

Evaluation of Digital Payment Systems and *Real-time* Information on the Success Rate of TIJE Application on Transjakarta Corridor 7C 2024

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Abstract: This study analyzes the effect of digital payment systems and *real-time* information on satisfaction with using the TIJE application among Transjakarta Corridor 7C bus users in 2024. The method used is descriptive quantitative, using a sample of 30 passengers on the Cibubur-Cawang Clilitan route in 2024. The data collected will be analyzed using *SPSS software*. The results showed that the digital payment system and *real-time* information impact the TIJE application's success rate. If one of these variables decreases or value increases, it will affect the amount of value at the successful use of the TIJE application.

Keywords: *Digital payment system, Real-time information, User satisfaction of TIJE application, Transjakarta buses.*

Introduction

In the era of rapid globalization, public transport systems play a vital role in connecting people, places, and economies. As cities grow and populations increase, the demand for efficient, reliable, and sustainable public transportation becomes increasingly important. Globalization has accelerated the pace of urbanization, leading to a greater need for transport networks that can handle the complexities of modern urban life. Globalization has brought significant changes to the way cities function and the way people live in them. It has led to increased migration, both within and between countries, creating diverse and densely populated urban areas. This shift requires cities to develop public transportation systems that are not just capable of managing large numbers of passengers but also adaptable to the diverse needs of the community.

All the factors previously described require solutions to reduce congestion due to population mobility in Jabodetabek. One of the solutions is transportation development. According to Soejono in the journal (Harahap, L. M. et al., 2024), Transportation is divided into two categories: transportation of goods and food with moving equipment; and passenger transportation. Therefore, transportation is the activity of moving goods or people from one place to another with or without moving equipment. The Provincial Government of DKI Jakarta established the Bus Rapid Transit (BRT) system in 2001 at the initiative of then Governor Sutiyoso. On January 15, 2004, the idea of BRT development finally became a reality with the release of Transjakarta. (Barimbing & Astini, 2023).

Transjakarta, which was established by the DKI Jakarta Provincial Government, serves all groups and already has a fairly luxurious service for existing road transportation. Transjakarta experienced a decrease in the number of passengers in 2013 and 2015. (Putri, 2022). The decline in the number of passengers was caused by many accidents, congestion of several rail fleets, employee strikes, and others. Therefore, Transjakarta has experienced an increase in the number of passengers in the last 3 years. Public transportation plays an important role in the daily life of urban communities. PT Transjakarta, as a *bus rapid transit* (BRT) transportation service provider in Jakarta, continues to improve the quality of its services through various technological innovations. This study focuses on analyzing the application of

digital payment systems, *real-time information*, and mobile applications in the context of PT Transjakarta integration, specifically on Corridor 7C serving the Cibubur-Cawang Cililitan route.

With the increasing use of technology in everyday life, people expect transportation services to be more efficient, fast, and accessible. The digital payment system allows passengers to make quick and secure transactions without having to carry cash. *Real-time* information provides immediate updates on bus schedules, departures, and traffic conditions, helping passengers better plan their trips. The mobile application becomes a platform that makes it easy for users to access various Transjakarta services in an integrated manner.

The evaluation of the implementation of the digital payment system and real-time information on the TIJE application aims to measure the success rate of using the application and ensure its effectiveness in supporting service continuity. Hopefully, this evaluation can significantly contribute to society and the company. Through this evaluation, the effectiveness of the digital payment system and real-time information provided by the TIJE application can be measured comprehensively. Thus, the results of this evaluation will give a clear picture of services that require improvement and development, so that the TIJE application can be continuously improved to meet user needs.

Literature review

Digital Payment System

The banking world continues to transform rapidly driven by technological advances. One proof of this is the presence of electronic money (*e-money*) payment instruments that bring a new color to the way we transact. In the past, payment instruments were limited to cash in the form of metal and paper. Today, there are more practical and innovative options in the form of cryptocurrencies (*e-money*).

In the provisions of Bank Indonesia Regulation Number 11/12 / PBI / 2009 concerning electronic money the provisions of Article 1 Paragraph 3 explain "Electronic Money is a payment instrument issued based on the value of money deposited in advance by the holder to the issuer, the value of money is stored electronically in a medium such as a server or *chip*, which is used as a means of payment to merchants who are not the issuer of the electronic money, and the value of electronic money deposited by the holder and managed by the issuer is not a deposit as intended in the laws governing banking. (Multazam, 2019).

