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Interest analysis of computer engineering students of universitas Wiralodra in the use of electronic wallets

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ABSTRACT
Now technology is developing very rapidly. One of the fields that follow technological developments is in the financial sector. Financial technology (fintech) is an update in the financial sector that is centered on today's technology. One of the fintechs currently in development is a digital wallet (e-wallet). E-wallet is an application that stores nominal e-money and transactions can be carried out via mobile media by connecting the network to the internet. E-money is an electronic payment medium by first handing over a certain amount of money to the publisher, either directly or through the publisher's agents. For payment transactions by reducing the value of money on the e-money media. The study was conducted to analyze the interest of Computer Engineering students at Wiralodra University in using digital wallets as a modern technology. By distributing questionnaires to Computer Engineering students at Wiralodra University. The results of the media questionnaire were processed using multiple linear regression calculations. The results obtained from this study are students' interest in e-wallet with perceptions of convenience, efficiency and security.

KEYWORDS e-wallet; fintech; e-money; computer; technology

1. INTRODUCTION

Today's technology is developing very rapidly. Various fields also adapt their development to today's technology. One of the fields that follow technological developments is in the financial sector. Technology in finance or financial technology (fintech) is an update in the financial sector that is centered on today's technology [1]. One of the fintech currently in development is an electronic wallet (e-wallet) [2].

According to Bank Indonesia, fintech is the result of a combination of the financial sector with technology which changes the business model from conventional to digital, which was originally a face-to-face payment while carrying some cash, now being able to make payments with remote transactions that can be carried out in the blink of an eye. In essence, fintech is the use of technology in the financial sector in providing services in payments (Risya and Estro; 2019, 2). Almost the entire community is greatly helped by the existence of fintech.

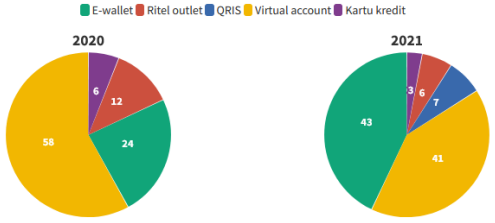


Figure 1. Trends in the Use of Digital Payment Instruments 2020-2021

From the diagram above, it can be seen that e-wallet will become a popular digital payment tool in 2021. Based on data from the financial technology company (fintech) Xendit, there are more than 150 million digital money transactions processed by Xendit, around 43% of financial transactions using e-commerce. -wallet. That number jumped up from 24% in 2020. [3]

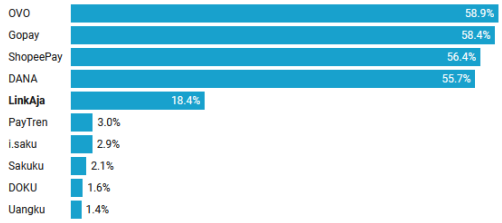


Figure 2. Ever used e-wallet platform [4]

Based on figure 2, according to CNBC Indonesia, 58.9% OVO will be the e-wallet platform with the most usage in 2022. Followed by Gopay with a percentage of 58.4% and ShopeePay with 56.4%, to Uangku as much as 1.4%.

In addition to the popularity of e-wallet in Indonesia, students are one of the e-wallet users of the technology offered [5]. The very busy situation makes students interested in the use offered by e-wallet [6] (Irna and Intan; 2020, 6). Therefore, researchers are interested in analyzing the interest of Computer Engineering students at Wiralodra University in the use of digital wallets as today's technology.

2. LITERATURE REVIEW

Financial Technology (fintech)

According to The National Digital Research Center (NDRC), in Dublin, Ireland, fintech is defined as "innovation financial services" or "innovation in financial technology financial services" which means innovation in the financial sector that has a touch of modern technology. The financial business through this fintech includes transactions, transfers, lending money, investments, payments, financial plans and financial product comparisons. [7]

The financial technology industry (fintech) is one of the methods of financial services that is starting to bloom in the current digital era. Digital payments are one of the fastest growing sectors in the fintech industry in Indonesia. This field is what the government and the community really hope for in the future to advance the increase in the quantity of people who have access to financial services. [8] [9]

E-Money

Electronic money (e-money) is an electronic payment medium that is obtained by first handing over a certain amount of money to the issuer, either directly or through issuing agents or by debiting an account at a bank and the value of the money becomes the value of money in the e-money media carried out. for payment transactions by reducing the value of money in the e-money media. [10]

