Correlation Level of Motorcycle and Travelling Characteristics Using Regression Model

Asma Massara[1]∗, Abdul Hakim [2], Achmad Wicaksono [3], Lambang Basri Said[4]

[1]Doctoral program of Environmental Science, Postgraduate School, Universitas Brawijaya
[2]Department of Public Administration, Faculty of Administrative Science, Universitas Brawijaya
[3]Department of Civil Engineering, Faculty of Engineering, Brawijaya University
[4]Department of Civil Engineering, Faculty of Engineering, Makassar Islamic University

*Abstract-*Inadequate transportation systems create social exclusion problems that encourage ownership of motorcycles for people in the suburbs and inaccessible mass transportation modes. Motorcycles are one of the modes that become the mainstay of low-income family to meet the needs of the movement because it has a relatively affordable price with the ease of the credit system. As a result, there was an inflation of motorcycles among the people in Makassar City, Indonesia, mainly low income people in Banta-Bantaeng and Untia areas. This has become one of the causes of congestion because the number of vehicles is not proportional to the available road capacity. The high frequency of travel and distance from residence to work place and some areas of activity center which become the attraction of society to do the activity of traveling become main cause of society buy and own motorcycle. This study aims to analyze the level of correlation between motorcycle ownership and travel characteristics through linear regression analysis method that is processed with the help of SPSS program 24. The results of this study indicate that there is a relevant correlation between motorcycle ownership and travel characteristics with R Square value of 0.491 means 49.1% for Banta-bantaeng area and R Square value of 0.66 which means that the correlation characteristic of traveling to motorcycle ownership is 66% in the location of Untia region.

Key words- Indonesia, Motorcycle, regression, traveling characteristic

I. INTRODUCTION

Travel behavior is a household decision by many non-spatial factors, such as economic, social, and demographic. It has been investigated by Kitamura which increases household income proportionately to the number of trips for recreational and recreational purposes [1], and to be a means of improving household enterprises, to do what is required on travel at weekend [2]. However, along with the development that is growing far between residential locations with the center of activity due to urban sprawl, arise the opinion that the spatial aspect is a factor more.
Vehicle dependence, arising from economic considerations, psychological preference, and habitual behavior, is formulated here as a subjective latent construct that acts in a person's mode choice [3]. Motorcycles are the main means of transportation in many economically disadvantaged countries. This is mainly because of the affordability of motorcycles [4]. This is also due to high maneuverability in dense streets. Cross-country statistics have revealed the growth of motorcycles in developed countries with developing countries due to increased urbanization and personal wealth. In contrast, the country is advancing car growth with increasing revenue. Motor vehicles are a high consequence of population increase.

Transportation can be one of the means in achieving the goal of social policy, namely by providing access to participation that can lead to equality. Inadequate transportation systems lead to social exclusion and encourage ownership of motor vehicles for people in the suburbs as well as inaccessible mass transportation modes [5]. As a result, there was an inflation of motor vehicles in motorcycles mainly among the people of Makassar City, including the low income community. Ownership of motorcycles in this study is a force or strength that arises from within the community to provide ease of mobility to achieve the desired goals. In this effort of ownership there is a process undertaken by the community to obtain the motorcycle in accordance with the ability or the carrying capacity of their economy. Operational ownership of motorcycles in this study is a low-income community response to a number of statements about the overall business that arises from within the community to grow the drive to have a motorcycle because the role of a motorcycle so important for the continuity of the family economy so desirable by the community to be achieved. This study aims to analyze the level of correlation between motorcycle ownership and travel characteristics through linear regression analysis method.

II. MATERIAL AND METHOD

This research data is obtained from low income society as research subject and is population in this research. In the description of this data will be described data free variable (Y) that is the ownership of motorcycles and the dependent variable (X) is the characteristics of traveling. The description of the data presented includes the size of the central tendency of mean (M), median (Me), mode (Mo), variance, standard deviation, maximum value, and minimum value.
The data collection for motorcycle ownership variable in

this research use the research instrument in the form of Likert scale spread to low income society in two residential areas in different sub-districts, Untia and Banta-bantaeng Urban Villages selected as research subjects. While data for travel characteristic variable were taken using questionnaire to see the origin-destination, distance, travel frequency, length of travel. Scores obtained from each question item of each variable were tabulated and calculated using a specific formula as listed in table 2 and table 3. Data obtained through questionnaires were used for testing purposes of hypotheses that have previously been tested for validity and reliability.

