PREDICTING CONSUMER LOYALTY TO ONLINE TAXI SERVICES USING THE TECHNOLOGY ACCEPTANCE MODEL (TAM)

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Abstract

This study aims to measure the factors that can affect customer loyalty in using the mobile taxi service application using the Technology Acceptance Model (TAM). The research model used involves several variables, namely perceived usefulness, perceived ease of use, attitude, customer loyalty and customer satisfaction as additional variables. The analysis used was Structural Equation Modeling (SEM) and respondents numbered 105 people from the city of Bandung. This research proves that in addition to the variables contained in the Technology Acceptance Model (TAM), in achieving loyalty the users of the mobile taxi service application must achieve customer satisfaction first. The results of this study indicate that the presence of customer satisfaction as an additional variable can increase understanding in technology acceptance by completing variables that are part of the Technology Acceptance Model (TAM).

Keywords: mobile taxi service; sharing economy; technology acceptance model; consumer loyalty; customer satisfaction

INTRODUCTION

The development of business life, electronic technology and the internet increases significant economic and social power (Blaise, 2017). The internet connection which is currently getting better in the 4G era with Electronic Information and Transactions (ITE) makes the Indonesian people in general enthusiastic about adopting life in this era, mainly triggered by internet penetration and the increasing use of smartphones every year (Setiawan, 2017). The impact of this increasingly open internet access can be seen in economic exchanges. Apart from selling goods, in recent years internet access has also reshaped the field of transportation. Now the people of Indonesia are offered convenience through the internet through applications that provide online motorcycle taxi services (Natadjaja & Setyawan, 2016). According to research from We Are Social and Hootsuite (2019), two mobile taxi service companies, namely Go-Jek and Grab, occupy the top 10 rankings for the most actively used applications in Indonesia.

Research results from the Demographic Institute of the Faculty of Economics and Business, University of Indonesia show that the contribution of Go-Jek partners to the Indonesian economy was recorded at IDR 44.2 trillion. The city of Bandung with the presence of Go-Jek as a food delivery service (Go-food), motorbike taxi (Go-ride), car taxi (Go-car) and beauty, automotive and massage therapist services (Go-life) has contributed Rp 2, 1 trillion of the total economy (CNN Indonesia, 2019). Go-jek's biggest competitor, Grab, has also signed a cooperation agreement (PKS) with the Bandung City Government in December 2018. Grab is committed to helping the government maximize potential in the tourism, transportation, environmental empowerment and digital infrastructure sectors. This collaboration is a tangible form of Grab to play an active role in solving problems that exist in the city of Bandung, especially in creating jobs and improving services in the field of

public transportation (CNBC Indonesia, 2018). Modern customer-oriented companies such as mobile taxi service companies based on applications in Indonesia, need a theory to predict the adoption and use of information technology (IT) by customers with the aim of evaluating the marketing effectiveness of the company. According to Hornbæk & Hertzum (2017) the Technology Acceptance Model (TAM) is the most researched and used model to predict the adoption and use of IT by individuals.

Previous research (Suhud et al., 2019) states that the Technology Acceptance Model (TAM) can be used to test consumer behavior from mobile taxi service applications in Indonesia. Suhud et al (2019) tested the intensity of young consumers' intentions to use the mobile taxi service application by implementing TAM. This research model contains the variables perceived usefulness, perceived ease of use as the dependent variable, attitude as the intervening variable and usage intention as the dependent variable. All relationships that have been hypothesized in the model show significance. However, this study does not provide additional variables other than the original variables which are part of the TAM. Therefore, Suhud et al (2019) suggested adding other variables as predictors that might contribute differently and to expand the sharing economy literature. This suggestion is supported by several previous studies which have established that TAM can have more illustrative power. better when used with additional external factors (Lin, C., Lin, L. C., & Roan, 2012; Taherdoost et al., 2009; Taherdoost & Masrom, 2009; Weng et al., 2017). Therefore, this study will also include customer satisfaction variables. By including additional external factors, namely customer satisfaction, it is hoped that this research can close the gap that has existed so far and contribute to developing and enriching the Technology Acceptance Model (TAM) literature.

This study specifically analyzes how the Technology Acceptance Model (TAM) variable influences perceived usefulness, perceived ease of use, attitude with additional variables of customer satisfaction on customer loyalty of mobile taxi service application users. Through this study, the author aims to determine the effect of the Technology Acceptance Model (TAM) variable which includes perceived usefulness, perceived ease of use, attitude with additional variables of customer satisfaction on customer loyalty to mobile taxi service application users.