Meanwhile, according to Septiano Pratama on the bank-indo.com website, he revealed that e-money is money packaged using an RFID (Radio Frequency Identification) chip and connected to computer networks and the internet. The way to make transactions with e-money is to expose the e-money card to the EDC (Electronic Data Capture) device. Cards that are useful as an alternative to money already contain an RFID chip that is connected to a computer network and the internet, as a digital storage medium using EFT (Electronic Funds Transfer). [11] [12]

E-Wallet

An electronic wallet (e-wallet) is an electronic service for storing payment data such as debit cards, credit cards and e-money for making payments. E-wallet is not defined as a non-cash payment instrument.

E-wallet is an application that stores nominal e-money and transactions can be carried out via mobile media by connecting the network to the internet. [13] [14]

3. RESEARCH METHODS

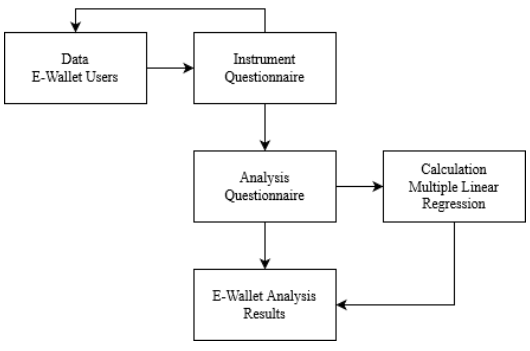


Figure 3. Stages of E-Wallet User Analysis

Figure 3 is the stage of analyzing interest in using e-wallet using the questionnaire method, which starts from collecting user data and is displayed as a questionnaire instrument.

Data Collection

Data collection was carried out using the questionnaire method, carried out by submitting several questions or written statements to respondents to be answered, both online and offline. An efficient questionnaire is carried out if the researcher knows what variables to measure and what can be expected from the respondent. In addition, the questionnaire is also suitable if the total number of respondents is large enough and spread over a wide area.

Multiple Linear Regression Analysis

The analysis in this study was carried out using the multiple linear regression method, which is a statistical technique that uses several explanatory variables to predict the results of the response variables. The purpose of this multiple linear regression is to form a linear relationship between the independent variable (free) and the dependent variable (bound). [15]

Formula :

$$Y = a + b_1X_1 + b_2X_2 + \ldots + b_nX_n$$

Information :

Y : Dependent Variable
a : Constant
b : Regression Coefficient
X : Independent Variable

4. RESULTS AND DISCUSSIONS

This study uses three independent variables and one dependent variable with the following regression equation:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

Information :

Y : User Interest
a : Constant
$b_{1,2,3}$: Regression Coefficient
X_1 : Perception of Ease
X_2 : Efficiency Perception
X_3 : Security Perception

N	User Interest	Perception of Ease	Efficiency Perception	Security Perception
1	5	5	5	5
2	5	4	4	4
3	4	3	4	5
4	5	4	4	4
5	4	3	4	4
6	4	3	3	4
7	3	3	3	2
8	4	5	5	3
9	4	4	4	5
10	2	2	2	2
11	3	4	3	3
12	5	4	4	3
13	4	3	4	2
14	5	5	5	5
15	3	3	3	2
16	5	4	4	4
17	4	4	4	3
18	5	5	4	4
19	3	4	3	4
20	5	5	5	3

21	3	3	3	3
22	2	2	2	2
23	2	2	2	2
24	3	4	3	4
25	3	4	3	3
26	3	4	3	4

The results of observations of 26 samples obtained data on e-wallet users of Computer Engineering students at Wiralodra University along with value statements.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

N	Y	X_1	X_2	X_3	Y^2	X_1^2	X_2^2	X_3^2
1	5	5	5	5	25	25	25	25
2	5	4	4	4	25	16	16	16
3	4	4	3	5	16	16	9	25
4	5	4	4	4	25	16	16	16
5	4	4	3	4	16	16	9	16
6	4	3	3	4	16	9	9	16
7	3	3	3	2	9	9	9	4
8	4	5	5	3	16	25	25	9
9	4	4	4	5	16	16	16	25
10	2	2	2	2	4	4	4	4
11	3	3	4	3	9	9	16	9
12	5	4	4	3	25	16	16	9
13	4	4	3	2	16	16	9	4
14	5	5	5	5	25	25	25	25
15	3	3	3	2	9	9	9	4
16	5	4	4	4	25	16	16	16
17	4	4	4	3	16	16	16	9
18	5	4	5	4	25	16	25	16
19	3	3	4	4	9	9	16	16
20	5	5	5	3	25	25	25	9
21	3	3	3	3	9	9	9	9
22	2	2	2	2	4	4	4	4
23	2	2	2	2	4	4	4	4
24	3	3	4	4	9	9	16	16
25	3	3	4	3	9	9	16	9
26	3	3	4	4	9	9	16	16
∑	98	93	96	89	396	353	376	331

