 | 3.16 |
| PR02 | 26 | 47 | 119 | 69 | 42 | 303 | 963 | 3.18 |
| PR03 | 38 | 66 | 109 | 48 | 42 | 303 | 899 | 2.97 |
| PS01 | 10 | 27 | 132 | 86 | 48 | 303 | 1044 | 3.45 |
| PS02 | 3 | 21 | 109 | 119 | 51 | 303 | 1103 | 3.64 |
| PS03 | 4 | 15 | 102 | 126 | 56 | 303 | 1124 | 3.71 |
| BI01 | 6 | 17 | 86 | 119 | 75 | 303 | 1149 | 3.79 |
| BI02 | 28 | 62 | 111 | 63 | 39 | 303 | 932 | 3.08 |
| BI03 | 20 | 40 | 113 | 84 | 46 | 303 | 1005 | 3.32 |
| TOTAL | | | | | | | | 3.66 |

In accordance with Table 3 the average value of the modified variable UTAUT 2 model for the quality of acceptance of e-commerce applications that can be used simultaneously has a total average value of 3.65. The average value above is based on the interval 3.43 x 4.23 and indicates that the quality of acceptance of e-commerce applications for students in Yogyakarta is in the "Good" category.

### *3.3 Validity Test*

The validity test using the Pearson correlation test value with a significance level of 5% was used in this study. If the findings of R count> R table is with a significance level of 5%, it can be declared valid. [22]. Table 4 displays the validity test's findings.

Table 4. Validity Test Results

| Variables | Item | Pearson Correlation ($r_{hitung}$) | Sig. (2-tailed) | Description |
|---|---|---|---|---|
| *Performance Expectancy* | PE01 | .591** | 0.000 | Valid |
| | PE02 | .653** | 0.000 | Valid |
| | PE03 | .589** | 0.000 | Valid |
| | PE04 | .640** | 0.000 | Valid |
| *Effort Expectancy* | EE01 | .610** | 0.000 | Valid |
| | EE02 | .647** | 0.000 | Valid |
| | EE03 | .689** | 0.000 | Valid |
| | EE04 | .664** | 0.000 | Valid |
| *Social Influence* | SI01 | .669** | 0.000 | Valid |
| | SI02 | .626** | 0.000 | Valid |
| | SI03 | .562** | 0.000 | Valid |
| *Facilitating Conditions* | FC01 | .572** | 0.000 | Valid |
| | FC02 | .652** | 0.000 | Valid |
| | FC03 | .657** | 0.000 | Valid |
| | FC04 | .606** | 0.000 | Valid |
| *Hedonic Motivation* | HM01 | .730** | 0.000 | Valid |
| | HM02 | .716** | 0.000 | Valid |
| | HM03 | .744** | 0.000 | Valid |
| *Price Value* | PV01 | .675** | 0.000 | Valid |
| | PV02 | .650** | 0.000 | Valid |
| | PV03 | .615** | 0.000 | Valid |
| *Habit* | HT01 | .718** | 0.000 | Valid |
| | HT02 | .675** | 0.000 | Valid |
| | HT03 | .615** | 0.000 | Valid |
| | HT04 | .701** | 0.000 | Valid |
| *Trust* | TR01 | .737** | 0.000 | Valid |
| | TR02 | .685** | 0.000 | Valid |
| | TR03 | .699** | 0.000 | Valid |
| | TR04 | .728** | 0.000 | Valid |
| *Perceived Risk* | PR01 | .417** | 0.000 | Valid |
| | PR02 | .440** | 0.000 | Valid |
| | PR03 | .433** | 0.000 | Valid |
| *Perceived Security* | PS01 | .607** | 0.000 | Valid |
| | PS02 | .556** | 0.000 | Valid |
| | PS03 | .608** | 0.000 | Valid |
| *Behaviour Intention* | BI01 | .737** | 0.000 | Valid |
| | BI02 | .612** | 0.000 | Valid |
| | BI03 | .610** | 0.000 | Valid |

In accordance with Table 4. it can be concluded that each comment item or statement from each variable is valid because each research instrument shows a Pearson correlation coefficient that is higher than the R table value of 0.113.