According to Anita in the journal (Multazam, 2019) Explains that what is meant by electronic payment is a payment that utilizes information and communication technology such as *Integrated Circuits (IC)*, *Cryptography*, and communication networks. Payment systems in general can be defined as the transfer of a sum of money from the payer to the recipient with money stored, processed, and received in the form of digital information and the transfer process is initialized through an electronic payment instrument. (Tarantang et al., 2019).

Citing (Ode & Mote, 2023) in their journal, it is explained that especially the capital city of Jakarta with the operator PT Transjakarta and several state-owned banks created a payment system with digital or *smart-card* technology, *cashless* or non-cash payment methods, where the process of using the payment method is by tapping the card, namely *Tap In* and *Tap Out*, and electronic cards that can be used to make payments for Jak Lingko transportation include *Flazz*, *E-money*, *Transjakarta Card*, *JakLingko Card*, and others. The ticketing system at Transjakarta bus stops since 2013 uses electronic cards (*e-ticketing*), as a substitute for cash. The corridor operator does not issue the card, but rather. using prepaid cards issued by banks. The banks are Bank Rakyat Indonesia (BRIZZI), Bank Central Asia (Flazz), Bank Negara Indonesia (Tapcash, Kartu Aku, and Rail Card), Bank Mandiri (*e-money*, *e-Toll Card*,

Indomaret Card, and *GazCard*), Bank DKI (*JakCard*), and Bank Mega *MegaCash*. Initially, customers only made ticket transactions by *Tap In* at the *Barrier Gate* when entering the *bus* stop. Then, as of August 17, 2016, customers must also *tap out* when exiting the bus stop. The electronic money balance will only be deducted at the time of *tap-in* (entering the bus stop). There is no fare change related to the implementation of *Tap Out*. By doing *Tap Out*, the customer has helped Transjakarta get data about the location of the customer's destination. This data will be used to improve routes and services more optimally according to the needs of loyal Transjakarta users (TransJakarta perspective, 2013).

PT Transjakarta began to develop a strategy to deal with the possibility of a reduction in subsidies provided by the government. The most likely strategy is to regulate the Transjakarta fare system both in terms of the amount and type of fare structure. The fare structure currently applied by Transjakarta is a flat fare structure where the flat structure seems to only pay attention to the number of passengers but does not pay attention to the characteristics of passenger movements and does not take advantage of the potential benefits of long-distance passengers. (Hariani et al., 2020). Locations to purchase and top up these prepaid cards are available at Transjakarta bus stops, *merchants* appointed by the five banks, as well as at the branch offices of each bank. Before use, the prepaid card must be charged first (maximum Rp 1,000,000) and can be *topped up*. It is very easy to use, simply by attaching the prepaid card to the card reader provided, then the payment will be processed automatically and the balance will be reduced according to the value of the transaction made.

Although the payment system in the TIJE application has been digitized, the cardless payment feature should have been implemented with full support from the application, such as in the purchase of e-tickets. However, unfamiliar payment methods are an obstacle for users in the process of purchasing tickets through the application. This inhibits users who want to switch from card payments to the barcode method through the TIJE application, so the goal of making it easier for users has not been fully achieved.

Real-time Information

Real-time information is data that is processed and presented directly and instantly, without any time lag between data collection and presentation of the results. This information is usually required in situations that require high speed and accuracy, such as in business transaction processing systems, production monitoring, or sensitive data management. Transjakarta real-time information is data that is processed and presented directly and instantly, without any time lag between data collection and the presentation of the results. Presentation of the results. This information allows users to get accurate and real-time information about the position and schedule of Transjakarta buses.

Based on (the Governor of DKI Jakarta 2024) what is meant is the principle of the regularity of Transjakarta passengers as referred to in Article 2 letter, including:

- a. Bus stop time;
- b. Service information;
- c. Arrival time and travel disruption information;

Quoting (Agni et al., 2021) In their journal, it is explained that the existence of real-time information is very helpful for the sustainability of using Transjakarta bus services. The concept put forward by Ko, Kim, and Etezady in 2019 (Devi et al., 2022), several variables can be used as parameters in determining BRT system levels such as the length of the BRT system, the number of corridors, the size of the operating fleet, transit lines, real-time information systems, and integrated payment systems.

