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IMPACT OF LARGE-SCALE SOCIAL RESTRICTIONS ON TRANSPORTATION MODES

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Abstract- This study aims to determine the choice of transportation modes used by residents of West Jakarta when the PSBB policy was implemented and to determine the factors that influence users of these modes in their daily trips. The questionnaire is shaped and uses descriptive analysis techniques and analyzes the most influential factors in the use of transportation modes with cross tabulation analysis. The results showed that in daily trips during the PSBB, 78% of the 300 respondents used private motorbikes, 6% car users, 16% public transport users. From crosstab analysis, this study found several factors such as gender, occupation, income, private vehicle ownership, SIM ownership, travel comfort affects the choice of transportation mode. The most closely related variable in influencing mode choice preferences is the vehicle ownership variable.

Keywords: Transportation, Private Vehicles, Public Transportation, COVID-19, Mode Choice.

1. INTRODUCTION

Transportation is a very interesting object for research, as long as with the rapidly increasing population, of course moving from one place to another requires a mode of transportation, for example in carrying out daily activities of working [12]. In the journey of private vehicles for people in urban areas, it provides more aspects of flexibility and convenience. But on the other hand, the ownership and use of private vehicles also contribute to traffic jams [13]. In this context, the ownership and use of private vehicles can be said to be an alternative for the community in meeting the demands of the movement. but on the other hand, this phenomenon has become one of the problems with the emergence of traffic congestion and a decrease in environmental quality in urban areas [3].

Transportation is the movement of people and goods from one place to another [7] so that transportation activities in general affect the optimal system of movement from one place to another, there are 2 modes of transportation, in this case represented by private transportation and public transportation [6]. However, at this time with the existence of the West Jakarta large-scale social restrictions policy, we know that the movement in West Jakarta which was once relatively busy has now become quieter due to the Covid pandemic and the enactment of the large-scale social restrictions. To find out the choice of transportation modes used by residents of West Jakarta at the time the large-scale social restrictions policy was enforced, it is necessary to conduct research entitled "Impact of Large-Scale Social Restrictions on Transportation Modes". It is hoped that the research on the characteristics of users in private car and public transport modes in West Jakarta at the time of the Large-scale Social Restrictions can identify the characteristics of the users of transportation modes in the area.

2. STUDY AREA

The research location is located in the Administrative City of West Jakarta, the West Jakarta Administrative City is a low-lying area located about 7 meters above sea level. West Jakarta is located from 106°22'42" to 106°58'18" BT and 5°19'12" to 6°23'54" LS. Based on the Governor's Decree No. 171 of 2007, the West Jakarta region is 129.54 km². Based on its geographical position, the city of West Jakarta has the following regional boundaries:

- Northern Border: Adm. City, North Jakarta
- Eastern Border: Adm. City, Central Jakarta
- Southern Border: Adm. City of South Jakarta and Banten Province
- Western Border: Banten Province and South Jakarta City

West Jakarta has 8 Districts including Cengkareng, Grogol Petamburan, Kalideres, Kebon Jeruk, Kembangan, Palmerah, Taman Sari, and Tambora.

3. METHODS

The survey was carried out by means of an individual census / questionnaire; The data were collected by purposive sampling, the sample was taken according to the purpose of the survey and based on random sampling and a list of questions was arranged based on the variables that became the reference for the theoretical synthesis. Then from the results of the questionnaire that has been filled in, it produces data related to the characteristics of daily commuters based on the preferences of the West Jakarta

area [8]. The number of samples in this study were 300 respondents. After the required data is sufficient, a code will be given at each point in the questionnaire. Then carried out a descriptive analysis of each point in the questionnaire results, including tabulations, percentages, bar charts, and pie charts [9]. The next step is to analyze what variables are correlated with the chosen mode selection variable and the selected household characteristics and travel time variables [16]. For that, it is necessary to test the correlation between each variable. This test will use the SPSS version 22 software tool.

3.1. Large Scale Social Restriction

Large-Scale Social Restrictions, abbreviated as PSBB on specific activities of residents in a region suspected of being infected with Corona Virus Disease 2019 (COVID-19) in such a way as to stem the possibility of the spread of Corona Virus Disease 2019 (COVID-19). In accordance with the Regulations of the Minister of Health of the Republic of Indonesia No. 9 of 2020, on the Guidelines on Large-Scale Social Restrictions for Accelerating the Handling of COVID-19 by keeping everyone's distance [11]. Where in the Transport Mode Restrictions that transport passengers, all air freight services, sea, trains, highways (public/private vehicles) continue to run with restrictions on the number of passengers. With the implementation of the PSBB, one of the government policies is to urge and enforce employees to work from home or work from home (WFH) [11].