### *3.4 Reliability Test*

Measuring instruments are related to dependability and can be trusted if used stably. To do this, the researcher used the SPSS 25 program, which is designed to be reliable if the alpha value is more than 0.60 [22]. The outcomes are displayed in Table 5.

Table 5. Reliability Test Results

| Variables | Item | *Cronbach's Alpha* | Description |
|---|---|---|---|
| *Performance Expectancy* | PE01 | 0.958 | Reliable |
| | PE02 | 0.958 | Reliable |
| | PE03 | 0.958 | Reliable |
| | PE04 | 0.958 | Reliable |
| *Effort Expectancy* | EE01 | 0.958 | Reliable |
| | EE02 | 0.958 | Reliable |
| | EE03 | 0.957 | Reliable |
| | EE04 | 0.957 | Reliable |
| *Social Influence* | SI01 | 0.957 | Reliable |
| | SI02 | 0.958 | Reliable |
| | SI03 | 0.958 | Reliable |
| *Facilitating Conditions* | FC01 | 0.958 | Reliable |
| | FC02 | 0.958 | Reliable |
| | FC03 | 0.958 | Reliable |
| | FC04 | 0.958 | Reliable |
| *Hedonic Motivation* | HM01 | 0.957 | Reliable |
| | HM02 | 0.957 | Reliable |
| | HM03 | 0.957 | Reliable |
| *Price Value* | PV01 | 0.957 | Reliable |
| | PV02 | 0.958 | Reliable |
| | PV03 | 0.958 | Reliable |
| *Habit* | HT01 | 0.957 | Reliable |
| | HT02 | 0.957 | Reliable |
| | HT03 | 0.958 | Reliable |
| | HT04 | 0.957 | Reliable |
| *Trust* | TR01 | 0.957 | Reliable |
| | TR02 | 0.957 | Reliable |
| | TR03 | 0.957 | Reliable |
| | TR04 | 0.957 | Reliable |
| *Perceived Risk* | PR01 | 0.959 | Reliable |
| | PR02 | 0.959 | Reliable |
| | PR03 | 0.959 | Reliable |
| *Perceived Security* | PS01 | 0.958 | Reliable |
| | PS02 | 0.958 | Reliable |
| | PS03 | 0.958 | Reliable |

| | | | |
|---|---|---|---|
| *Behaviour Intention* | BI01 | 0.957 | Reliable |
| | BI02 | 0.958 | Reliable |
| | BI03 | 0.958 | Reliable |

In accordance with Table 5, it can be concluded that each variable in the study has a Cronbach's Alpha level of more than or equal to 0.6. Therefore, it can be said that every variable in the study's questionnaire is trustworthy and can be utilized again for related studies.

### *3.5 Normality Test*

A normal distribution for the regression model is stated to exist if the significance level value is greater than 0.05. The data are not regularly distributed if the significance level value is 0.05 [22]. Table 6 displays the outcomes of the tests for data normalization.

Table 6. Normality Test Results

***One-Sample Kolmogorov-Smirnov Test***

| | | ***Unstandardized Residual*** |
|---|---|---|
| *N* | | 303 |
| *Normal Parameters* | *Mean* | 0.0000000 |
| | *Std. Deviation* | 0.53558411 |
| *Most Extreme Differences* | *Absolute* | 0.093 |
| | *Positive* | 0.061 |
| | *Negative* | -0.093 |
| *Test Statistic* | | 0.093 |
| *Asymp. Sig. (2-tailed)* | | .000[c] |

*a. Test distribution is Normal.*
*b. Calculated from data.*
*c. Lilliefors Significance Correction.*

The SPSS 25 output based on the test findings in Table 6 shows that the significant value of Aslymp.Sig (2- tailed) of 0.000 is less than 0.05. Therefore, it can be determined that the data are not normally distributed based on the criteria for the Kolmogorov-Smirnov normality test discussed above. The Central Limit Theorem assumption can be applied if the normality test indicates that the data used in this study were likely to be abnormal, meaning that if the amount of research data were large enough (n> 30), the normality assumption can be disregarded [26], since the normality test is primarily designed for data with a small sample size. It is regarded as usual for data with a large sample size [27].