The problem of limited access to information in the use of Transjakarta buses still often occurs. The TIJE application should be able to be a solution to facilitate access to information for users. However, there is a mismatch between the information presented in the application and the conditions in the field, which ultimately creates obstacles for users in utilizing the service optimally.

TIJE Application Success Rate

Success rate is a measure of the amount of success produced by a particular thing. The success rate can also be interpreted as a good or bad reference for an assessment. In (Muzakky et al., 2024) The success rate is used as a benchmark to state that a product or service can be said to be successful in its operation, this is also supported by several factors. With this cited in the journal (Ramanda & Abadi, 2024) The level of success can also be measured in the use of an application. Indicators in it include performance, efficiency, control and security, and service. The application comes from the word application, which is the noun form of the verb to apply, which in Indonesian means processing. (Afandi, 2019). In terms, a computer application is a sub-class of computer software that uses direct computer capabilities to perform a task that the user wants. The TIJE application is a digital platform developed specifically to provide smartphone users easy online access to Transjakarta information. (Ramanda & Abadi, 2024). The TIJE application, developed by PT Transjakarta, comes with various sophisticated and simple features that make it easier for users to use Transjakarta services. Here are some excellent features of the TIJE application:

1. Homepage: A simple and attractive display, making it easy for users to understand basic information about Transjakarta.
2. Route Search: This feature allows users to plan a trip from origin to destination, find out the position of the nearest bus stop, route options that can be used, and estimate travel time.
3. Tjari Bus: This feature allows users to know the position of the bus as well as fleet details such as body number and bus type.
4. Route Information: This feature provides information about routes, bus stops, headway, bus arrival schedules, as well as other latest information related to Transjakarta services.
5. Route Search: This feature allows users to plan their trip from origin to destination more effectively.
6. Health Information: This feature is equipped with friendly health information, such as information about stops that have health facilities so that users can choose routes that are more suitable for their health needs.

After rejuvenating, now the new version of the TIJE application is equipped with 6 health-friendly features with more advanced features as follows:

1. Homepage: a simple and attractive look
2. Route Search: plan a trip with Transjakarta, find out the position of the nearest bus stop, route options that can be used, and estimated travel time.
3. Tjari Bus: easier to find out the position of the bus as well as fleet details such as body number and bus type
4. Route Information: find out up to date route information
5. Bus Stop Information: find out information on bus stops both in operation and in the process of renovation, etc.

6. Loyalti-je: more benefits for customers who download the TIJE app and make payments using QR tickets, where they will get points that can be exchanged for attractive prizes.

With these features, the TIJE application becomes more effective and easier to use, making it easier for users to enjoy Transjakarta services more comfortably and efficiently. (Indriyati, 2020). Head of Road Transportation Division of DKI Jakarta Transportation **Agency Susilo Dewanto** said that the TIJE Application with a series of advanced features is in line with Regional Strategic Activities.

To support this, Transjakarta presents a solution through digital innovation in its official application, the TIJE application. To ensure user trust in the TIJE application, the success of its use can be measured through an evaluation that aims to see the extent of its success. This evaluation is important to determine how much the TIJE application has succeeded in meeting user needs.

Research Methods

The research method used is quantitative by collecting data from respondents through questionnaires. Data collection using a questionnaire in the form of *Google Forms*. *Google Forms* are distributed to respondents in the form of links distributed electronically to be filled in. The measuring instrument in this study consists of a fill-in and closed *questionnaire* statement (*fixed alternative question*), with a modified *Likert* scale form with five alternative answer choices. The statements in the scale consist of statements that strongly agree and strongly disagree. The tool was prepared based on the theory used in this study. The list of statements is arranged in a "*Likert*" model scale. modified from 6 alternative answers to 5 alternative answers with consideration to avoid neutral statements. Each variable will be measured using scores and a variety of words ranging from very negative to very positive. Each existing answer will be associated with the following measuring instrument:

Table 1. Table of Operational Definition of Research Variables

Variable	Indicator	Source	Statement
Digital Payment System (SPD)	Ease	Journal of SamsulOde & Mote 2023:" "IMPLEMENTATION OF INTEGRATED TRANSPORTATION IN URBAN AREAS"	Digital paymenttransactions often fail or are delayed
			Absence of choicemethods
	Reliability		Diverse digital payment methods
			Often being charged unexpected fees
Real-time Information (IRT)	Security	GOVERNMENT DKI Jakarta Number 2 Year 2024	when using the system of digital payments
			Difficulties in get help from officers when problems occur in the paymentprocess
	Service Information And route trajectory		Feeling unsure aboutthe security of my data when using paymentsystems digital Transjakarta
			There is no available information 7C corridor line track
			Difficulties Accessing