The Technology Acceptance Model (TAM), introduced in 1989, later became the most widely applied theoretical model in the field of Information Systems. Currently TAM has been applied in many studies that measure the level of consumer acceptance of new technologies such as gameplay, tablet PCs, fin-tech or financial-technology and e-learning (Wang & Sun, 2016). Recent studies (Fleischer, A., & Wahlin, 2016; Liu, 2014; Suhud et al., 2019; Weng et al., 2017) tested TAM to predict how customers receive mobile taxi service applications.

TAM, adapted from Theory of Reasoned Action (Fishbein, M., & Ajsen, 1975) is a psychological theory that seeks to explain individual actions by identifying causal relationships between various components: beliefs, attitudes, intentions and behavior. Several years later Davis (1989) proposed a technology acceptance model (TAM) to explain and predict user behavior to use technological innovations, particularly in user acceptance of an information technology. Davis (1989) assumes that the acceptance of a person's information system is determined by two main variables Perceived Usefulness (PU) or perceived benefits and Perceived Ease of Use (PEOU) or ease of use.

As previously mentioned, TAM has been used by researchers to predict a person's intention to adopt a particular technology in either the original model or a modified model. The TAM instrument contains indicators to measure attitude, perceived usefulness, perceived ease of use, and intention to return to use (Liu, 2014).
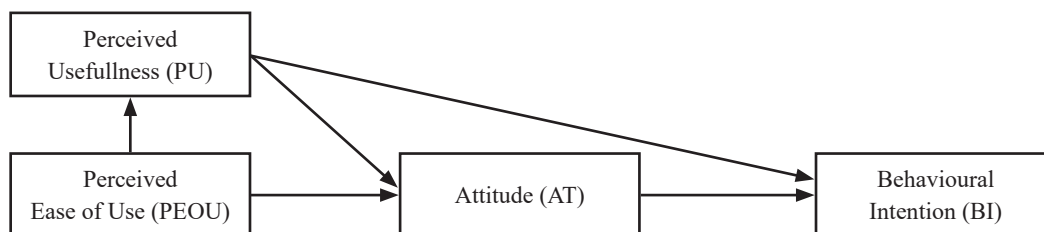

Figure 1. Research Model Based on TAM (Liu, 2014)

TAM, with its focus on the acceptance of Information Systems, explains that in a straight line the decision to use the system is influenced by the intensity of using it (Liao et al., 2009). Marangunić & Granić (2015) stated that previous studies have published analysis of research using TAM and showed that the results were not completely consistent and clear, thus requiring other significant factors to be included in the study. Therefore, as previously described, several previous studies have determined that TAM can have better illustrative power when used with additional external factors (Lin, C., Lin, L. C., & Roan, 2012; Taherdoost, 2018; Taherdoost et al. al., 2009; Weng et al., 2017).

According to (Kim, Yong Jin., Jae Uk Chun., 2009), attitude towards using the system is the most important determinant of the consumer's behavioral intention to use the system. Attitude is considered a significant aspect among all the references involved in the dimensions for explain consumers' sustainable intentions (Ajzen, 2011; Shah Alam & Mohamed Sayuti, 2011). In previous studies, attitude was a strong predictor of consumer continuance intention. Therefore, attitude has a significant relationship with the consumer's continuing intention to a phenomenon (Amaro & Duarte, 2015). From a theoretical perspective, attitudes toward system use fully mediate the effects of perceived usefulness and perceived ease of use on consumers' continuing intentions to use information systems. In the context of the mobile taxi service application, it is believed that when users have a positive attitude towards the mobile taxi service application, they will have a stronger interest in continuing to use it (Weng et al., 2017).

Satisfaction or satisfaction in general is a person's feeling of pleasure or disappointment resulting from comparing the perceived product performance (or outcome) with the person's expectations. If the performance of the product or the experience felt by the customer is not as expected, the customer is dissatisfied. If the performance and experience are in line with expectations, the customer is satisfied. If it exceeds expectations, then the customer is very satisfied or happy (Kotler, P., & Keller, 2016). In the use of services in mobile devices, customer satisfaction is defined as the perception of the total consumption of consumers when using services in mobile mobile devices (Kuo et al., 2009). In the context of a mobile taxi service application, customer satisfaction with the application can reduce their continued intention to use the application. Satisfaction has been extensively analyzed in the literature and has been found to play a critical role in predicting consumer behavior and sustainable behaviors such as loyalty (Weng et al., 2017).

