ISSN 2278-3091
Volume 9, No.1, January – February 2020
International Journal of Advanced Trends in Computer Science and Engineering
Available Online at http://www.warse.org/IJATCSE/static/pdf/file/ijatcse06912020.pdf
https://doi.org/10.30534/ijatcse/2020/06912020

Technology Acceptance Model for Online Transportation

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ABSTRACT

Online transportation is a type of application-based transportation that helps a person in carrying out his daily activities. This study discusses the factors of acceptance and use of online transportation in Garut Regency. The methodology used is the Technology Acceptance Model using four exogenous constructs, namely Perception of Ease of Use, Perception of Benefits, Use of Attitudes, Use of Actual Systems, and four exogenous constructs, namely, screen design, navigation, accessibility, and social organization expertise. Data collection used was by observation and distribution of questionnaires, samples taken with systematic random sampling techniques, and obtained 328 respondents as users of online transportation applications, then tested the hypothesis with descriptive analysis and Structural Equation Model. The results showed that all constructs were significant to other constructs with a significance level of 5%.

Key words: Structural Equation Model, Perceived, Screen Design, Navigation.

1. INTRODUCTION

At the end of 2017, Garut Regency has become one of the places where application-based online transportation has developed, although its existence is still considered unofficial, this does not prevent the community as users from making online transportation a transportation option that is considered effective and efficient [1], [2]. The type of application-based transportation that develops in Garut Regency includes Gojek and Grab, the services offered are motorcycle taxi, motorbike, car, freight services, various food orders, and other services [3].

Online transportation itself is a type of application-based transportation that can be accessed wherever and whenever, in real-time, users can easily mobilize anywhere by accessing this application [4]–[6]. Therefore, the factors that can affect the ease of using the application are very important to note. This is done so that this application-based transportation can have high benefits for its users [7], [8]. One of the theories about the use of information technology systems that are considered to be very influential and commonly used to explain the individual acceptance of the use of information technology systems is the technology acceptance model of the Technology Acceptance Model (TAM). TAM variable constructs expressed are Perceived Ease of Use, Persuasive Usefulness, Attitude Toward Using, Behavioral Intention to Use, and Actual System Usage while external variables are taken based on literature studies and supporting variables on the application used [9], [10].

Previous research analyzed the application of innovation in the form of appropriate communication technology that can provide changes to the social system of the community with the object of Grab Bike and Gojek Indonesia research [11]. Also, besides, an analysis of the use of online motorcycle taxis has discussed the efficiency and impact of its existence [12]. The model used to analyze the receipt and use of the information system used is TAM. In addition to online motorcycle taxi applications, TAM has been used previously for analysis of regional financial information systems using two main constructs [13]. Research on online motorcycle taxis has also discussed the analysis of opinion sentiments that emerged using Naïve Bayes, which resulted in positive sentiment opinion [14]. Subsequent research discusses the TAM model, which explains that user perceptions will determine attitudes in the acceptance and use of information technology, which is influenced by usefulness, which is one of the main constructs of TAM [15].

Based on several previous studies, this study discusses the analysis of factors that influence the acceptance and use of online transportation by using four main TAM constructs. Contributions are given from the results of this study, with the acceptance of the relationship constructs on the hypothesis, means that the community can accept the existence of online transportation as users, is expected to make consideration especially for the local government of Garut Regency to legalize the existence of online transportation.