3.2. Criteria of Tarvel

Traveler who are objects in this study are seen from the following criteria [5]:

1. Income

The income that travelers have is certainly influential in choosing the mode of transportation. Low-income travelers tend to choose the cheapest mode of transportation while high-income travelers tend to choose the mode of transportation that suits their preferences.

2. Age

This factor is also a factor that influences the choice of transportation mode. Older travelers tend to choose the mode of transportation based on the closest distance and convenience, while younger travelers tend to choose the mode of transportation by considering several aspects such as travel time and cheaper prices.

3. Gender

In general, women and men tend to have different preferences. This can be seen from several aspects such as aspects of comfort, secure and ease of access.

4. Purpose of Travel

The purpose of the trip is very influential in the choice of mode because for each destination the traveler has a different route with a different travel time.

5. Domicile

Domicile influences the choice of transportation mode where the closest transportation mode tends to be preferred by travelers The determination of variables is needed to assist in the preparation of the research questionnaire.

3.3. Mode of Transportation Selection

Mode choice can be defined as the share or proportion of the number of trips into different ways or modes of travel. The choice of transportation mode is an important stage in planning transportation in an area. This concerns the efficiency of movement in urban areas, the space that the city must provide for transportation infrastructure, and the many choices of transportation modes that residents can choose [14].

In choosing the mode of transportation, a person will be influenced by factors that influence the decision to choose between using a private vehicle or public transportation [12]. He explains that the factors that can influence the choice of mode can be grouped into [14]:

1. Characteristics of road users

The availability or ownership of private vehicles, the higher the ownership of private vehicles, the less dependence on public transportation. Owning a driving license (SIM). Household structure (young couple, family with children, retired, single, etc.).

2. Characteristics of movement

The purpose of movement, for example movement to the workplace.

3. Characteristics of transportation modes

Travel time, waiting time at the bus stop, walking time to the bus stop, moving time, and so on. Transportation costs (fare, fuel costs, etc.). Availability of space and parking rates. Qualitative factors, including comfort and safety, reliability and regularity, and others.

4. City or zone features

Some of the features that can influence modal choice are distance from city center and population density.

3.4. Sample Data Collection

Samples were taken from several residents of West Jakarta who would be distributed questionnaires. It can be seen on as Determination of Variables and Research Data. [15].

The determination of variables is needed to assist in the preparation of the research questionnaire [1]. For this reason, the variables below are considered as influencing factors in the choice of transportation modes for users of transportation modes at the time of the PSBB [2]. These variables are: Independent Variable that the determination of this variable is taken from the previous research variables that have been carried out by adding several variables that can influence passengers in choosing the mode of transportation [4].

No., Variables

A) Dependent Variables (*Y*)

Public Transportation:

- City Transportation
- Shuttle Bus
- Online-based transportation

Private Vehicle:

- Car
- Motor cycle

B) Independent Variables (*X*)

1. Age
2. Gender

3. Occupation
4. Income
5. Private vehicles
6. Driver license
7. Purpose
8. Mileage
9. Travel Time
10. Safety
11. Comfort
12. Frequency

4. RESULTS AND DISCUSSIONS

4.1. Identification of Socioeconomic Characteristics

From Figure 1 below showed the percentage results by characteristic age that many respondents from this study were 89% aged between 17-55 years old, 7% of respondents were less than 17 years old, and 4% of respondents were over the age of 55.

The percentage of daily travelers at the time of PSBB with the percentage of male was 45.7% and female was 54.3%. In West Jakarta City as much as 71% of the population are private / self-employed workers, a 3% are civil servants (PNS), and 26% is unemployment.

The results show that a 79% of respondents in West Jakarta City have an income of less than IDR 5,000,000. From the Figure 2 below from 237 with a percentage of 79% of respondents who own private vehicles, and as many as 63 with a percentage of 21% of respondents who do not own private vehicles. From the diagram below 180 people with a percentage of 60% of respondents who have a driver license, and as many as 120 people with a percentage of 21% of respondents who do not have a driver license.

Based on Figure 1 the majority are private employees who work in West Jakarta City. Meanwhile, other activities are shopping, playing, and taking of children, which are routine activities almost every day. Although currently in the PSBB period after schools are suspended, most companies impose WFH, and other social activities are limited. However, the purpose of travel for work was still 52%, and the purpose of travel for the public was 33% and the purpose of travel for school was 15%.

Based on the results of the analysis from Figure 1 below, most of the distance traveled by respondents in West Jakarta City is less than 10 km.

The travel time of less than 30 minutes to get to the destination of the respondent's trip has a percentage of 59%, this is more than the travel time of more than 30 minutes which has a percentage of 41%.

Based on the results of data processing, alternative modes of transportation that can ensure safety on the way are one of the factors considered in the choice of transportation modes in West Jakarta City. The type of transportation chosen based on security is the private motorcycle with 271 respondents or 90% of the respondents.