N	$X_1 \times Y$	$X_2 \times Y$	$X_3 \times Y$	$X_1 \times X_2$	$X_1 \times X_3$	$X_2 \times X_3$
1	25	25	25	25	25	25
2	20	20	20	16	16	16
3	16	12	20	12	20	15
4	20	20	20	16	16	16
5	16	12	16	12	16	12
6	12	12	16	9	12	12
7	9	9	6	9	6	6
8	20	20	12	25	15	15
9	16	16	20	16	20	20
10	4	4	4	4	4	4
11	9	12	9	12	9	12
12	20	20	15	16	12	12
13	16	12	8	12	8	6
14	25	25	25	25	25	25
15	9	9	6	9	6	6
16	20	20	20	16	16	16
17	16	16	12	16	12	12
18	20	25	20	20	16	20
19	9	12	12	12	12	16
20	25	25	15	25	15	15
21	9	9	9	9	9	9
22	4	4	4	4	4	4
23	4	4	4	4	4	4
24	9	12	12	12	12	16
25	9	12	9	12	9	12
26	9	12	12	12	12	16
∑	371	379	351	360	331	342

The following table shows the calculated variable data according to the specified value. The data is translated into A matrix of order 4×4.

$$A = \begin{bmatrix} n & \sum X_1 & \sum X_2 & \sum X_3 \\ \sum X_1 & \sum {X_1}^2 & \sum X_1X_2 & \sum X_1X_3 \\ \sum X_2 & \sum X_1X_2 & \sum {X_2}^2 & \sum X_2X_3 \\ \sum X_3 & \sum X_1X_3 & \sum X_2X_3 & \sum {X_3}^2 \end{bmatrix}$$

$$A = \begin{bmatrix} 26 & 93 & 96 & 89 \\ 93 & 353 & 360 & 331 \\ 96 & 360 & 376 & 342 \\ 89 & 331 & 342 & 331 \end{bmatrix}$$

A shows the data on the perception of student interest in using e-wallet according to the questionnaire conducted. From this data, it can be processed into an analysis of the perception of student interest in e-wallet.

$$H = \begin{bmatrix} \sum Y \\ \sum X_1 Y \\ \sum X_2 Y \\ \sum X_3 Y \end{bmatrix} \qquad H = \begin{bmatrix} 98 \\ 371 \\ 379 \\ 351 \end{bmatrix}$$

H shows data on student interest in the use of e-wallet. The data in the H matrix is translated into the A matrix.

$$A1 = \begin{bmatrix} \mathbf{98} & 93 & 96 & 89 \\ \mathbf{371} & 353 & 360 & 331 \\ \mathbf{379} & 360 & 376 & 342 \\ \mathbf{351} & 331 & 342 & 331 \end{bmatrix}$$

$$A2 = \begin{bmatrix} 26 & \mathbf{98} & 96 & 89 \\ 93 & \mathbf{371} & 360 & 331 \\ 96 & \mathbf{379} & 376 & 342 \\ 89 & \mathbf{351} & 342 & 331 \end{bmatrix}$$

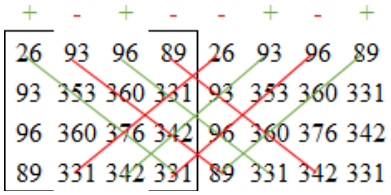
$$A3 = \begin{bmatrix} 26 & 93 & \mathbf{98} & 89 \\ 93 & 353 & \mathbf{371} & 331 \\ 96 & 360 & \mathbf{379} & 342 \\ 89 & 331 & \mathbf{351} & 331 \end{bmatrix}$$

$$A4 = \begin{bmatrix} 26 & 93 & 96 & \mathbf{98} \\ 93 & 353 & 360 & \mathbf{371} \\ 96 & 360 & 376 & \mathbf{379} \\ 89 & 331 & 342 & \mathbf{351} \end{bmatrix}$$

A1 to A4 are matrices resulting from the combination of matrix A and matrix H. Matrix A along with matrices A1 to A4 are solved by the determinant formula.

