

**TRAVEL MODE SELECTION MODEL TO SHOPPING CENTER USING
PRIVATE VEHICLE AND ONLINE OJECTS
(CASE STUDY: PALANGKA RAYA BIG MARKET)**

Ayu Nizar Wati, Ina Elvin, dan Devia

*Civil Engineering Study Program, Faculty of Engineering, University of Palangka Raya
Email:*

ABSTRACT

Everyone needs transportation to meet their daily needs such as going to work, school, recreation, or social interactions. When traveling to Pasar Besar in Palangka Raya, people face choices of different types of transportation modes, such as using private vehicles or online motorcycle taxis. For their choice of transportation mode, travelers consider various factors like the journey itself, distance, cost, and so on. Many people travel to Pasar Besar in Palangka Raya using various types of transportation, either private vehicles or online motorcycle taxis.

In this study, data collection was obtained from questionnaire respondents who considered transportation costs, residents' income, the number of vehicles owned, travel time and distance, as well as the respondents' age levels. Additionally, data were gathered from specific agencies or through interviews with relevant parties, such as demographic data from the Central Statistics Agency (BPS). The sampling methods used included SPSS software and Microsoft Excel

The variable that influences or is significant in the choice of mode towards a large market is Motor Vehicle Ownership (X_1), with a value of $0.034 < 0.05$, Car Vehicle Ownership (X_2) with a value of $0.044 < 0.05$, and Frequency of Private Vehicles (X_{12}) with a value of $0.024 < 0.05$.

Keywords: transportation, mode selection, private vehicles, online motorcycle taxis.

1. INTRODUCTION

Everyone needs transportation to fulfill life's needs, such as work, school, recreation or social interaction. Traveling to the Big Market in Palangka Raya City, the journey is faced with a choice of modes of transportation, using private vehicles and online motorbike taxis. For the choice of transportation mode, travelers consider various factors such as travel, distance traveled, costs and so on. Many people travel to the Palangka Raya Big Market with various types of transportation using private vehicles or online motorbike taxis.

The Pasar Besar area often experiences overcrowding and has limited parking spaces, which makes some people choose online motorbike taxis. Therefore, it is deemed necessary to conduct research among the public who use private vehicles and online motorcycle taxis regarding the choice of mode to use if they are going to the large market between private vehicles and online motorcycle taxis.

2. LITERATURE REVIEW

Transportation is defined as an effort to move, move, transport, or divert an object from one place to another, so that in another location the object becomes more useful or can be useful for a certain purpose (Miro, 2005). Transportation is also a process, namely the process of moving, the process of moving, the process of transporting and transferring where this process cannot be separated from the need for supporting equipment to ensure a smooth transfer process according to the desired time. Transportation modeling is very useful for transportation planning, because through this modeling the planning and decision-making process for various transportation problems can be simplified.

Binary Logit Model only for the choice of 2 alternative modes of transportation, namely mode A and mode B. The form of this model is in the form of probability (%) the opportunity for mode A to be chosen depends on the parameter values or satisfaction using modes A and B and the exponential value.

3. RESEARCH METHODS

Analyze the choices of consumers (travelers) from a set of alternative modes that compete with each other and cannot be chosen (used) simultaneously by more than one mode. The binary logit model is used only for the choice of transportation mode, the model form is as follows (Miro, 2005):

$$P(i) = \frac{e^{\beta X_{in}}}{1 + e^{\beta X_{in} - \beta X_{jn}}} \text{ and } \beta X_{jn} = 1 / 1 + e^{\beta(X_{in} - X_{ij})}$$

Where $P(i)$ is the probability of selecting mode I , βX_{in} , βX_{jn} is the value of the mode- ij satisfaction parameter, and e is exponential.

Determining the level of mode choice of travel behavior for all alternative choices. The research model is then further tested to see whether it has adequate validity and reliability, and then calibrated with existing real conditions to assess the success of the model.

4. RESULTS AND DISCUSSION

1. Research variable

A research variable is an object, attribute or value both qualitatively and quantitatively that is determined in a study so that information can be obtained from that object. This research variable is taken from factors that influence the choice of transportation mode, namely the characteristics of the traveler, trip characteristics and characteristics of the transportation mode facilities.