### *3.6 Multicollinearity Test*

Multicollinearity occurs if the tolerance level is 0.10 or equal to VIF 10. If the VIF value is less than 10, it can be said that there is no multicollinearity (passes the multicollinearity test) [22]. The multicollinearity test results are shown in Table 7.

Table 7. Multicollinearity Test Results

| **No** | **Variable** | ***Collinearity Statistics*** | |
|---|---|---|---|
| | | ***Tolerance*** | ***VIF*** |
| 1 | *Performance Expectancy* | 0.437 | 2.289 |
| 2 | *Effort Expectancy* | 0.430 | 2.328 |
| 3 | *Social Influence* | 0.489 | 2.045 |
| 4 | *Facilitating Conditions* | 0.413 | 2.419 |
| 5 | *Hedonic Motivation* | 0.328 | 3.047 |
| 6 | *Habit* | 0.433 | 2.311 |
| 7 | *Price Value* | 0.433 | 2.312 |
| 8 | *Trust* | 0.329 | 3.035 |
| 9 | *Perceived Risk* | 0.764 | 1.308 |
| 10 | *Perceived Security* | 0.544 | 1.838 |

In accordance with Table 7, each independent variable in the SPSS 25 output table has a variance inflation factor (VIF) with a value of less than 10, so it can be concluded that there is no multicollinearity. Conversely, all independent variables used in this study had a tolerance level of at least 0.10. Therefore, it can be concluded that the linear regression model formed is a regression model that is robust to multicollinearity between the dependent and independent variables.

### *3.7 Heteroscedasticity Test*

If the significance (sig) between the independent variable and the absolute residual is more than 0.05 (5%) then there is no heteroscedasticity issue, according to the Glejser test [22]. Table 8 displays the test results.

Table 8. Heteroscedasticity Test Results

| No | **Variables** | ***Unstandardized Residual Sig. (2-tailed)*** |
|---|---|---|
| 1 | *Performance Expectancy* | 0.365 |
| 2 | *Effort Expectancy* | 0.497 |
| 3 | *Social Influence* | 0.318 |
| 4 | *Facilitating Conditions* | 0.594 |
| 5 | *Hedonic Motivation* | 0.291 |
| 6 | *Price Value* | 0.843 |
| 7 | *Habit* | 0.225 |
| 8 | *Trust* | 0.745 |
| 9 | *Perceived Risk* | 0.69 |
| 10 | *Perceived Security* | 0.706 |

In accordance with Table 8, the results of the Glejser method test in the SPSS 25 output coefficient table for each independent variable have residuals with a value greater than or equal to 0.05. It indicates that there is no heteroscedasticity or what is also called homoscedasticity in the regression model.

### *3.8 Test F*

If the sig value. 0.05 or if F count> F table, it can be said that the model in question can be used for analysis [22]. The F test results can be seen in Table 9.

Table 9. F Test Results

| Model | *Sum Of Squares* | Df | *Mean Square* | F | *Sig.* |
|---|---|---|---|---|---|
| *Regression* | 149.11 | 10 | 14.911 | 50.261 | .000[b] |
| *Residual* | 86.629 | 292 | 0.297 | | |
| Total | 235.739 | 302 | | | |

Based on the results of Table 9, it can be concluded that the model can be used to describe the relationship between variables such as performance expectations, effort expectations, social influence, supporting conditions, hedonic motivation, habits, price value, trust, risk perception, and perceived security with variables on behavioral intention variables in using e-commerce with a significant value of less than 0.05 and F count 50.216 > F table 2.555.

### *3.9 Determination Test*

The R-Square model's quality is assessed using the coefficient of determination, which takes into account the fact that some large-scale variables (X) have an impact on the readily available random regression variables (Y) [22]. Table 10 displays the R2 test results.