2. METHODOLOGY

The analytical model used is TAM to explain individual acceptance of the use of information technology systems [16]. The TAM construct can be seen in Figure 1 below:

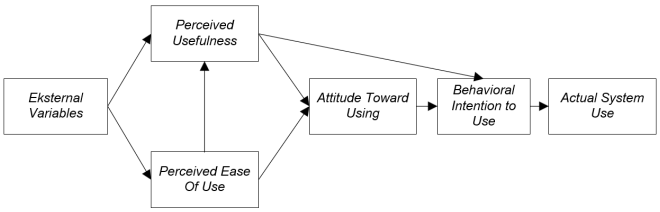

Figure 1: Technology Acceptance Model

Based on the TAM construct above, the research variables used in this study consist of:

- **Exogenous Constructions**
  Exogenous constructs in research are screen design (X1), navigation (X2), accessibility (X3), and social, organizational expertise (X4).
- **Endogenous constructs**
  Endogenous constructs in the research are Perceived Ease of Use (Y1), Perceived Usefulness (Y2), Attitude Toward Using (Y3), Actual System Usage (Y4) [17].

By using the TAM technology acceptance model and predetermined constructs, it was decided as a consideration in this study can be seen in Figure 2

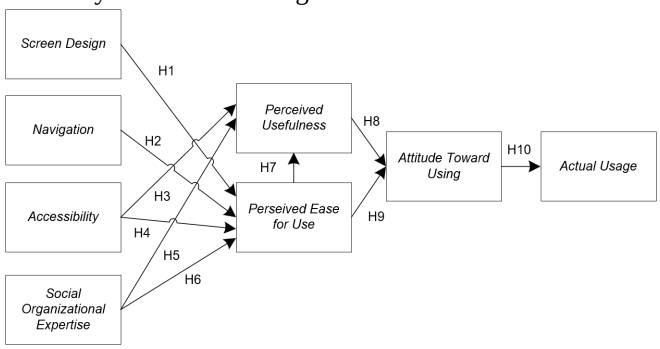

Figure 2: Theoretical Framework

2.1 Population and Samples

The population in this study were all online transportation users in Garut Regency, both those who use motorcycle taxi, car, go food, and other services while the sample is taken by systematic random sampling technique from users [18].

2.2 Data Collection

Data collection is done by survey method, which is using a questionnaire that is done by giving a set of questions and written statements to the respondent to answer [19], [20]. The data collected is the expectations of online transportation users for constructs or variables in the form of a list of questions and statements used in the research model. The distribution and data collection is done directly to the respondent by filling in the questionnaire provided by himself.

2.3 Analysis Method

A. Descriptive Statistics

Descriptive statistics is a method relating to the presentation of data to provide information about the size of the location, size of variability, and size of shape [21]. Also, this method is used to calculate the value of the validity and reliability of data.

B. Hypothesis Testing

Hypothesis testing is carried out using the Structural Equation Model, SEM is used to discuss model identification and provides a general description of structural equation models, hypothesis models and certain parameters [22], [23].

3. RESULTS AND DISCUSSION

3.1 Respondent's Response to Research Variables

A. Respondents to Variable Screen Design

Respondent's perception of Screen Design indicators, 58% answered agreeing with the screen design statement that online transportation applications can make it easier to find the desired information

B. Respondents to the Navigation variable

Respondent's perceptions of the Navigation indicator, 63% answered agreeing with the navigation statement that the online transportation application can assist in getting information.

C. Respondents to Accessibility variables

Respondent's perceptions of accessibility indicators, 52% answered agreeing that online transportation application statements can be easily accessed anytime and anywhere

D. Respondent's response to the Social Skills Expertise variable

Respondent's perceptions of the Social Organization Expertise indicator, 52% answered agreeing to the statement of the online transportation application Expertise Social Organizations can help in conveying information (comments, responses, complaints, etc.)

E. Respondents to variable Perception of Ease of Use

Respondent's perceptions of the perceived ease of use indicator, 53.5% responded they agree that the statement of online transportation applications is easy to use.

F. Respondents to the Usability variable

Respondent's perceptions of indicators of perceived usefulness, 54% answered agreeing to the statement of an easy-to-use online transportation application.

G. Respondents to Attitude Toward Using variables

Respondent's perceptions of attitudes toward indicator use, 58% answered agreeing with statements of interest using online transportation applications.

H. Respondents to Actual Use variables

Respondent's perceptions of the Actual Use indicator, 47% answered agreeing with statements often using online transportation applications.