Table 4.1 Research Variables

Variable	Indicator	Description
Dependent variable		
Types of Moda	Community Mode to Big Market a. Private vehicle b. Online Motorbike Taxi	The answer that is the mode of transportation to the Big Market is Private Vehicles and Online Motorbike Taxi
Independent Variable		
Characteristics of Travelers	Vehicle Ownership	0 = Does not have a vehicle 1 = Motor
	Vehicle Ownership	0 = Does not have a vehicle 1 = Car
	Ownership of a driving license	0 = Does not have a driver's license 1 = YES C

	Ownership of a driving license	0 = Does not have a driver's license 1 = YES A
	Total Income	1 = < Rp. 1,000,000 2 = Rp. 1,000,000 - Rp. 2,000,000 3 = IDR 2,000,000 - IDR. 3,500,000 4 = IDR 3,500,000 - 5,000,000 5 = > Rp. 5,000,000
	<i>Life Style</i>	0 = Appetite 1 = Need
Travel Characteristics	Distance from residence to big market	1 = 1 - 5 Km 2 = 5 - 10 Km 3 = 10 - 15 Km 4 = > 15 Km
	Time of Trip to Big Market	0 = Morning/Afternoon 1 = Afternoon/Evening
Characteristics of Transportation System Facilities	Time taken on the way to the big market	1 = 5 - 15 Minutes 2 = 15 - 30 Minutes 3 = 30 - 60 Minutes 4 = > 60 Minutes
	Monthly Transportation Costs	1 = < Rp. 200,000 2 = Rp. 200,000 - Rp. 350,000 3 = IDR 350,000 - IDR. 500,000 4 = > Rp. 500,000
	Choice of Mode to Big Market	0 = Private Vehicle 1 = Online Motorbike Taxi
	Fashion Opportunities for Big Markets	1 = 1 Times 2 = 1 - 2 Times 3 = > 2 Times
	Frequency of Private Vehicles	0 = Rarely 1 = Often
	Online Motorbike Taxi Frequency	0 = Rarely 1 = Often

2 Factors that Influence the Choice of Transportation Mode

This analysis was carried out with the help of SPSS 22.0 software with the variables used being Motor Vehicle Ownership (X1), Car Vehicle Ownership (X2), SIM C Ownership (X3), SIM A Ownership (X4), Total Income (X5), Life Style (X6), distance from residence (x7), time of trip (x8), time taken (x9), transportation costs (x10), mode opportunities to the market (x11), frequency of private vehicles (X12), online

motorcycle taxi frequency (X13). The respondents selected in this research were 100 respondents.

1. First, enter the data for the Independent Variable (X) and Related Variable (Y)

	Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14
1	0	1	0	1	0	2	1	1	1	1	2	1	1	1														
2	0	1	0	1	0	2	1	1	1	0	1	2	2	1	1													
3	0	1	1	1	1	0	3	1	3	1	2	2	2	1	1													
4	0	1	0	0	1	3	1	2	1	2	4	1	1	1	1													
5	0	1	1	1	1	0	1	1	1	1	1	2	2	1	1													
6	0	0	1	0	0	2	1	2	1	2	2	2	2	2	1													
7	0	1	0	1	0	2	1	4	1	2	1	1	1	2	1													
8	0	1	0	1	0	1	1	3	1	1	3	1	1	1	1													
9	0	0	1	0	1	2	1	2	1	2	1	3	3	2	1													
10	0	1	0	0	0	1	0	1	1	1	1	1	1	1	1													
11	0	0	0	0	0	1	1	2	1	2	1	2	1	1	1													
12	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1													
13	0	0	1	0	1	1	1	1	2	0	2	1	1	1	1													
14	0	1	0	0	1	4	1	3	1	1	4	1	1	1	1													
15	0	1	1	1	0	1	1	2	0	2	2	2	2	1	1													
16	0	1	1	1	0	1	1	4	1	2	2	1	2	1	2	1												
17	0	1	0	1	0	1	1	1	1	1	2	1	1	1	1													
18	0	1	0	0	1	5	1	4	0	2	1	1	1	1	1													
19	0	1	1	1	0	5	1	4	0	2	2	2	2	1	1													
20	0	1	1	1	0	3	1	1	1	1	1	1	1	2	1													
21	0	1	0	1	0	1	1	2	1	2	2	1	2	1	2	1												
22	0	1	1	1	0	4	1	2	1	2	2	1	2	1	1													
23	0	1	1	0	0	2	1	3	1	1	2	1	1	1	1													
24	1	0	1	0	1	4	1	2	1	2	2	1	1	1	2													
25	0	1	0	1	0	1	0	1	1	1	1	1	1	1	1													
26	1	1	0	1	0	1	1	1	1	1	1	2	1	1	1													
27	0	1	1	0	0	1	1	2	1	2	2	1	1	1	1													