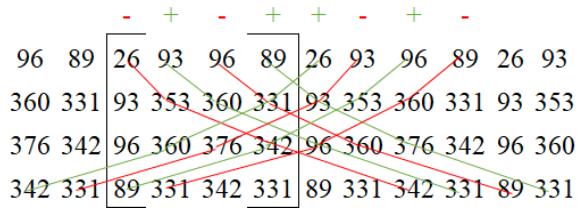
Matrix A

Step 1 :



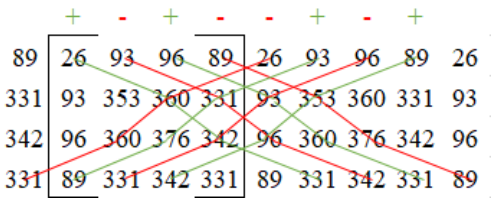
1142257168 – 1019064240 + 1009714176 – 1019064240 – 1071068336 + 1011621636 – 1076825088 + 1026561600 = 4132676

Step 2 :



-1073495592 + 1063860480 – 1018103040 + 1030122312 + 1059570720 – 1076419944 + 1031482944 – 1018103040 = -1085160

Step 3 :

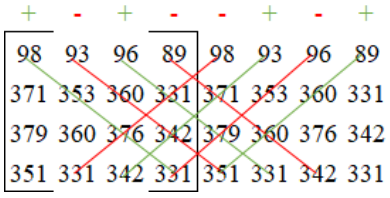


1059570720 – 1010667456 + 1063860480 – 1051338488 – 1115337600 + 1030122312 – 1010667456 + 1031482944 = -2974544

Determinant A :
4132676 – 1085160 – 2974544 = 72972

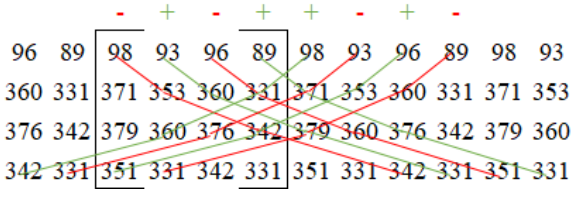
Matrix A1

Step 1 :



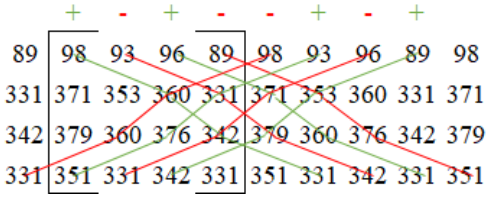
4305430864 – 4019006160 + 3986267424 – 4065299280 – 4037103728 + 4035608892 – 4251215712 + 4048574400 = 3256700

Step 2 :



-4046252616 + 4200032520 – 4015215360 + 4109412664 + 3993766560 – 4294105368 + 4067983296 – 4019385960 = -3764264

Step 3 :

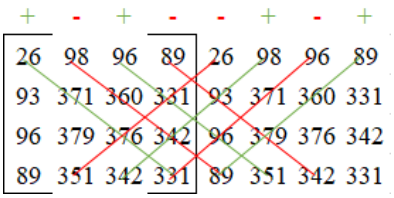


3993766560 – 3990030894 + 4244002560 – 4146289992 – 4203964800 + 4062617208 – 4031802432 + 4072208706 = 506916

Determinant A1 :
3256700 – 3764264 + 506916 = -648

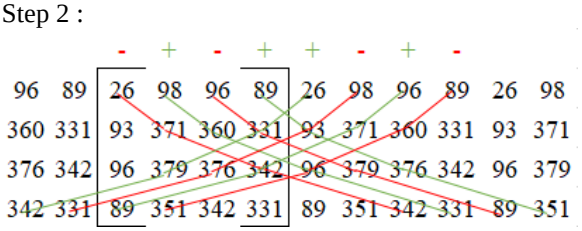
Matrix A2

Step 1 :