Table 10. Determination Test Results

| Variables | *R Square* | *Adjusted R Square* |
|---|---|---|
| *Behavior Intention* | 0.633 | 0.620 |

In accordance with the results of Table 10, the R-Square value of the Behavior Intention (BI) variable is 0. 633 which means that the performance expectancy (PE) variable or performance expectations, effort expectancy (EE) or effort expectations, social influence (SI) or social influence, facilitating conditions (FC) or supporting conditions, hedonic motivation (HM) or hedonic motivation, habit (HB) or habit, price value (PV) or price value, trust (TR) or trust, perceived risk (PR) or perceived risk and perceived security (PC) or perceived security influence the Behavior Intention (BI) variable by 63.3%, with other factors influencing the remaining 36.7%.

### *3.10 Test T*

The partial T test describes the relationship and influence of each variable on the behavior intention variable [22]. Table 11 displays the results of the T test.

Table 11. T Test Results

| Hypothesis | Variables | *Standardized* | $T_{hitung}$ | Sig(α) |
|---|---|---|---|---|
| H01 | *Performance Expectancy* (X01) | 0.473 | 9.315 | 0.000 |
| H02 | *Effort Expectancy* (X02) | 0.457 | 8.905 | 0.000 |
| H03 | *Social Influence* (X03) | 0.511 | 10.324 | 0.000 |
| H04 | *Facilitating Conditions* (X04) | 0.488 | 9.696 | 0.000 |
| H05 | *Hedonic Motivation* (X05) | 0.600 | 13.001 | 0.000 |
| H06 | *Price Value* (X06) | 0.509 | 10.263 | 0.000 |
| H07 | *Habit* (X07) | 0.729 | 18.462 | 0.000 |
| H08 | *Trust* (X08) | 0.642 | 14.510 | 0.000 |
| H09 | *Perceived Risk* (X09) | 0.368 | 6.872 | 0.000 |
| H10 | *Perceived Security* (X10) | 0.597 | 12.905 | 0.000 |

Based on Table 11 which displays the "Coefficients" output from SPSS version 25 above, the significant value of these variables is 0.000, which is less than 0.05. This shows that each variable has an influence on the behavioral intention variable in using e-commerce applications.

### *3.11 Hypothesis Results*

*3.11.1 Influence between Performance Expectation and Behavioral Intention:* The results of the linear regression analysis conducted with SPSS statistical software version 25, concluded that the significance level for the relationship between X01 and Y is 0.000 so (0.000 < 0.05) and the value of Thitung 9.315 > Ttabel 1.968. From the results of this experiment, hypothesis 01 (H01) is confirmed or accepted, so it can be concluded that there is a positive correlation between the performance expectation variable (X01) and the behavioral intention variable (Y). In other words, when the use of e-commerce applications as an alternative online transaction and payment method increases favorably, so will the level of application use increase and encourage to conduct online transactions. Based on the results of this experiment, it is also the same as that applied by Ivanova [28] that performance expectations affect behavioral intentions in using applications, because the better the services provided by application providers, the intention to use will increase, by providing many conveniences that are so effective and efficient in digital services [28].

*3.11.2 Influence between Effort Expectancy and Behavioral Intention:* The results of the linear regression analysis conducted with SPSS statistical software version 25, concluded that the significance level for the relationship between X02 and Y is 0.000 so (0.000 < 0.05) and the value of Thitung 8.905 > Ttabel 1.968. From these experimental results, hypothesis 02 (H02) is accepted or confirmed, so we can conclude that there is a positive correlation between the factor (X02) and the behavioral intention factor (Y). As a result, people can use e-commerce applications with more ease, and it thus helps encourage people to utilize e-commerce application services more. The result of this experiment supports the findings by Widanengsih [8] explaining that the effort expectation factor has a significant effect on the behavioral intention variable, which means that the more convenient the system is, the better the application the users will use [8].