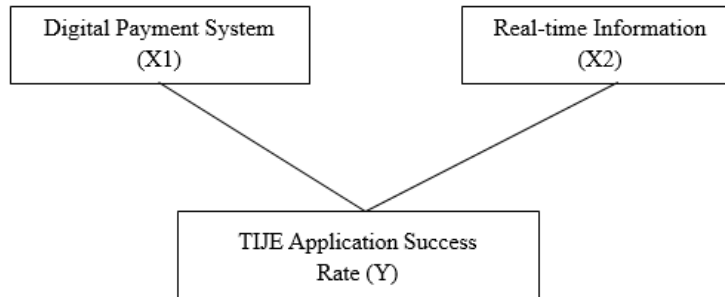
			information on fleet availability and the accuracy of the waiting time.
	Information time arrival and travel disruptions		No information on bus departure times.
	Bus stop time		No access to information on travel disruptions, such as congestion and Accident or fleet breakdown.
	Performance		View page main the Transjakarta app is confusing and unattractive
		Ramanda & Abadi Journal year 2024 "Evaluation Application Success Rate TIJE Application Using the Pieces Framework"	The estimation of time travel provided by the 'Find a Route' feature is not accurate
TIJE Application Success Rate (APT)	Efficiency		The Route Information feature does not provide information about the route
	Control and Security		Features contained in the TIJE application often experience errors
	Services		No available form of Integration in traveling using the application

Each question in the questionnaire in Table 1 was given to 30 respondents who were 7C Transjakarta users at the Cibubur-Cawang Clilitan bus stop as a means of testing the validity and reliability of this research. In (Sugiyono, 2020) Book entitled "Quantitative, Qualitative and R&D Research Methods" the scoring stage is carried out or gives a value for each respondent's answer with a predetermined scoring system, namely:

- Score 1 for Strongly Agree answer
- Score 2 for Agree answer
- Score 3 for Neutral answers
- Score 4 for Disagree answer
- Score 5 for a Strongly Disagree answer
- f.

The objects in this study are digital payment systems, *real-time information*, and the TIJE application. According to Sugiyono in the journal (Suriani et al., 2023), Population is a general area that includes subjects or objects with certain qualities and characteristics. In this study, the sample we took amounted to 30 respondents. For research using inferential statistics, such as hypothesis testing or linear regression, a minimum sample size of 30 is considered sufficient to produce a reliable p-value. This sample size also serves to reduce the risk of type I error (rejecting the correct null hypothesis) and type II error (accepting the wrong null hypothesis) with the theory of Prof. Sugiyono. (Sugiyono, 2020).

Hypothesis Framework



- H1:** The digital payment system has an impact on the success rate of using the TIJE application.
H2: Real-time information has an impact on the success rate of using the TIJE application.
H3: Digital payment systems and *real-time* information jointly have an impact on the success rate of using TIJE applications.

Result and Discussion

The questionnaire used is a *Likert* scale, which is a scale that is usually used as a measure of behavior, responses, views, and perceptions about an event. The questionnaire to be used consists of 2 statements regarding convenience indicators, 1 statement regarding reliability indicators, 2 statements regarding security indicators in the payment system variable 2 indicator statements regarding service information and route trajectories, 2 statements regarding arrival time information indicators and travel disruptions, 1 statement regarding bus stop time indicators in *real-time information* variations and 1 statement regarding satisfaction indicators, 2 statements regarding usability indicators, 1 statement regarding regularity indicators in the TIJE application variable tested on 30 Transjakarta Cibubur-Cawang Clilitan user.