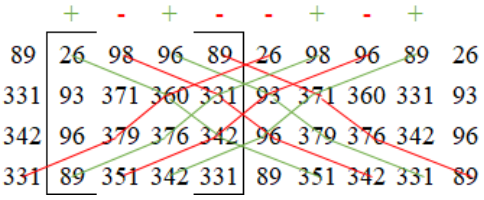
1200502576 – 1073852640 + 1070724096 – 1072848186 – 1135785456 + 1066009896 – 1131734016 + 1080741240 = 3757510

Step 2 :



-1128234744 + 1121057280 – 1071836256 + 1092365352 + 1115492508 – 1134291984 + 1084079808 – 1079619840 = -987876

Step 3 :

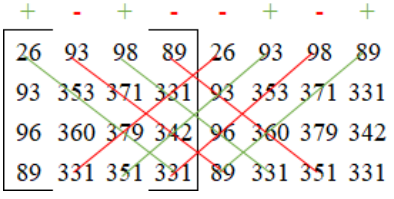


1123593120 – 1065004416 + 1120008672 – 1104947816 – 1174202640 + 1085505232 – 1071734976 + 1084079808 = -2703016

Determinant A2 :
3757510 – 987876 – 2703016 = 66618

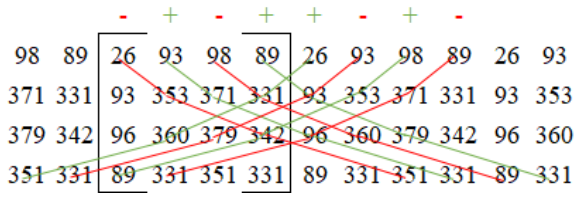
Matrix A3

Step 1 :



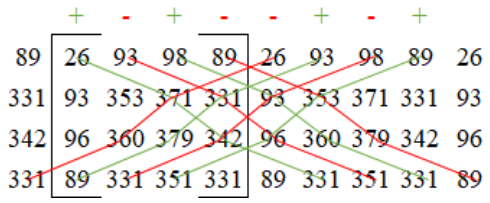
1151370922 – 1050202314 + 1030749888 – 1045881720 – 1079614094 + 1038243258 – 1099258944 + 1057928760 = 3335756

Step 2 :



-1101745476 + 1096367328 – 1039313520 + 1038341373 + 1087454160 – 1085008401 + 1052972172 – 1049211744 = -144108

Step 3 :

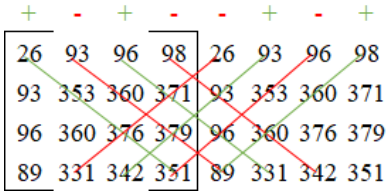


1091946492 – 1037263968 + 1086024240 – 1059726827 – 1149417360 + 1038341373 – 1031723028 + 1058627232 = -3191846

Determinant A3 :
3335756 – 144108 – 3191846 = -198

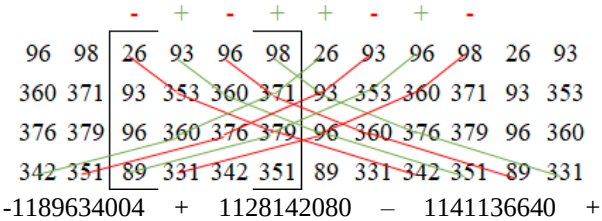
Matrix A4

Step 1 :



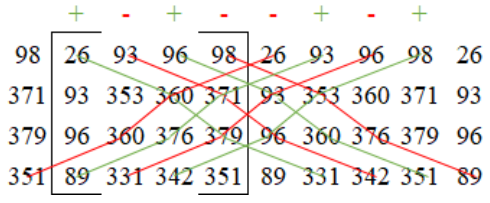
1211275728 – 1129313880 + 1131734016 – 1122115680 – 1200502576 + 1121066082 – 1141890048 + 1130371200 = 624842

Step 2 :



-1189634004 + 1128142080 – 1141136640 + 1134291984 + 1187615520 – 1141460424 + 1143076128 – 1121057280 = -162636

Step 3 :



1174202640 – 1132802496 + 1128142080 – 1157653616 – 1182729600 + 1154608392 – 1120008672 + 1135790208 = -451064

Determinant A4 :
624842 – 162636 – 451064 = 11142

The value of the regression coefficient (b) has not been obtained, the calculation is continued from the results of the determinant until the regression coefficient is found.