Loyalty since around 1970 is understood as a concept that emphasizes purchase intensity (Avkiran & Ringle, 2018). In the marketing literature of the last decade, customer loyalty is one of the most debated topics. The great interest in customer loyalty can be attributed to its importance in achieving sustainable competitive advantage and financial results (Moretta Tartaglione et al., 2019). According to Weng et al., (2017) it is very important for online taxi service providers to find out how customers develop their loyalty. In addition, customer satisfaction plays an important role in the formation of purchase intensity or brand loyalty.

METHOD

The method to be used is a quantitative method using a verification approach. The verification research method is a method of testing hypotheses through statistical analysis tools. According to (Dimyati, 2013), the verification method is research that aims to test the truth of a particular theory or rule. According to (Sugiyono, 2014), the verification method is a research method that basically analyzes theory by testing hypotheses. Hypothesis testing is done by using statistical calculations that are used to test variables. Verification means testing a theory by testing a hypothesis whether it is accepted or not. The following is a visual explanation of the relationship between variables in Figure 2.
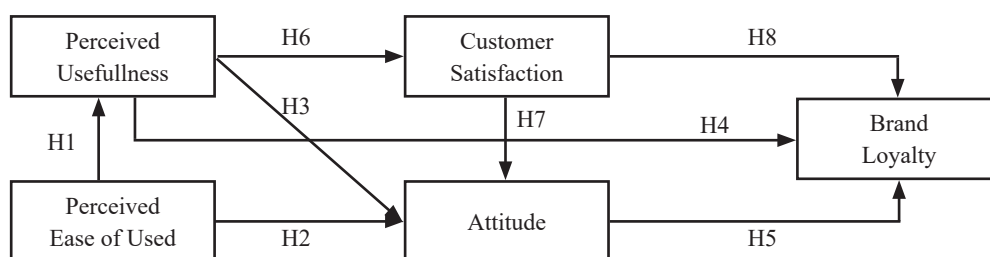

Figure 2. Research Model

In this study, the population determined was users of online transportation applications in the city of Bandung, these applications were Go-jek and Grab. The number of online taxi application service users in the city of Bandung is still unknown, so it can be concluded that the population in this study is an infinite population. The sampling technique used in this research is convenience sampling. Convenience sampling which is also known as or Accidental Sampling is a type of nonprobability sampling in which members of the target population who meet certain criteria, such as easy accessibility, geographical proximity, availability at a certain time, or willingness to participate are included for research purposes (Etikan, 2016).

The number of samples in the study refers to Hair, J., Black, W. C., Babib, B., & Anderson (2010), namely determining the number of samples is determined by the number of research indicators that will be used as questions in the questionnaire multiplied by the standard error with a scale of 5-10% so that The number of samples in this study was 21 (questionnaire question indicators) x 5 (5% standard error), namely 105.

The analytical method used in this study is Structural Equation Modeling (SEM) which is a multivariate technique that combines aspects of factor analysis and regression, which allows researchers to test the relationship between variables simultaneously (Hair, Jr., J. F., Hult, G. T., Ringle, C., & Sarstedt, 2014). The software used to formulate PLS analysis in this study is WarpPLS version 6.0.

The research instruments are perceived usefulness, perceived ease of use, attitude, customer satisfaction, and brand loyalty derived from research by Weng et al., (2017) who examined the intensity of the use of mobile taxi service technology in Malaysia.

Table 1. Research Instruments

Variable	Indicator	Scale
Perceived Usefulness	The mobile taxi service application is useful to help me order a taxi service.	Ordinal
	Feel more comfortable ordering a taxi through the mobile taxi service application.	
	The mobile taxi service application helps me to get services more easily.	
	The mobile taxi service application is useful to help me get services faster.	
	The mobile taxi service application is useful to help me get services cheaper.	
	(Weng, Zailani, Iranmanesh, & Hyun, 2017)	
Perceived Ease of Use	It doesn't take much effort to adapt to the mobile taxi service application.	Ordinal
	This mobile taxi service application is easy to use.	
	The mobile taxi service application that is used can be easily learned.	
	Can flexibly interact with mobile taxi service applications.	
	Overall, the operation and use of the mobile taxi service application is easy.	
	(Weng, Zailani, Iranmanesh, & Hyun, 2017)	
Attitude	Ordering services using a mobile taxi service application compared to ordering conventionally is a good idea.	Ordinal
	Ordering services using a mobile taxi service application compared to ordering conventionally is wise.	
	Ordering services with the mobile taxi service application is preferable compared to ordering in the conventional way.	
	Using the mobile taxi service application is a pleasant experience.	
	(Weng, Zailani, Iranmanesh, & Hyun, 2017)	
Customer Satisfaction	Can enjoy my whole experience using online taxi app.	Ordinal
	Overall my experience using the online taxi application is very satisfying.	
	According to experience, it is very convenient to use the online taxi application.	
	Overall, really like my experience using online taxi	
	(Weng, Zailani, Iranmanesh, & Hyun, 2017)	
Customer Loyalty	They tend to continue to use the mobile taxi service application compared to not using it anymore.	Ordinal
	Tend to continue to use the mobile taxi service application compared to using conventional methods,	
	Desire to use online taxi apps as often as possible	
	(Weng, Zailani, Iranmanesh, & Hyun, 2017)	