Validity Test

The validity test is carried out to determine the validity of the research used. A study is said to be valid if it can measure what is desired and accurately reveal the data of the variables studied. conducted to determine the valid level of the research used. The test criteria are with it (*product moment table*). Looking at the *r* table (can be seen in Appendix 3), using the real level of 5% (0.05), the value of *r* table = 0.361 is obtained for 30 statements from the 7C Transjakarta questionnaire taken from 9 indicators. Data processing through SPSS found the results of valid statements as follows:

Table 2. Summary Of Validity Test Results of Variable Data

STATEMENT ITEMS	R-CALCULATED VALUE	R TABLE VALUE	VALIDITY RESULTS
SPD1	0,596	0,361	Valid
SPD2	0,668	0,361	Valid
SPD3	0,789	0,361	Valid
SPD4	0,636	0,361	Valid
SPD5	0,676	0,361	Valid
IRT1	0,641	0,361	Valid

IRT2	0,862	0,361	Valid
IRT3	0,780	0,361	Valid
IRT4	0,826	0,361	Valid
IRT5	0,780	0,361	Valid
APT1	0,768	0,361	Valid
APT2	0,769	0,361	Valid
APT3	0,795	0,361	Valid
APT4	0,813	0,361	Valid
APT5	0,729	0,361	Valid

Sources: Validity Calculation Results, 2024

From the table above, it can be explained that the value of $r > r$ table is calculated based on a significance test of 0.05, meaning that the variables above are declared valid.

Reliability Test

The reliability test was carried out by calculating *Cronbach's Alpha* which shows that the variables used to measure the concepts in this study are quite reliable. Up to 30 SPD1, SPD2, SPD3, SPD4, SPD5, IRT1, IRT2, IRT3, IRT4, IRT5, APT1, APT2, APT3, APT4, APT5. The 30 samples will then be tested for reliability.

Table 3. Readability Test	
Reliability Statistics	
Cronbach's Alpha	N of Items
0,846	15

The high and low reliability is expressed experimentally with a number called the reliability coefficient value. High reliability is indicated by an α -value close to 1. In general, reliability is said to be satisfactory if ≥ 0.700 . If the α value is > 0.7 , it means that the reliability is sufficient, while if the α is > 0.80 , it indicates that all items are reliable and all tests are consistently highly reliable. Some people explain it like this: If $\alpha > 0.90$ then reliability is perfect. If α is between 0.70 and 0.90, reliability is high. If α is between 0.50 and 0.70, reliability is moderate. If $\alpha < 0.50$, reliability is low. If α is low then it is likely that one or more elements are unreliable.

Regression Test

Table 4. Entered/removed Variables			
Variables Entered/Removed			
Model	Variables Entered	Variables Removed	Method
1	HOUSEWIFE, SPD ^b		Enter

In this section, there is only variable information entered, where the variables entered are *real-time* information and digital payment systems. None of the variables entered are excluded. This is because the data is processed only once.

Table 5. Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.732 ^a	0,536	0,501	2,185

a. Predictors: (Constant), IRT, SPD

b. Dependent Variable: APT

In multiple correlation analysis, the *Model Summary* table shows an R of 0.732 which indicates a strong positive relationship between the independent and dependent variables. *R square* (0.536) indicates that 53.6% of the variation in user satisfaction can be explained by the independent variables in the model. This means that the correlation model can explain most of the variation in the data, but there is a 46.4% variation that may be influenced by other factors not included in the model.

Table 6. ANOVA Table

ANOVA^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	148,640	2	74,320	15,572	<,001 ^b
Residuals	128,860	27	4,773		
Total	277,500	29			

The ANOVA table shows the results of the analysis of variance for the multiple linear regression model. With a *Sum of Squares* for the regression of 148,640 and a *Mean Square* of 74,320, this table indicates that the regression model significantly explains the variation in the dependent variable. The F count of 15.572 compared to the F table of 3.35 indicates that the overall model is significant, with the independent variables contributing to the success rate of using the TIJE application. In contrast, the *Sum of Squares* Residual of 128,860 indicates a variation that cannot be explained by the model. Thus, the ANOVA results support that the regression model used has good predictive power in explaining variations in user satisfaction.

Table 7. Coefficients

Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3,414	1,738		1,964	0,060
SPD	-0,040	0,164	-0,033	-0,243	0,810
IRT	0,747	0,136	0,738	5,509	0,000

From the data analysis that has been carried out, the results of the multiple linear regression calculation equation are obtained as follows:

$$Y = 3.414 - 0.0414x_1 + 0.747x_2$$

The regression equation above shows the relationship between the independent variable and the dependent variable partially, with the conclusion that:

- a. The constant value is 3.414, which means that if there is a change in the digital payment system variable and *real-time* information (If X_1 and X_2 are 0 = zero), the level of success in using the TIJE application is 3.414.
- b. If the digital payment system decreases by 1 unit, the success rate of using the TIJE application decreases by -0.040. So that shows the digital payment system has little impact on the success rate of using the TIJE application.
- c. c. If real-time information increases by 1 unit, the success rate of using the TIJE application increases by -0.747. This shows that real-time information impacts the success rate of using the TIJE application.