*3.11.3 Influence between Social Influence and Behavioral Intention:* Based on the results of linear regression analysis The results of linear regression analysis conducted with SPSS statistical software version 25, it can be concluded that the significance level for the relationship between X03 and Y is 0.000 so (0.000 < 0.05) and Thitung 10.324 > Ttabel 1.968. from this test, hypothesis 03 (H03) is accepted or confirmed. Concluding that there is a positive correlation between the social influence variable (X03) and the behavioral intention factor (Y). As a result, the increasing influence of social relationships such as family relationships, community relationships and friendship relationships that motivate a person to use an e-commerce application is growing. then, it will increasingly encourage someone to use e-commerce applications. The results of this study are also in line with those conducted by Akinnuwesi, in his research social influence also has a significant influence on behavioral intentions, because digital services will have a good social impact when the service provides convenience and speed in providing information [29].

*3.11.4 Influence between Facility Condition and Behavioral Intention:* The results of the linear regression analysis conducted with SPSS statistical software version 25, it can be concluded that the significance level for the relationship between X4 and Y is 0.000 (0.000 < 0.05) and T count 9.696 > T table 1.968. The results of this experiment, hypothesis 04 (H04) is accepted or confirmed, concluding that there is a positive correlation between the facilitating conditions variable (X04) and the behavioral intention variable (Y). Thus, the more e-commerce application users feel the convenience and benefits of the facilities provided in their daily lives, thus, it becomes more likely for users to continue using e-commerce applications. The findings of this research also supports one conducted by Faida [30] showing that the facility condition greatly influences user behavior, because services with various benefits tend to make the users use the services more [30].

*3.11.5 Influence between Hedonic Motivation and Behavioral Intention:* Based on the results of the linear regression test conducted with SPSS version 25, it can be concluded that the significance level for the relationship between X05 and Y is 0.000 (0.000 < 0.05) and the significance level for Thitung 13.001 > Ttabel 1.968. The results of this test, hypothesis 05 (H05) is accepted or confirmed, concluding that there is a positive correlation between the hedonic motivation variable (X05) and the behavior intention variable (Y). Thus, when more and more available e-commerce applications provide pleasure and convenience, the user base will grow and the desire to continue using these applications also grows. The results of this research also supports the findings by Maulana and Cahyadi [31] in which there is a significant impact between hedonic motivation and behavioral intentions, because the better the application, which is built in accordance with the needs of the community, the more motivated users will use it in everyday life [31].

*3.11.6 Influence between Price Value and Behavioral Intention:* Based on the results of the linear regression analysis conducted with SPSS statistical software version 25, it can be concluded that the significance level for the relationship between X06 and Y is 0.000 (0.000 < 0.05) and Thitung 10.263 > Ttabel 1.968. As a result of this experiment, hypothesis 06 (H06) is accepted or confirmed, concluding that there is a positive correlation between the price value variable (X6) and the behavioral intention variable (Y). Thus, as e-commerce applications get better, they offer benefits and advantages that are greater than the costs associated with their use, thus increasing the interest for people to continue using these applications. Based on the test results from this study, it is also the same as that applied by Melinda [32], it is stated that price value plays a role in influencing behavioral intentions in using application services because the better the price offered will be an attraction in using the application [32].

*3.11.7 Influence between Habit and Behavioral Intention:* Based on the results of linear regression analysis conducted with SPSS statistical software version 25, it can be concluded that the significance level of the relationship between X7 and Y is 0.000 (0.000 < 0.05) and Thitung 18.462 > Ttabel 1.968. The test results obtained, hypothesis H06 (H06) is accepted or confirmed, concluding that there is a positive correlation between the habit variable (X7) and the behavioral intention variable (Y). Consequently, if the service provider provides a good level of experience and service to e-commerce application users, it causes users to continue using the application. The findings of this research supports one by Malanga [33] that found that habits in using the system have an influence on behavioral intentions in using the application, because the more convenient the system is, the more attractive it will be [33].

*3.11.8 Influence between Trust and Behavioral Intention:* Based on the results of the linear regression test conducted with SPSS version 25, it can be concluded that the significance level for the relationship between X08 and Y is 0.000 so (0.000 < 0.05) and Thitung 14.510 > Ttabel 1.968. The hypothesis 08 (H08) is accepted or confirmed, concluding that there is a positive correlation between the trust variable (X08) and the behavioral intention variable (Y). As a result, the likelihood of users to continue using an e-commerce application will increase as the user's trust in the application increases. The results of this experiment is in line with what was done by Ivanova [28], explaining that the trust factor has a positive impact on behavioral intentions, because the safer the technology, the more users will use it with confidence [28].