RESULTS

In this study, the respondents were users or consumers of the mobile taxi service application in the city of Bandung. The data taken in this study consisted of questions regarding gender, age and the mobile taxi service application used.

Table 2. Age of Respondents

No	Age of Respndents	Percentage
1.	18 – 22 years old	6.70 %
2.	23 – 27 years old	77.10 %
3.	28 – 32 years old	13.30 %
4.	> 32 years old	2.90 %
	Total	100%

Table 2 shows that the majority of respondents are customers of the mobile taxi service application aged 23-27 years where at that age can be said to be of productive age and have many needs and desires that require assistance from transportation services and other services provided by the mobile taxi service application.
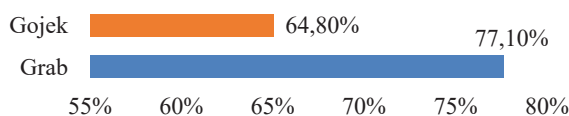
Figure 3. Respondents' Use of the Mobile Taxi Service Application

Figure 3 shows that the majority of respondents use the Grab application at 77.1% compared to Go-Jek 64.8%. Although the difference in the percentage of users is not too far in Figure 5.2, these results indicate that customers from online transportation in the city of Bandung prefer the Grab application compared to Go-jek even though not a few have two applications, namely Grab and Go-jek on their mobile devices. Customers who have two applications, namely Grab and Go-Jek, usually choose which application has a cheaper fare, or customers look for an application that is holding promos for low fares.

The first test carried out is the evaluation of the outer model. According to Hair et.al (2014) the evaluation of the outer PLS model consists of convergent validity, discriminant validity, composite reliability, and Cronbach's alpha. The first stage of data processing is measuring convergent validity. The results can be seen in Table 1.

Based on Table 3, it is known that the AVE value for the variables perceived usefulness, perceived ease of use, attitude, customer satisfaction and customer loyalty has a value of > 0.5. Thus it can be stated that each variable in the study already has decent convergent validity so that further testing can be carried out.

Table 3. Nilai Average Variance Extracted(AVE)

PU	PEOU	Attitude	CS	Loyalty
0.674	0.844	0.73	0.726	0.697

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Table 4. Correlations Among Lvs. With sq. Rts. Of AVEs

	PU	PEOU	Attitud	CS	Loyalty
PU	(0.821)	0.815	0.841	0.673	0.643
PEOU	0.815	(0.919)	0.758	0.615	0.555
Attitude	0.841	0.758	(0.854)	0.698	0.689
CS	0.673	0.615	0.698	(0.852)	0.688
Loyalty	0.643	0.555	0.689	0.688	(0.835)

Table 4 shows that discriminant validity is in a diagonal position and bracketed higher than the correlation between latent variables in the same column (top and bottom positions), all variables meet the requirements of discriminant validity except for the perceived usefulness variable which has a lower value than the value of attitude. However, the difference in perceived usefulness and attitude is very small.

Table 5. Composite Reliability

PU	PEOU	Attitude	CS	Loyalty
0.91	0.964	0.915	0.913	0.873

The composite reliability value for all variables is already above 0.7. These results indicate that all variables in the study have met the composite reliability value, so it can be concluded that the model has sufficient reliability and can be tested further. In other words, every indicator in the three variables can be trusted or reliable.

Reliability testing can also be done with Cronbach's alpha with the expected test criteria of > 0.7 for all constructs (Hair, 2014). The results can be seen in Table 6.