A criterion testing instrument validity was calculated value of r exceeds the tabulated r value which means valid question. If otherwise, it means the question was invalid. The tabulated r requirement was 0.3. In this case the grain score was considered X and the total score was considered Y. The correlation number of each item as the result of the calculation is consulted with the table at the significance level of 5% and N = 96. Item/question was said to be valid if r xy exceed tabulated r. From the table, it was known that tabulated r as 0.3. Thus if the correlation coefficient less than 0.3, it was declared void. Conversely, if the correlation coefficient was equal to or more than 0.3, than the score was valid. Technically, the calculation process was completed with the help of computer with SPSS program 24. The valid motorcycle ownership variable was 13 items, whereas the number of invalid was 3 items. For traveling characteristic, the valid variable was 20 items, while the number of invalid was 5 items. Summary can be seen in Table 1.

The next calculation can be seen in the appendix, Summary of validity analysis item questionnaire items and items can be seen in the following table.

Table 1. The validity result summary

No.	Variables	Number of items	Valid items	Invalid items	Fell items
1	Motorcycle ownership	16	13	3	6,14,16
2	Travel characteristics	20	15	5	6,13,14,15,16
	Total		28	8	

From the results obtained in Table 1, it can be seen the questionnaire for motorcycle ownership obtained items 6, 14 and 16 fell because invalid while the questionnaire for the characteristics of traveling obtained grains 6,13,14,15 and 16 fell. Therefore, in the implementation of the research, the item is not used so that the number of items of question items that can be used is 28 statements. The results of this validity calculation did not affect the construction and all aspects of the research instrument. In this case there was no missing or falling aspect.

Based on calculations, coefficient of reliability for motorcycle ownership was 0.665 and travel characteristics variable was 0.705. The results were then consulted with the interpretation of the coefficient of reliability used. From the interpretation, it was known that motorcycle ownership and travel characteristics have good reliability so that they are qualified to be used as a measuring and data collection tool of motorcycle ownership and traveling characteristics. The

following data reliability test results that can be seen in Table 2.

Table 2. The reliability result summary

No	Variables	Result	Note
1.	Motorcycle ownership	0.665	reliable
2.	Traveling characteristics	0.705	reliable

In the process of data collection used measuring instrument in the form of questionnaires as research instruments. For this motorcycle ownership variables the instruments include (a) verbal satisfaction statement, (b) revealing the number of motorcycles, (c) raising the motorcycle, (d) raising the cost, (e) revealing the role of motorcycle for community life, (f) bring up the basis of ownership considerations. These indicators developed into 16 question items as listed in table 3 below.

Tabel 3. Instrument of Motorcycle ownership

No	Indicators	No. of items	total
1	Verbal satisfaction statement	1	1
2	Revealing the number of motorcycles	2	1
3	Raising the way to get motorcycle	3	1
4	Raising the cost	6,7	2
5	Revealing the role of motorcycle for community life	5,8,9,10,11,12,13	7
6	Bring up the basis of ownership considerations.	4,14,15, 16	4
	Total	16	

Tabel 4. Indicator of travelling

No	Indicators	No. of items	total
1.	The tendency to travel using motorcycle transportation mode	3,5,6,9,10, 11, 12,13, 20	9
2.	The travel frequency	1, 2	2
3.	The distance and location of travel destination	7	1
4.	Difficulties and ease in doing transportation activities on a motorbike	4, 8	2
5.	Availability of public facilities and social facilities	17, 18, 19	3
6.	Availability of public transport modes around his residence.	14, 15, 16	3
	Total	20	

The variable characteristics of the traveling low-income society of the instrument were reflected in the 6 indicators. It included of (a) the tendency to travel using motorcycle transportation mode, (b) the travel frequency, (c) the distance and location of travel destination, (d) difficulties and ease in doing transportation activities on a motorbike, (e) availability of public facilities and social facilities, (f)

availability of public transport modes around his residence. The list of interest learning instruments was as follows:

Each item of motorcycle ownership questionnaire and travel characteristics was measured by ratio scale. For scoring on each item the Likert scale has been modified and prepared for an alternative answer.
For an alternative positive answer:
• SS (Strongly Agree): score 4
• S (Agree): score 3
• TS (Disagree): score 2
• STS (Strongly Disagree): score 1

All data has been collected further in the analysis using linear regression method. Linear regression analysis was an analytical tool used to determine whether there was influence between variables by studying the change in the value of a variable (dependent variable) caused by changing the value of other variables (independent variable) that can affect the variable. The linear regression equation used in the analysis for indicator of travelling as a dependent variable and motorcycle ownership as an independent variable was as follows:

Table 5. The dependent variable

Dependent variable	Code	Parameters
Indicator of travelling	X_{BP}	traveling time
		traveling frequency
		Length of traveling
		Public transportation vehicle
		Transportation cost

Table 6. The independent variable

independent variable	code	Parameter
motorcycle ownership	Y_{SP}	Number of motorcycle

$Y_{SP} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + ...+ \beta_{10} X_{10}$ -------------[1]
β_0 = constanta
$\beta_1...\beta_9$ = coefficient of each variables

III. RESULT AND DISCUSSION

1. Ownership of Motorcycles

Motorized ownership data (variable Y) is obtained through a questionnaire consisting of 13 (thirteen) statements. The score scale for each item is 1-4 with 96 respondents in Banta-bantaeng Urban Village. Each respondent can get a maximum score of 52 and a minimum value of 13. Based on motorcycle ownership data, the calculation result with SPSS version 24 for Windows has tendency to center with mean price (M) of 48.40, median (Me) of 47.0, variant of 10.41, range of 12.00, standard deviation of 3.22, minimum value 42.00, and maximum value 51. The results of statistical analysis of motorcycle ownership are summarized in the following Table 7.

Table 7. Data Statistical data of motorcycle ownership in Banta-bantaeng Urban Village

motorcycle ownership		
N	Valid	96
	Missing	0
Mean		48.4063
Median		47.0000
Mode		46.00
Std. Deviation		3.22679
Variance		10.412
Range		12.00
Minimum		42.00
Maximum		51.00

To see the level of motorcycle ownership in the research location, the classification of the observed symptoms was observed into 3 (three) categories, namely high, medium, and low. Categories based on ideal standard deviations and ideal mean scores. The classification is as follows.
• High category = if the score is above 35 (thirty five)
• Medium category = if the score is between 21 and 35
• Low category = if the score is below 20 (twenty)
The identification of the trend category or the high degree of motorcycle ownership in this study is based on the above three categories. The mean price obtained for motorcycle ownership variables as listed in Table 8 of the above descriptive data is 48.4 and standard deviation of 3.22. Based on these criteria, obtained the category of motorcycle ownership was listed in Table 8.

Table 8. Distribution of Variable Propensities of Ownership of Motorcycles in Banta-bantaeng Urban Village

Interval	Frequency (%)	Cumulative Percentage	Category
1-20	0 (0)	0	low
21-35	19 (19.8)	19.8	medium
36-55	77 (80.2)	100.0	high
Total	96 (100)		

The result shows that motorcycle ownership in Banta-bantaeng Urban Village was 19 households (19,8%) was in medium category and 77 households (80,2%) were in high category. The following diagram is used to explain the propensity of motorcycle ownership. The motor ownership data (Y variable) was obtained through a questionnaire consisting of 13 (thirteen) statements. Scale value scores for each item is 1-4 with the number of respondents as many as 83 households in Untia Urban Village. Each respondent can obtain a maximum value of 52 and a minimum value of 13. Based on motorcycle ownership data, the calculation results with the program SPSS version 24 for Windows has a tendency to center with the mean price (M) of 39.88 median (Me) of 39.0, variants of 10.47, range at 14.00, standard deviation of 3.23, minimum value of 33.00, and maximum score of 47. The result of statistical analysis of motorcycle ownership is summarized in Table 9 below.

Table 9. Data Statistical data of motorcycle ownership in Untia Urban Village

Motorcycle ownership		
N	Valid	83
	Missing	0

Mean	39.8795
Median	39.0000
Mode	37.00
Std. Deviation	3.23622
Variance	10.473
Range	14.00
Minimum	33.00
Maximum	47.00

The identification of the trend category or the high degree of motorcycle ownership in this study was based on the above three categories. The mean price obtained for motorcycle ownership variables as listed in table 9 above descriptive data is 39.88 and standard deviations of 3.23. Based on these criteria, obtained the category of motorcycle ownership as listed in Table 11 below.

Tabel 11. Distribution of Variable Propensities of Motorcycles Ownership in Untia Urban Village

Interval	Frequency (%)	Cumulative Percentage	Category
1-20	0 (0)	0	low
21-35	4 (4.8)	4.8	medium
36-55	79 (95.2)	95.2	high
Total	83 (100)	100.0	

These results indicate that motorcycle ownership in Untia is 4 households (4.8%) are in the middle category and 79 households (95.2%) are in the high category. The following diagram is used to explain the propensity of motorcycle ownership.