*3.11.9 The influence between perceived risk and behavioral intention:* Based on the results of the linear regression analysis test implemented with SPSS statistical software version 25, the significance level

of the relationship between X09 and Y is 0.000 (0.00 < 0.05), and Thitung 6.872 > Ttabel is 1.968. Based on the results obtained, hypothesis 10 (H10) is confirmed or accepted, concluding that there is a positive correlation between the risk perception variable (X09) and the behavioral intention variable (Y). According to this, if the risk associated with using e-commerce applications decreases, then people are likely to continue using them. The results from this study supports what Hidayat [34] found, that is, the risk perception factor has a positive effect on the intention to use the application because the smaller the risk, the more comfortable the users will be when using it, which means that the provider must make system improvements so that there is less risk posed [34].

*3.11.10 The influence between perceived security and behavioral intention:* Based on the results of the linear regression analysis test implemented using SPSS statistical software version 25, the significance level for the relationship between X10 and Y is 0.000 so (0.000 < 0.05), and the significance level for T count is 12.905 (12.905 < 1.968). Based on the results obtained, hypothesis 10 (H10) is accepted or confirmed, concluding that there is a positive correlation between the perceived security variable (X10) and the behavioral intention variable (Y). As a result, the likelihood that users will use e-commerce applications to complete transactions will increase as the level of security perceived by users increases. The results of this research support the findings by Evan, explaining that the perceived security factor has a significantly good impact on behavioral intentions, which means that the more enhanced the security provided, the more confident the people when using the service. It is very important to keep the data secured, so no data theft would occur [11].

## 4 CONCLUSION

The purpose of this study is to identify the factors that might influence the students' level of acceptance in using e-commerce applications in Yogyakarta using the modified UTAUT 2 Model. The results of descriptive analysis of 303 respondents show that the dominant users of e-commerce application were women with a total of 166 people, the majority of e-commerce applications used were Shopee with a total of 186 users, the average time span in using the e-commerce applications is >2 years with a total of 144 people and the majority of transaction volumes made by users were in the range of Rp. 100,000 - Rp. 500,000 with a total of 131 people. Based on the analysis, it is found that the students' level of acceptance of e-commerce applications in Yogyakarta Special Region was in the "Good" category.

The results showed that the elements that have a conclusive or positive effect on the behavior intention variable are significant according to the standardized coefficients. It can be seen that the test results of the path coefficients are: performance expectancy (PE) or performance expectations, effort expectancy (EE) or effort expectations, social influence (SI) or social influence, facilitating conditions (FC) or supporting conditions, hedonic motivation (HM) or hedonic motivation, habit (HB) or habit, price value (PV) or price value, trust (TR) or trust, perceived risk (PR) or perceived risk and perceived security (PC) or perceived security. Perceived risk is a factor that has a negative impact on behavior intention. The independent variable influences the dependent variable by 63.3% and the remaining 36.7% is influenced by other variables.

This research indicates a positive influence, and thus this model can be recommended for e-commerce companies and government to evaluate and adopt new technology in the future, as a guideline to make innovations and policies related to economic and digital progress, by considering the variables in this study.

## AUTHOR'S CONTRIBUTION

Dori Gusti Alex Candra is the first author who digs up information, conducts literature studies, collects data, designs evaluation models, analyzes data, compiles discussion results and provides conclusions. Muhammad Taufiq Nuruzzaman is the second author who provided guidance, advice and input on the concept and focus of the research. Shofwatul 'Uyun, Bambang Sugiantoro, and Millati Pratiwi helped review and improve the quality of the research.

## COMPETING INTERESTS

In accordance with the publication ethics of this journal, Dori Gusti Alex Candra and Muhammad Taufiq Nuruzzaman as the authors of this article declare that this article is free from conflict of interest (COI) and competing interest (CI).

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