Table 6. Composite Reliability

PU	PEOU	Attitude	CS	Loyalty
0.874	0.954	0.874	0.872	0.782

All variables have a Cronbach's Alpha value above 0.7, so that it can be stated that the model has sufficient reliability and further testing can be carried out.

The next test is the evaluation of the inner model to ensure the accuracy of the model used by looking at R2, Q2, and testing the hypothesis. The first stage to be evaluated is to test the R-Square value in this study. R-Square is used to measure how much endogenous variables are influenced by other variables. The coefficient of determination of 0.67 and above for endogenous latent variables in the structural model indicates that the effect of exogenous variables (which affect) on endogenous variables (which is influenced) is in the good category. Meanwhile, if the result is 0.33 – 0.67 then it is included in the medium category, and if the result is 0.19 – 0.33 then it is included in the weak category (Ghozali, 2012). The results in table 5 show that the R-Square is included in the medium category.

Table 7. R-square

	R Square	R Square Adjusted
Customer Loyalty (Z)	0.581	0.569

The R-Square value of 0.581 illustrates that the influence of the variable perceices usefulness (X_1), perceived ease of use (X_2), attitude (Y_1), customer satisfaction (Y_2) on customer loyalty (Z) provides a value of 0.581 which can be interpreted that the customer variable loyalty can be explained by the variables perceived usefulness, perceived ease of use, attitude and customer loyalty of 58.1.%. The remaining 41.9% is explained by variables outside the variables studied.

The next test is to look at the Q-Square predictive relevance for the structural model, measuring how well the predictive relevance value is generated by the model and also the estimated parameters. The value of Q2> 0 indicates that predictive relevance or predictive relevance is accurate. While the value of Q2 < 0 indicates that the model lacks predictive relevance. (Sarstedt, Ringle, & Hair, 2017), Using WarpPLS 6.0 software, Q-Squared coefficients are 0.584, Q2 has a value of more than 0, so it can be concluded that the structural model of this study has predictive relevance with a strong correlation.

Referring to the results of the model scheme tested with Warp PLS with variables perceived usefulness, perceived ease of use, attitude, customer satisfaction and customer loyalty in this study, the following are the results of hypothesis testing in this study.

Table 8. Hypothesis Testing

Effect	Path Coefficients	Standard Error (SE)	P value	Effect Size (ES)	Notes
The effect of perceived usefulness on perceived ease of use.	0.852	0.078	<0.001	0.726	Ha Accepted
The effect of perceived ease of use on attitude.	0.178	0.08	<0.001	0.592	Ha Accepted
The effect of perceived usefulness on attitude.	0.526	0.081	<0.001	0.575	Ha Accepted
The effect of perceived usefulness on customer loyalty.	0.168	0.082	<0.001	0.416	Ha Accepted
The effect of attitude on customer loyalty.	0.315	0.09	<0.001	0.22	Ha Accepted
The effect of perceived usefulness on customer satisfaction.	0.677	0.082	<0.001	0.458	Ha Accepted
The influence of customer satisfaction on attitude.	0.233	0.092	0.006	0.166	Ha Accepted
The effect of customer satisfaction on customer loyalty.	0.36	0.087	<0.001	0.3	Ha Accepted

Hypothesis Decision Making Basis
P-value 0.05 then Ho is accepted
P-value 0.05 then Ho is rejected and Ha is accepted
Effect size : Weak (0.020), Medium (0.15), and Large (0.35)

DISCUSSION

This study shows that the perceived usefulness of the customer (perceived usefulness) has a higher parameter coefficient on attitude than the perceived ease of use of the application (perceived ease of use), but this happens because perceived ease of use does not directly impact attitude, perceived usefulness is greatly influenced large by the variables that affect it directly, namely perceived ease of use. Likewise with customer loyalty, t has a lower parameter coefficient on perceived usefulness, but has a higher parameter coefficient on customer satisfaction. The strong influence generated by perceived usefulness has a direct impact on customer satisfaction.

Based on empirical results, Technology Acceptance Model (TAM) can explain not only loyalty to use mobile taxi service applications, but also attitudes, satisfaction, and perceived benefits of users towards technology. These findings indicate that TAM is a strong model to explain attitudes, satisfaction , and loyalty to use the application. This study is an attempt to explore the determinants of the loyalty of mobile taxi service application users in using the services provided. This study supports previous research (Suhud et al., 2019) that the Technology Acceptance Model (TAM) can be used to test consumer behavior from mobile taxi service applications in Indonesia. Suhud et al (2019) tested the intensity of young consumers' intentions to use the mobile taxi service application by implementing TAM. This research instrument contains indicators to measure attitude, perceived usefulness, perceived ease of use, and usage intention. All the tested hypotheses showed significance. However, the study from Suhud, Wibowo & Wilson (2019) did not provide additional variables other than the part of the TAM.