$$b0 = \frac{Det\ A1}{Det\ A}$$
$$b0 = \frac{-648}{72972} = -0{,}009$$
$$b1 = \frac{Det\ A2}{Det\ A}$$
$$b1 = \frac{66618}{72972} = 0{,}913$$
$$b2 = \frac{Det\ A3}{Det\ A}$$
$$b2 = \frac{-198}{72972} = -0{,}003$$
$$b3 = \frac{Det\ A4}{Det\ A}$$
$$b3 = \frac{11142}{72972} = 0{,}153$$

After calculating the regression coefficient and getting the results of the regression coefficient and other variables, then determine the value of the constant.

$$a = \frac{(\sum Y) - (b_1 \times \sum X_1) - (b_2 \times \sum X_2) - (b_3 \times \sum X_3)}{n}$$
$$a = \frac{(98) - (-0{,}913 \times 93) - (-0{,}003 \times 96) - (0{,}153 \times 89)}{26}$$
$$a = -0{,}008880118$$

Prediction of Student Interest

After doing various stages of calculations using multiple linear regression analysis. From the data matrix A, the determinants of the matrix are calculated to obtain the results of the determinants to determine the value of the regression coefficient.

$\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3$
$\hat{Y} = -0{,}009 - 0{,}0913X_1 - 0{,}003X_2 + 0{,}153X_3$

Y predicted calculation is used to predict the interest in using e-wallet among students. From the calculation of multiple linear regression obtained the results of the prediction data as follows :

$\hat{Y}$	$\hat{Y} - \bar{Y}$	$(\hat{Y} - \bar{Y})^2$	$Y_i - \hat{Y}$	$(Y_i - \hat{Y})^2$
5.306	1.536	2.361	-0.306	0.093
4.243	0.473	0.224	0.757	0.573
4.398	0.629	0.396	-0.398	0.159
4.243	0.473	0.224	0.757	0.573
4.245	0.476	0.227	-0.245	0.060
3.333	-0.437	0.191	0.667	0.446
3.027	-0.742	0.551	-0.027	0.001
5.000	1.231	1.515	-1.000	1.000
4.395	0.626	0.392	-0.395	0.156
2.117	-1.652	2.730	-0.117	0.014
3.177	-0.592	0.351	-0.177	0.031
4.090	0.321	0.103	0.910	0.828
3.940	0.171	0.029	0.060	0.004
5.306	1.536	2.361	-0.306	0.093
3.027	-0.742	0.551	-0.027	0.001

4.243	0.473	0.224	0.757	0.573
4.090	0.321	0.103	-0.090	0.008
4.240	0.471	0.222	0.760	0.578
3.330	-0.439	0.193	-0.330	0.109
5.000	1.231	1.515	0.000	0.000
3.180	-0.589	0.347	-0.180	0.032
2.117	-1.652	2.730	-0.117	0.014
2.117	-1.652	2.730	-0.117	0.014
3.330	-0.439	0.193	-0.330	0.109
3.177	-0.592	0.351	-0.177	0.031
3.330	-0.439	0.193	-0.330	0.109
98.000	8×10^{16}	21.006	-4×10^{16}	5.610

The table above shows the predictions of student interest in the use of e-wallet with various perceptions according to the questionnaire given. This prediction shows that there are many fans with various perceptions.

From these data, calculations were made using the Anova table to determine the Regression and Error Models that would occur.

Model	Sum of Square	df	Mean Square	F
Regression/ Model	$\Sigma(\hat{Y}-\bar{Y})^2$	K-1	$\frac{SSR}{df\,SSR}$	$\frac{MSR}{MSE}$
Residual/ Error	$\Sigma(Y_i-\hat{Y})^2$	$n-K$	$\frac{SSE}{df\,SSE}$	
Total	SSR + SSE			

Model	Sum of Square	df	Mean Square	F
Regression/ Model	8×10^{16}	3	2×10^{16}	1×10^{15}
Residual/ Error	5.610	22	0.255	
Total	5.610	25		

The table above shows the data from the regression model and the possible errors that occur.

5. CONCLUSION

From this research, it shows that there are many enthusiasts from among students in the use of e-wallet, both men and women. It states that e-wallet is well known and popular in Indonesia, one of which is among students, because e-wallet is a modern technology that can be used by anyone by considering the perception of convenience, perception of efficiency and perception of security, so that e-wallet can be trusted. by each user.

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