The respondent's preferred mode of transportation based on the convenience of his trip was selected by the respondent with a total of 286 people or as much as 95%.

Based on figure 1 most respondents made by trips every day is 77% or 231 respondents, by 2 times / week as much as 12% and a frequency of four times / week as many as 11%.

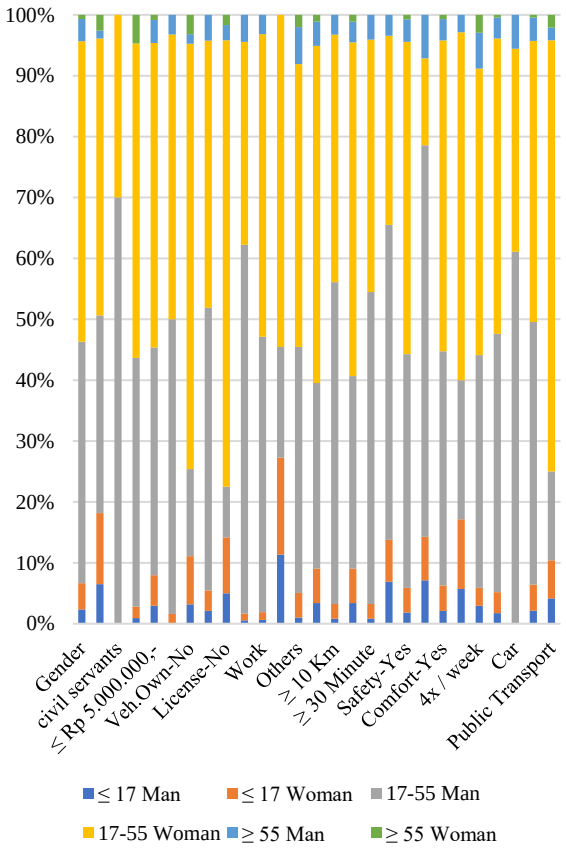

Figure 1. Characteristics of Respondents

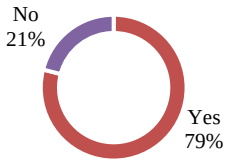

Figure 2. percentage of respondents on private vehicle ownership

4.2. Test Contingency Coefficient

The test contingency coefficient is shown in Table 1.

Table 1. Chi-Square and Contingency Coefficient

	Variable * Mode	Chi Square	*q*	Asymp Sig.	Contingency Coef.
1	Age	2.434 [a]	0.05	0.656	0.09
2	Gender	16.271 [a]	0.05	0.000	0.22
3	Occupation	57.602 [a]	0.05	0.000	0.40
4	Income	15.461 [a]	0.05	0.000	0.22
5	Vehicle Ownership	85.539 [a]	0.05	0.000	0.47
6	Driver's license	42.406 [a]	0.05	0.000	0.35
7	Purpose of Travel	5.285 [a]	0.05	0.259	0.13
8	Travel Distance	3.644 [a]	0.05	0.162	0.11
9	Travel Time	3.202 [a]	0.05	0.202	0.10

10	Security	5.525 [a]	0.05	0.063	0.13
11	Comfort	8.321 [a]	0.05	0.016	0.16
12	Travel Frequency	1.839 [a]	0.05	0.765	0.07

* Variable mode by: Age, Gender, Occupation, Income, Vehicle Ownership, Driver's license, Purpose of Travel, Travel distance, Travel time, Security, Comfort, Travel frequency.
a. age: 4 cells (44.4%) have expected count less than 5. The minimum expected count is 0.78.
a. gender: 0 cell (0.0%) have expected count less than 5. The minimum expected count is 8.22.
a. occupation: 3 cells (33.3%) have expected count less than 5. The minimum expected count is 0.60.
a. income: 1 cell (16.7%) have expected count less than 5. The minimum expected count is 3.72.
a. vehicle ownership: 1 cell (16.7%) have expected count less than 5. The minimum expected count is 3.78.
a. driver's license: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.20.
a. purpose of travel: 1 cell (11.1%) have expected count less than 5. The minimum expected count is 2.64.
a. travel distance: 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.38.
a. travel time: 0 cell (0.0%) have expected count less than 5. The minimum expected count is 7.38.
a. security: 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.74.
a. comfort: 2 cells (33.3%) have expected count less than 5. The minimum expected count is 0.84.
a. travel frequency: 2 cells (22.2%) have expected count less than 5. The minimum expected count is 2.04.
(Source: Results of Author Analysis by Crosstabs- Chi-Square Tests and Contingency Coef. with SPSS 22, 2020)

4.3. Correlation Regression Test Results

Based on provisions made correlational interpretations, judged by the amount of interest, correlations can be decided.[10]