2.   Characteristics of Traveling

Travel characteristics data (variable X) were obtained through questionnaires or questionnaires in low-income majority settlement areas in Banta-bantaeng Urban Village. The number of questions asked totals 15 questions has been adapted to the cause of the community traveling from home (origin) to another destination. The score scale is 1-4. Respondents can obtain a minimum score of 15 and a maximum value of 60. Based on the calculation data of community travel characteristics with SPSS 24 for windows program, it is known that the central tendency is obtained by means of mean price (M) of 48.47, median (Me) of 48.00, variant of 5.73, 10.00, standard deviation of 2.99, minimum value 44, and maximum value 54. Summary of statistical analysis results can be seen in Table 11 below.

Table 11. Data Statistical data of Traveling characteristics in Banta-bantaeng Urban Village

Traveling characteristics		
N	Valid	96
	Missing	0
Mean		48.4742
Median		48.0000
Mode		48.00
Std. Deviation		2.39397
Variance		5.731
Range		10.00
Minimum		44.00
Maximum		54.00

To observe the level of traveling characteristics in the study sites, the classification of the symptoms observed into 3 (three) categories are high, medium, and low. Categories based on ideal standard deviations and ideal mean scores. The classification is as follows.
• High category = if the score is above 40 (forty)
• Medium category = if the score is between 21 and 40
• Low category = if the score is below 20 (twenty)
The identification of the trend categories or the height of low travel characteristics in this study is based on the above three categories. The mean price obtained for the travel characteristics variable as listed in table 12 of the above descriptive data is 48.47 and standard deviation of 2.39. Based on these criteria, the categories of travel characteristics are listed in Table 12 below.

Table 12. Distribution of Variable Trends in Traveling Characteristics in Banta-bantaeng Urban Village

Interval	Frequency (%)	Cumulative Percentage	Category
1-20	0 (0)	0	low
21-35	0 (0)	0	medium
36-55	96 (100)	100.0	high
Total	96 (100)	100.0	

The results indicate that in Banta-bantaeng Village is 96 families (100%) or all sample of research is in high category. This open diagram is to explain travel attributes. While the data of travel characteristics (variable X) is obtained through questionnaires or questionnaires in the residential areas of the majority of low-income communities in Untia. The number of questions asked totals 15 questions has been adapted to the cause of the community traveling from home (origin) to another destination (destination). The score scale is 1-4. Respondents can obtain a minimum score of 15 and a maximum value of 60. Based on the calculation data of community travel characteristics with SPSS 24 for windows program, it is known that central tendency is obtained by means of mean price (M) of 47.99, median (Me) of 48.00, variant of 8.62, 13.00, standard deviation of 2.94, minimum value 41, and maximum value 54. Summary of statistical analysis results can be seen in Table 13 below.

Table 13. Data Statistical data of traveling characteristics in Untia Urban Village

Traveling characteristics		
N	Valid	83
	Missing	0
Mean		47.9880
Median		48.0000
Mode		48.00
Std. Deviation		2.93629
Variance		8.622
Range		13.00
Minimum		41.00
Maximum		54.00

To observe the level of traveling characteristics in the study sites, the classification of the symptoms observed into 3 (three) categories are high, medium, and low. Categories based on ideal standard deviations and ideal mean scores.

The classification is as follows.
• High category = if the score is above 40 (forty)
• Medium category = if the score is between 21 to 40
• Low category = if the score is below 20 (twenty)
The identification of the trend categories or the height of low travel characteristics in this study is based on the above three categories. The mean price obtained for the travel characteristics variable as listed in table 14 above descriptive data is 47.99 and standard deviation of 2.94. Based on these criteria, the category of travel characteristics as listed in Table 14 below.

Table 14. Distribution of Variable Trends in Traveling Characteristics in in Untia Urban Village

Interval	Frequency (%)	Cumulative Percentage	Category
1-20	0 (0)	0	low
21-35	0 (0)	0	medium
36-55	96 (100)	100.0	high
Total	96 (100)	100.0	

These results indicate that the characteristics of traveling in Untia Urban Village amounted to 83 families (100%) or the entire sample of the study is in the high category. The following diagram is used to explain the trends of traveling characteristics.