Based on the comparison between t count and t table, the following results are obtained:

- a. There is a calculated t value on the digital payment system variable of -0.243, where the t table is 1.701, meaning that the calculated t value < t table, which shows that the digital payment system does not have much impact on the success rate of using the TIJE application.
4. There is a calculated t value on the digital payment system variable of 5.509, where the t table is 1.701, meaning that the calculated t value > t table, which is shows *real-time* information on the success rate of using the TIJE application.

Conclusion

Based on the observations made, the Digital Payment System does not significantly impact the successful use of the TIJE Application. However, Real-Time Information does significantly impact the success rate of the TIJE Application. That is, both have the same impact on the success rate of the TIJE Application but at different scales.

Implication

The results of the evaluation of digital payment systems and *real-time* information have several important implications for the successful use of information technology applications. The following are the impacts that can be obtained from the results of the research that has been done:

1. Digital Payment System

The digital payment system can be improved by adding more commonly used methods, making it more accessible. The company should also strengthen transaction security so that Transjakarta bus users feel safe. This payment system evaluation is important to improve transaction efficiency and accuracy. In addition, integration with real-time information helps companies adapt quickly to technological changes. The SPD 3 indicator shows the highest value, namely 0.789, which shows the greatest contribution to the effectiveness of the digital payment system in the TIJE application.

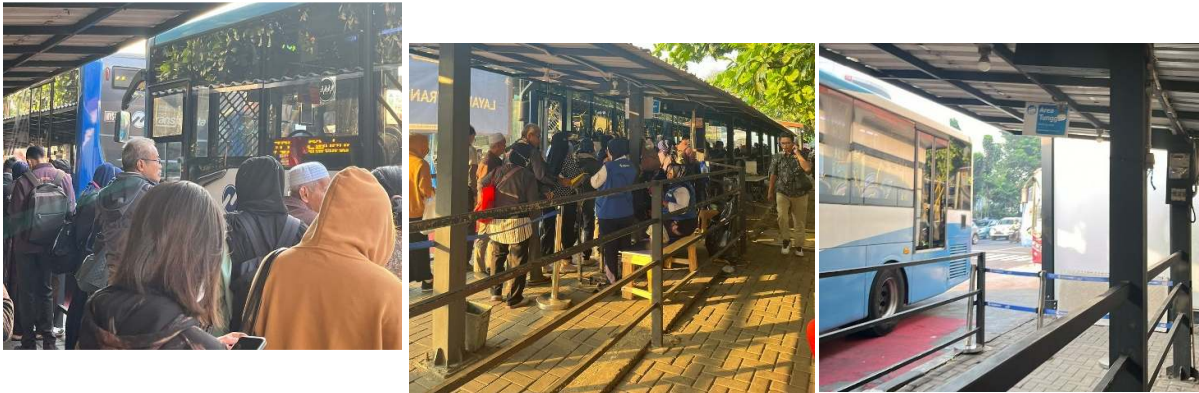
2. Real-time information

Accurate and real-time information can increase customer trust in digital payment systems because they can monitor transaction status directly, resulting in increased customer satisfaction. By utilizing real-time information, digital payment systems can more quickly detect and address errors or disruptions, thereby improving overall system reliability. In addition, real-time information allows users to more easily understand the transaction process, which in turn increases the usability of the TIJE application. In this statement, the indicator obtained the highest value of 0.862, indicating a significant influence on the effectiveness of using the TIJE application.

3. TIJE Application Success Rate

Can TIJE application updates be needed to provide a more attractive appearance, to increase user interest? In addition, increasing features in the TIJE application is very important to increase the efficiency of its use and reduce the waiting time often experienced by users. Evaluation of digital payment systems and real-time information has an important role in improving and optimizing the use of the TIJE application, especially for Transjakarta bus users in corridor 7C. The results of this evaluation can be used to manage company resources and increase adaptability. The APT2 indicator shows a correlation of 0.813, which means that APT2 is closely related to the use of the TIJE application.

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