2. Then go to the analysis menu then select Regression then select Binary Logistic

IBM SPSS Statistics Data Editor - BINER_Latihan_1.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

Visible: 14 of 14 Variables

	Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14
1	0	1	0	1	0	2	1	1	1	1	2	1	1	1														
2	0	1	0	1	0	2	1	1	1	0	1	2	2	1	1													
3	0	1	1	1	0	3	1	3	1	2	2	2	1	1	1													
4	0	1	0	0	1	3	1	2	1	2	4	1	1	1	1													
5	0	1	1	1	0	1	1	1	1	1	2	2	1	1	1													
6	0	0	1	0	0	2	1	2	1	2	2	2	2	2	1													
7	0	1	0	1	0	2	1	4	1	2	1	1	1	2	1													
8	0	1	0	1	0	1	1	3	1	1	3	1	1	1	1													
9	0	0	1	0	1	2	1	2	1	2	3	3	2	1	1													
10	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1													
11	0	0	1	0	0	1	1	2	1	1	1	1	1	1	1													
12	1	1	0	1	0	1	1	2	0	2	1	1	1	1	1													
13	0	1	0	0	1	4	1	3	1	1	4	1	1	1	1													
14	0	1	1	1	0	1	1	2	0	2	2	2	2	1	1													
15	0	1	1	1	0	1	1	4	1	2	2	1	2	1	2	1												
16	0	1	0	1	0	1	1	1	1	1	2	1	1	1	1													
17	0	1	0	0	1	5	1	4	0	2	1	1	1	1	1													
18	0	1	1	1	0	5	1	4	0	2	2	2	2	1	1													
19	0	1	1	1	0	3	1	1	1	1	1	1	1	2	1													
20	0	1	0	1	0	1	1	2	1	2	2	1	2	1	2	1												
21	0	1	1	1	0	4	1	2	1	2	2	1	1	1	1													
22	0	1	1	0	0	2	1	3	1	1	2	1	1	1	1													
23	0	1	1	0	0	2	1	3	1	1	2	1	1	1	1													
24	1	0	1	0	1	4	1	2	1	2	2	1	1	1	2													
25	0	1	0	1	0	1	0	1	1	1	1	1	1	1	1													
26	1	1	0	1	0	1	1	1	1	1	2	1	1	1	1													
27	0	1	1	0	0	1	1	2	1	2	2	1	1	1	1													