3.2 Test Results for Validity of Research Instruments

The results of the validity test presented in Table 1 below.

Table 1: Results of Test Validity of Research Instruments

Variable	Indicator	Standardized Loading	Information
Screen Design (SE)	SE 1	0,509	Valid
	SE 2	0,750	Valid
	SE 3	0,631	Valid
Navigation (NG)	NG 1	0,513	Valid
	NG 2	0,638	Valid
Accessibility (AC)	AC 1	0,615	Valid
	AC 2	0,827	Valid
	AC 3	0,753	Valid
Social Organizational Expertise (SOE)	SOE 1	0,752	Valid
	SOE 2	0,513	Valid
	SOE 3	0,768	Valid
	SOE 4	0,320	Invalid
	SOE 5	0,752	Valid
Perceived Ease of Use (PEOU)	PEOU 1	0,573	Valid
	PEOU 2	0,813	Valid
Perceived Usefulness (PU)	PU 1	0,745	Valid
	PU 2	0,292	Invalid
	PU 3	0,752	Valid
Attitude Toward Using (ATU)	ATU 1	0,579	Valid
	ATU 2	0,780	Valid
	ATU 3	0,621	Valid
	ATU 4	0,571	Valid
Actual Usage (AU)	AU 1	0,763	Valid
	AU 2	0,625	Valid

From Table 1, it can be seen that there are two indicators in the research instrument declared invalid; this is because the factor loading value of each indicator is smaller than 0.5 [24].

3.3 Research Instrument Reliability Test Results

The reliability test results presented in Table 2 below.

Table 2: Research Instrument Reliability Test Results

Variable	Indicator	Cronbach's Alpha	Information
Screen Design (SE)	SE 1	0,864	Well
	SE 2	0,861	Well
	SE 3	0,860	Well
Navigation (NG)	NG 1	0,860	Well
	NG 2	0,859	Well
Accessibility (AC)	AC 1	0,861	Well
	AC 2	0,827	Well
	AC 3	0,858	Well
Organizational Social Expertise (SOE)	SOE 1	0,858	Well
	SOE 2	0,861	Well
	SOE 3	0,864	Well
	SOE 5	0,858	Well
Perceived Ease of Use (PEOU)	PEOU 1	0,860	Well
	PEOU 2	0,858	Well
Perceived Usefulness (PU)	PU 1	0,845	Well
	PU 3	0,852	Well
Attitude Toward Using (ATU)	ATU 1	0,879	Well
	ATU 2	0,880	Well
	ATU 3	0,821	Well
	ATU 4	0,871	Well
Actual Usage (AU)	AU 1	0,863	Well
	AU 2	0,825	Well

From Table 2, we can see the value of Cronbach's Alpha on all variables stated to have good reliability [25].

3.4 Evaluation of Normality and Data Outliers

The results of evaluating the normality of data can be seen in Table 3 below.

Table 3: Data Normality

Variable	min	Max	Skew	c.r.	Kur-tosis	c.r.
SE 1	1,000	5,000	-0,741	-3,528	1,405	3,345
SE 2	1,000	5,000	-0,678	-3,229	0,197	0,469
SE 3	1,000	5,000	-0,662	-3,151	0,468	1,114
NG 1	1,000	5,000	-0,824	-3,921	0,898	2,138
NG 2	1,000	5,000	-0,501	-2,384	0,373	0,889
AC 1	1,000	5,000	-0,821	-3,906	1,237	2,945
AC 2	1,000	5,000	-0,955	-4,548	1,785	4,249
AC 3	1,000	5,000	-0,792	-3,772	1,268	3,018
SOE 1	1,000	5,000	-0,791	-3,765	1,062	2,528
SOE 2	1,000	5,000	-0,594	-2,827	0,364	0,867
SOE 3	1,000	5,000	-0,403	-1,921	0,577	1,373
SOE 5	1,000	5,000	-0,885	-4,213	1,962	4,671
PEOU 1	1,000	5,000	-0,222	-1,057	0,526	1,251
PEOU 2	1,000	5,000	-0,764	-3,639	1,184	2,819
PU 1	1,000	5,000	-0,403	-1,921	0,211	0,502