In this study, customer satisfaction as an additional variable has played a significant role in the Technology Acceptance Model (TAM) and is categorized as one of the influences needed to analyze customer loyalty in a mobile taxi service application using the Technology Acceptance Model (TAM). Supported by research by Weng, Zailani, Iranmanesh, & Hyun (2017) which uses Technology Continuance Theory (TCT) as an improvisation of the Technology Acceptance Model (TAM) variable by adding confirmation, perceived risk, subjective norms and customer satisfaction variables in researching mobile taxi service In Malaysia, customer satisfaction significantly influences the level of customer loyalty. This study shows that customer satisfaction in the mobile taxi service application can decrease or increase their ongoing intention to use the application. Supported by previous research (Weng et al., 2017), consumer satisfaction has been analyzed in depth and has been found to play a critical role in predicting consumer behavior and sustainable behavior such as loyalty.

CONCLUSION

Perceived ease of use has a strong influence on perceived usefulness. Users of the mobile taxi service application can feel the benefits (perceived usefulness) of the influence of the ease of use of the application (perceived ease of use), the ease of using the mobile taxi service application maximizes benefits for customers in get services through the mobile taxi service application. This shows that applications on mobile devices are generally considered more useful if they are easy to use.

Perceived ease of use has a strong influence on attitude. Users of the mobile taxi service application can show a positive attitude from the mobile taxi service application with the influence of the ease of use of the application (perceived ease of use). Perceived ease of use encourages customers to show a positive attitude. customers to the mobile taxi service application. The easier the application to use, the more positive the customer's attitude towards the mobile taxi service application.

Perceived usefulness has a strong influence on attitude. The more customers of the mobile taxi service application feel the benefits (perceived usefulness) of the mobile taxi service application, the more customers will show a positive attitude. Benefits perceived by customers (perceived usefulness) are aspects considered by customers to produce attitudes.

Perceived usefulness has a strong influence on customer loyalty. The more customers of the mobile taxi service application feel the perceived usefulness of the mobile taxi service application, the more customers will show a positive attitude. Perceived usefulness affects the intensity for repetition in interactions, usage and transactions by customers in using the mobile taxi service application.

Attitude has an influence on customer loyalty in the moderate category. The more customers of the mobile taxi service application show a positive attitude, the more customers are motivated to be loyal. Conversely, a negative attitude will decrease customer loyalty from the mobile taxi service application. Attitude can be used to determine a user's ongoing behavior or loyalty towards the use of a mobile taxi service. Attitudes have an impact on the use and acceptance of systems and technology. When consumers show positive perceptions of technology, they prefer not to take advantage because when customers have a positive attitude towards the mobile taxi service application, they will have a stronger interest to continue using it (customer loyalty).

Perceived usefulness has a strong influence on customer satisfaction. The more customers of the mobile taxi service application feel the benefits (perceived usefulness) of the mobile taxi service application, the greater the satisfaction felt by the customer (customer satisfaction). These results indicate that the perceived usefulness of the customer plays a major role in increasing customer loyalty in the mobile taxi service application.

Customer satisfaction has a medium category effect on attitude. The more customers of the mobile taxi service application feel satisfied (customer satisfaction) with the mobile taxi service application, the more positive the attitude generated by the customer will be. Customer satisfaction is related to research on information systems because it clearly describes the emotional response to the information system. This supports previous research, that customer satisfaction was found to play an important role in predicting consumer behavior.

The results of the study show that customer satisfaction has an influence on customer loyalty. This influence can be categorized as a moderate category. The more customers of the mobile taxi service application feel satisfied (customer satisfaction) with the existence of the mobile taxi service application, the greater will be customer loyalty. Customer satisfaction describes an emotional response to the mobile taxi service application, while customer loyalty emphasizes the intensity of use or transactions made through the application. Customer satisfaction is an aspect that is highly considered when customers continue to make transactions or use mobile taxi service applications. Customer satisfaction has a significant and positive impact on loyalty behavior, namely, intention to return, frequency of consumption and intention to recommend. In the context of mobile taxi service applications, customer satisfaction with the application can reduce customer loyalty intentions to reuse.

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