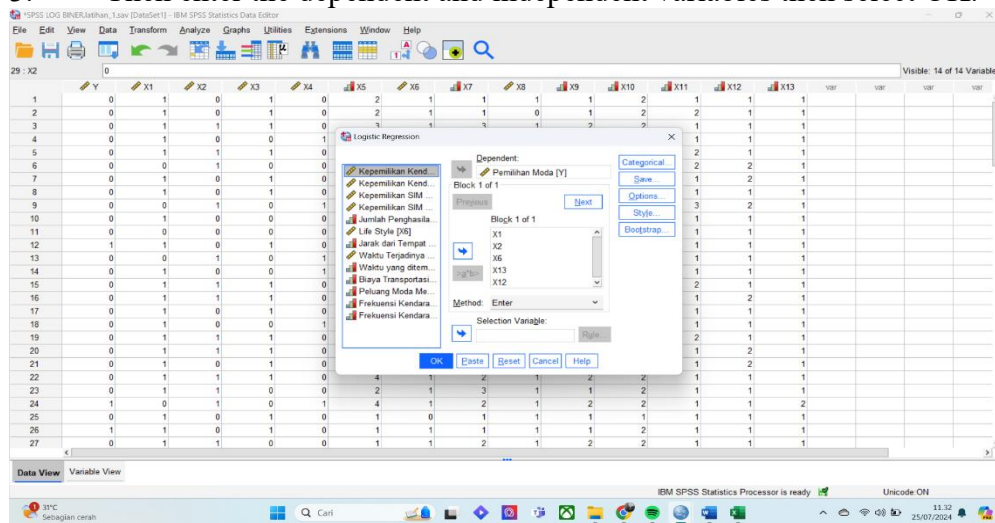
Data View Variable View

IBM SPSS Statistics Processor is ready

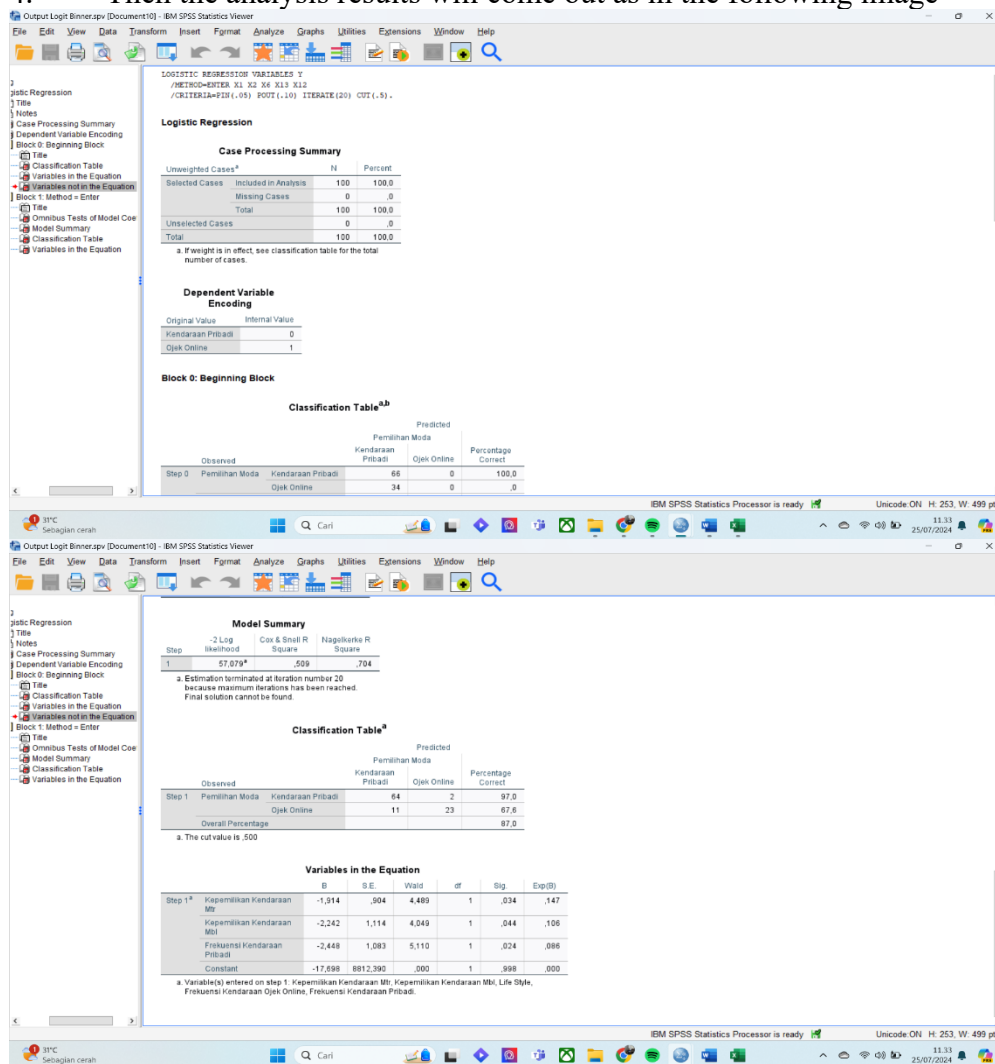
Unicode ON

11:32 25/07/2024

3. Then enter the dependent and independent variables then select OK.



4. Then the analysis results will come out as in the following image



From the results of the analysis there are 3 significant variables, namely as follows:

Table 4.2 Variable Description and Summary Statistics

Variables in the Equation						
	B	S.E.	Forest	df	Say.	Exp(B)
Vehicle Ownership Mtr	-1,914	0,904	4,489	1	0,034	0,147
Mbl Vehicle Ownership	-2,242	1,114	4,049	1	0,044	0,106
Frequency of Private Vehicles	-2,448	1,083	5,110	1	0,024	0,086
Constant	-17,698	8812,390	0,000	1	0,998	0,000

Source: Analysis Results (2024)

Next, table 5.12 displays the B value which is the regression coefficient for each variable, where the (+) and negative (-) signs indicate the tendency of the independent variable towards the dependent variable.