33

Variable	min	Max	Skew	c.r.	Kur-tosis	c.r.
PU 3	1,000	5,000	-0,849	-4,042	1,499	3,568
ATU 4	1,000	5,000	-0,571	-2,718	0,473	1,127
ATU 3	1,000	5,000	-0,744	-3,541	1,150	2,737
ATU 2	2,000	5,000	-0,227	-1,080	-0,021	-0,049
ATU 1	2,000	5,000	-0,476	-2,267	0,263	0,627
AU 1	1,000	5,000	-0,688	-3,277	0,696	1,657
AU 2	1,000	5,000	-0,136	-0,647	-0,002	-0,004
Multivariate					17,575	41,841

The assumption of normality of the data is tested by looking at the value of skewness and kurtosis, if the value is c.r. has a range between -2,58 to +2,58, the data can be declared normally distributed [26]. From Table 3, it can be seen that there is still a value of c.r outside + -2,58, meaning that the data is not distributed normally. Therefore, outlier detection will be carried out so that the data is distributed normally. Outlier detection results show values of p1 and p2 greater than 0,05 [27].

3.5 Model Testing Result

The feasibility test of the overall model is carried out using SEM, which is also used to analyze the proposed hypothesis for the goodness of fit model, as can be seen in Table 4.

Table 4: A Goodness of Fit Model

The goodness of Fit Index	Cut of Value	Information
Chi-Square	expected small	325,385
Probability	> 0,05	0,000
NCP	expected small	129,385
GFI	0,90	0,845
RMR	≤ 0,05	0,039
RMSEA	≤ 0,08 good fit = 0,05 close fit	0,072
ECVI	expected small	2,430
TLI	> 0,95	0,987
AGFI	> 0,90	0,821
NFI	0,80 - 0,90 marginal	0,893
RFI	0,80 - 0,90 marginal	0,857
IFI	0,80 - 0,90 marginal	0,906
CFI	0,80 - 0,90 marginal	0,904
CMIN/DF	< 2,00	0,176
PGFI	expected big	0,873
PNFI	expected big	0,873

Of the overall measurements of the goods mentioned above of fit, the proposed model is considered to be eligible because there is a model that is a good fit or meets the requirements.

3.6 Hypothesis Testing Result

H1 : Screen Design has a significant effect on Perceived Ease for Use.
H2 : Navigation has a significant effect on Perceived Ease for Use.
H3 : Accessibility has a significant effect on Perceived Ease for Use.
H4 : Expertise Social Organization has a significant effect on Perceived Ease for Use.
H5 : Accessibility has a significant effect on Perceived Usefulness.
H6 : Social Organization Expertise has a significant effect on Perceived Usefulness.
H7 : Perceived Ease for Use has a significant effect on Perceived Usefulness.
H8 : Perceived Usefulness has a significant effect on Attitude Toward Using.
H9 : Perceived Ease for Use has a significant effect on Attitude Toward Using.
H10 : Attitude Toward Using has a significant effect on Actual Usage.

4. CONCLUSION

Based on the results of the analysis of the constructs related to the Technology Acceptance Model, we can conclude that all the results of the analysis of variables have a significant effect on each relationship between the variables. This proves that the use of transportation can be accepted in the community of Garut Regency. Furthermore, this study uses four main constructs in the Technology Acceptance Model showing that not all constructs in TAM are used, so for further research, it is recommended to add constructs that have not been analyzed to relate the relationships of constructs that can be used to see from a different perspective.

ACKNOWLEDGEMENT

Authors wishing to acknowledge Sekolah Tinggi Teknologi Garut that supports and funds this research publication.

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