3. Linear Regression Analysis

In general the linear regression equation formula is $Y = a + bX$. Meanwhile, to know the value of regression coefficient in Banta-bantaeng Urban Village can be based on the output. The regression coefficient in Banta-bantaeng was $Y = 24.778 + 0.490$. The value of constant number was 24.778. This number was a constant number which means that if there was no traveling characteristics (X) then the consistent value of motorcycle ownership (Y) was 24.778. The value of regression coefficients was 0.490. This number means that every 1% increase in traveling characteristics (X), then motorcycle ownership (Y) will increase by 0.490. Since the value of the regression coefficient is plus (+), then it can be said that the travel characteristics (X) have a positive effect on motorcycle ownership (Y). Based on the above output it is known that the significance value (Sig.) was 0.000 less than probability 0.05, so it can be concluded that there was influence of travel characteristics (X) on motorcycle ownership (Y).

Based on the output, the value of t count was 8.441. While tabulated t value was 0.025. The degree of freedom (df) = n – 2 = 96 - 2 = 94. Value of 0.025; 94 then on the distribution of the value of t table was 1.989. Because the value of t count 8.441greater than 1.989, so it can be concluded that there was influence of travel characteristics (X) to motorcycle ownership (Y). To know the magnitude of influence of travel characteristics (X) to motorcycle ownership (Y) in linear regression analysis can be based on R Square or R2 value which is in SPSS output of Summary Model section. The R Square value was 0.431. This value means that the influence of traveling characteristics (X) on motorcycle ownership (Y) is 43.1%, while 56.9% of motorcycle ownership is influenced by other un-researched variables.

The regression coefficient in Untia was $Y = 38.706 + 0.233$

X. The value of constant number was 38.706. This number is a constant number which means that if there was no traveling characteristics (X) then the consistent value of motorcycle ownership (Y) was 38,706. The value of regression coefficients was 0.233. This number means that every 1% increase in traveling characteristics (X), then motorcycle ownership (Y) will increase by 0.233.Since the value of the regression coefficient is plus (+), then it can be said that the travel characteristics (X) have a positive effect on motorcycle ownership (Y). Based on the above output it is known that the significance value (Sig.) Is 0.019 less than <probability 0.05, so it can be concluded that there is influence of travel characteristics (X) on motorcycle ownership (Y).

Based on the output, the value of t count was 2.389. While tabulated t value was 0.025. The degree of freedom (df) = n – 2 = 83 - 2 = 81. Value of 0.025; 81 then on the distribution of the value of t table was 1.989. Because the value of t count 2,389 is greater than 1.989, so it can be concluded that there is influence of travel characteristics (X) to motorcycle ownership (Y). To know the magnitude of influence of travel characteristics (X) to motorcycle ownership (Y) in linear regression analysis can be based on R. The R Square value was 0.66. This value means that the influence of traveling characteristics (X) on motorcycle ownership (Y) is 66%, while 34% of motorcycle ownership was influenced by other un-researched variables.

IV. DISCUSSION

The correlation level between traveling characteristics and motorcycle ownership is high enough so that the main factors of increasing the number of motorcycles in Makassar City was the variety of characteristics traveling from home to downtown and other activity centers. The farther the distance between the house and the purpose of traveling lead the higher the public interest to have a motorcycle. Motorbike use depends on a combination of demographic and economic factors. A study in Taipei, Taiwan showed that motorcycle ownership and usage was due to economical factor. The empirical study in showed the depend on their motorcycles to achieve unaccompanied, short-distance, multistop trips; motorcyclists under the age of 25 who were inferior in economic terms and did not use an automobile showed relatively higher measures of motorcycle dependence [3]. Other study in Barcelona, Spanyol showed that motorbike is seen as a fast and reliable mode of transport in dense urban environments. This motorized two-wheeled mode of transport in everyday mobility is user friendly. Second reason emphasizes the role of the affordability factor to help understand the rise of motorcycle. The specificities of motorbike use pose new challenges to transport policy makers [4].

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AUTHORS

Asma Massara – PhD Student, Doctoral program of Environmental Science, Postgraduate School, Universitas Brawijaya. Email: asma.massara@gmail.com

Abdul Hakim – Promotor, Department of Public Administration, Faculty of Administrative Science, Universitas Brawijaya. Email: hakimend61@gmail.com

Ahmad Wicaksono – Co-Promotor, Department of Civil Engineering, Faculty of Engineering, Brawijaya University Email: wicaksono68@ub.ac.id

Lambang Basri Said – Co-Promotor, Department of Civil Engineering, Faculty of Engineering, Makassar Islamic University. Email: lambangbasri.umimakassar@gmail.com

Corresponding author – Lambang Basri Said, Department of Civil Engineering, Faculty of Engineering, Makassar Islamic University. Urip Sumoharjo KM 5, Panaikang, Panakkukang, Makassar City, South Sulawesi, 90231. Email: lambangbasri.umimakassar@gmail.com