3. Binary Logit Model Analysis

The model for choosing transportation modes to large markets in this study uses a binary logit model.

$$P(1) = \frac{\exp^{(U_1)}}{1 + \exp^{(U_2 - U_1)}}$$

$$P(1) = \frac{2,718^{(0,147)}}{1 + 2,718^{(0,106 - 0,147)}}$$

$$P(1) = 0,59 = \mathbf{59\%}$$

Dan

$$P(2) = \frac{1}{1 + e^{(U_1 + U_2 + U_3)}}$$

$$P(2) = \frac{1}{1 + 2,718^{(0,147 + 0,106 + 0,086)}}$$

$$P(2) = 0,41 = \mathbf{41\%}$$

After the three variables that influence mode choice are entered into the binary logit model equation, the probability of mode choice to a large market is obtained:

Table 4.3 Probability of Mode Choice

No.	Sarana Transportasi	Persentase
1	Kendaraan Pribadi	59%
2	Ojek Online	41%

Source: Analysis Results (2024)

Based on the table and equation above, the probability of respondents choosing private vehicles as a means of getting to large markets is 59%. Meanwhile, the probability of respondents choosing a motorbike taxi *online* as a means to reach a large market as much as 41%.

From the results of the analysis using SPSS, it can be seen that variables that are proven to be significant in mode choice include Motor Vehicle Ownership (X₁), Car Vehicle Ownership (X₂), and Frequency of Private Vehicles (X₁₂) a value of 0.05 is the hypothesis of a confidence level of 95% = 0 .05. Hypothesis accepted...

CONCLUSION

1. CONCLUSION

The following are the conclusions from the research results, namely:

1. The variable that influences or is significant in the choice of mode towards a large market is Motor Vehicle Ownership (X₁), with a value of $0.034 < 0.05$, Car Ownership (X₂) with a value of $0.044 < 0.05$, and Frequency of Private Vehicles (X₁₂) with a value of $0.024 < 0.05$.
2. Based on the equation above, the probability of respondents choosing private vehicles as a means of getting to large markets is 59%. Meanwhile, the probability of respondents choosing a motorbike taxi *online* as a means to reach a large market as much as 41%.

2. SUGGESTION

The following are suggestions from the research results, namely:

1. Related: This research can be used as a basis for planning facilities and infrastructure in large market environments.
2. Further research is needed to discuss more deeply the binary logit model used, such as the ratio or difference logit model.

BIBLIOGRAPHY

Arung, Z. (2021). **Analysis of the Choice of Travel Transportation Modes to Makassar Mall Using the Multinomial Logit Method (Case Study: Phinisi Point Mall).**

Iis, S. (2020). **Selection of Transportation Modes to Campus By Semarang State University Students.**

Marisa, M.M., Audie, L.E. Rumayar., Longdong, J. (2020). **Model of Choice of Public Transport and Online Transportation Modes in Tomohon City (Case Study: Students in Tomohon City).** Journal of Civil Statistics 8(6). Manado.

Miro, F. (2005). **Transportation Planning for Students, Planners, and Practitioners.** Erlangga. Jakarta.

Rati, W. (2020). **Analysis of Transportation Mode Selection at Riau University using the Binary Logit Method.**

Riani, D., Mohamad, A., Imam, F.H. (2018). **Model for Selecting Travel Modes to Shopping Centers Using Private Vehicles (Motorbikes and Cars).** Journal of Engineering 1(2). Palangka Raya.

Rofifah, R., Dwiana, N.T., Muhammad, H. (2019). **Mode Choice Model Between Private Vehicles and City Transport on Jalan Jenderal Sudirman, Klandasan Ilir Subdistrict. Plano Civil Journal 8(2).** Balikpapan.

Supit, R.M., Samuel Y.R. Rompis., Lucia, I.R. Lefrandt. (2020). **Model of Online Transportation Mode Selection in Manado City.** Journal of Civil Statistics 7(1). Manado.

Sihombing, R., Desriantomy., Sutan, P.S. (2022). **Analysis of Transportation Mode Choices to Palangka Raya University**. Serambi Engineering Journal 7(4). Palangka Raya.

Silitonga, S. P. (2012). **Model of Mode Choice and Function of Public Transport Utilities**. Brawijaya University. East Java.

Sugiyono. (2014). **Educational Research Methods Quantitative, Qualitative and R&D Approaches**. Alberta. Bandung.

Tamin, O. Z. (1997). **Transportation Planning and Modeling**. ITB. Bandung.