1. The relationship between the type and age of the correlation is –0.073 and the interest is 0.210 > 0.05 where, Ho is received and Ha rejected, which means there is no correlation between the mode type and age of the respondent.
2. The relationship between the type of mode and gender correlation is 0.229 and the importance is 0.00 < 0.05 where, Ho is rejected and Ha accepted, which means there is a correlation between the type of mode and gender.
3. The relationship between the type of mode and type of work correlation coating is 0.053 and the interest is 0.357 > 0.05 where, Ho is accepted and Ha rejected, which means there is no correlation between the type of mode and work.
4. The relationship between the type of mode and income coated correlation is –0.183 and the interest is 0.001 < 0.05 where, Ho is deducted, and Ha received which means there is a correlation between the type of mode and income of the respondent.
5. The relationship between the type of mode and possession of the correlation of a private vehicle is -0.459 and the interest is 0.000 < 0.05 where, Ho is rejected and Ha accepted, which means there is a correlation between the type of mode and ownership of a private vehicle.
6. The relationship between the type of mode and possession of the driver's license correlation coating is -0.371 and the interest is 0.000 < 0.05 where, Ho is rejected, and Ha accepted which means there is a correlation between the type of mode and ownership of the license driver.
7. The relationship between the type and destination of the travel correlation is –0.034 and the stake is 0.560 > 0.05 where, Ho is accepted and Ha rejected, which means there is no correlation between the type of mode and the travel destination.
8. The relationship between the type of mode and travel distance of the correlation is –0.093 and the interest is 0.107 > 0.05 where, Ho is accepted and Ha rejected, which means there is no correlation between the type of mode and the distance of the journey.
9. The relationship between the type of mode and the travel time correlation is –0.064 and the interest is 0.272 > 0.05 where, Ho is accepted and Ha rejected, which means there is no correlation between the type of mode and time of travel.
10. The relationship between the type of mode and travel safety correlation is –0.126 and the importance is 0.030 > 0.05 where, Ho is received and Ha rejected, meaning there is no correlation between the type of mode and security.
11. The relationship between the type of mode and comfort of the travel correlation coating is –0.159 and the importance is 0.006 > 0.05 where, Ho is received and Ha rejected, meaning there is no correlation between the type of mode and comfort.
12. The relationship between the type and frequency of travel correlation is 0.026 and the interest is 0.657 > 0.05 where, Ho is accepted and Ha rejected, which means there is no correlation between the type of mode and frequency of travel.

Table 2. Model summary regression test result

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.538 [a]	0.289	0.259	0.395
a. Predictors: (Constant), Frequency, Time, Security, Income, Age, Purpose, Vehicle Ownership, Gender, Occupation, Comfort, Driving License, Travel Distance				

(Source: Results of Author Analysis with SPSS 22, 2020)

4.5. Discussions

From the results of the analysis and testing above, it can be concluded that:

- For the characteristics of respondents, most respondents are aged between 17-55 years (89%), work as private/self-employed employees (71%) and have a monthly income of less than IDR 5,000,000 (79.3%).
- From the regression test that those who have correlation or that affect the choice of mode are the independent variables which include the sex of the respondent, monthly income, vehicle ownership and SIM/driving licenses ownership.
- From the results of the crosstab analysis: The variable that has the closest relationship in influencing the mode choice preference is the vehicle ownership variable. This factor most influences the choice of mode on daily trips at the time of the PSBB in West Jakarta.

• From the analysis, private motorbike transportation is the most preferred choice. This is also a consideration for workers to drive their vehicles after a day of high activity, this will certainly affect driving safety. For respondents who have low income, this can be a consideration in order to save expenses.

5. CONCLUSIONS

Based on the results of the data analysis that has been performed, it can be concluded as follows:

1. Factors affecting the selection of mode of transport at the time of PSBB in the West Jakarta Area, from the results of the regression test can be concluded that the free variables cover gender, income per month, ownership of private vehicles and possession of an influence driver's license in choosing mode of transport.
2. The selection of alternative modes of transport used for daily travel at the time of PSBB's enactment in West Jakarta was obtained from the distribution of a questionnaire of 300 respondents, most of the users were respondents using private motorcycle vehicles of 234 (78%), car users of 18 (6%), and public vehicle users of 48 (16%).
3. Factors affecting the use mode is by using crosstab analysis including gender respondents, respondents' work, income, ownership of private vehicles, ownership of driving licenses, travel comfort. From the results variables that have the most closely related in influencing the priority of mode selection are vehicle ownership variables.

NOMENCLATURES

Acronyms

PSBB : Pembatasan Sosial Berskala Besar / The Large-Scale Social Restrictions
BT : Bujur Timur / East Longitude
LS : Lintang Selatan/South Latitude
km : Kilometer / Kilometer
WFH : Work from Home
SIM : Surat Ijin Mengemudi / Driving License
PNS : Pegawai Negeri Sipil / Civil Servants
IDR : Indonesian rupiah

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