

Model of Vehicle Movement Pulling In Vocational High Schools In Ternate City

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Abstract. School area is one type of land use that has a large enough appeal to the community. The number of vehicle modes can cause new problems in school areas which generally do not have special lanes to drop passengers. This study is to find out the number of pulls of vehicle movements, the characteristics of so unlucky economy and travel of students, teachers and employees, and make a model of pulling merger of vehicles in the educational area on the road K.H Dewantara Ternate city. Methods of collecting survey and questionnaire data, descriptive statistical analysis, correlation analysis, and multiple linear regression analysis. The results of the study on the number of vehicle movement pulls in SMA Negeri 1 Ternate City for 2-wheeled motor vehicles 743 vehicles, 4-wheeled vehicles 59 vehicles, SMK Negeri 1 Ternate City for 2-wheeled motor vehicles 654 vehicles, 4-wheeled vehicles 35 vehicles, SMA Negeri 10 Ternate City for 2-wheeled motorized vehicles as many as 512 vehicles, 4-wheeled vehicles 29 vehicles, and SMK Negeri 5 Kota for 2-wheeled motor vehicles 271 vehicles, 4-wheeled 18 vehicles. The results of the analysis of the best model of vehicle movement pull using a motor are $Y_1 = 248.511 + 0.153 X_1$ and the vehicle movement pull using a car is $Y_2 = -11.068 + 0.895 X_1$. Then the free variables used in this study also had a good influence on the pull of vehicles using a motorbike or by using car.

Keywords: Model, the pull of vehicle movement, Regression Analysis, Ternate.

1 Introduction

Movement occurs in two places where the need for goods or services is available in other places. The process for the fulfillment of such needs as travel for education, work, recreation, and others. Individual travel will be different in each other zone and is influenced by the characteristics of travelers in the study zone.

The large-scale traffic flow caused by the movement of students and teachers on land use for the K.H Dewantara road education area of Ternate city often causes traffic congestion, especially during school entrance and return hours. A large number of shuttles and pick-ups in school zones generally do not have stopping or parking spaces, thus reducing road capacity.

In this regard, traffic flow control is very necessary by analyzing the volume of movement from outside to inside the school, so that later we can find calculations to anticipate congestion that occurs in the area.

The purpose and purpose of this study is to find out what factors affect the movement pull in the area and find out the best model of vehicle movement pull in the area.

The growth of political, economic, socio-cultural, and other sectors can be felt. The growth of these sectors leads transportation to have a very strategic role. Land use are categorized as educational areas, industrial areas, tourist areas, residential areas and trade/shopping areas, would create the specific impact to the transport behavior and attraction [2]. Traffic congestion is a common problem encountered not only by highly urbanized cities but also by developing cities. Studies show that there are a lot of factors that causes traffic congestion where this may include poor traffic signal timing, weather events, and road accidents. Consequently, the more evident cause of traffic congestion in the city of Ternate is due to trip attraction generated by schools. Traffic congestion is further evident where the schools are located within the periphery of the central business district.[3]. Amavi et. al (2014) on the other hand conducted a study on advanced trip generation/attraction models. The study used the multiple linear regression (MLR) model from zonal data where the models were compared to each other by analyzing their hypothesis and the required adjustments. The model considered the spatial correlation and analyzed their improvements with reference to previous models not considering spatial correlations.[4]. The study of Kulpa and Szarata (2016)

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is focused on analysis of household survey sample size in trip modelling process. The Comprehensive Travel Surveys (CTS) were conducted where the core part of the survey are the household trip questionnaires used to identify residents' trip pattern. The present study on the other hand used home interview survey to identify the trip characteristics of pedestrians going to schools and malls in the city of Dagupan [5].

2 Research Methods

In this study, the Education Area on Jalan K.H Dewantara will be used as a place of research, including SMA Negeri 1 Ternate City, SMK Negeri 1 Ternate City, SMA Negeri 10 Ternate City, and SMK Negeri 5 Ternate City.

The method used in this study is descriptive quantitative, by analyzing the attraction of vehicle movements that occur in the education area of Jalan K.H Dewantara. Data on the number of towing vehicle movements as primary data, namely data containing the number of towing vehicle movements that enter the education area at busy times, namely 06:30-08:00 WIT Tamin O. Z (2000), In analyzing the data, several stages of statistical tests must be carried out so that the resulting movement generation model will be stated later, the stages are:

2.1 Correlation Test

Correlation test was conducted to determine the strength/closeness of the relationship between the independent variable and the dependent variable. The results of the correlation test are expressed by the correlation coefficient, where with the value of this correlation coefficient can be known the level of connection between the dependent variable and the independent variable which is very useful in analyzing the level of connectivity. For the relationship between independent variables, independent variables will be selected which have a not strong correlation value or <0.5 in an equation, while the relationship between independent variables and dependent variables will be selected for independent variables that have a strong correlation or > 0.5 in an equation.

2.2 Determining The R Value in Each Variable Relationship

The interpretation of the R value can be seen in Table 1 below:

Table 1. Interpretation of R Value.

R	Interpretation
0	Not Correlated
0.01 - 0.20	Very Low
0.21 - 0.40	Low
0.41 - 0.60	Slightly Low
0.61 - 0.80	Enough
0.81 - 0.99	Tall
1	Very High

2.3 Multiple Regression Assumption Test

2.3.1 Multicollinearity Test

To test whether the regression model found a correlation between the independent variables. If there is a correlation, it is called a multicollinearity problem. A good regression model should not have a correlation between the independent variables.

2.3.2 Normality Test

To test whether in a regression model, the dependent variable, the independent variable, or both have a normal distribution or not. A good regression model is the data distribution or close to normal.

3 Result and Discussion

This research is located in 4 schools in Ternate City, and this research was carried out for students and teachers for daily learning activities. The location of the study was carried out in the schools in Table 2.

Table 2. Primary Data for Vehicle Registration.

NO	School Name	Motorcycle	Car
		Y1	Y2
1	SMA Negeri 1	743	59
	Kota Ternate		
2	SMK Negeri 1	654	35
	Kota Ternate		
3	SMA Negeri 10	512	29
	Kota Ternate		
4	SMK Negeri 5	271	18
	Kota Ternate		

3.1 Description of The Variables

The most significant independent variables used in the models are:

- X1: number of teachers
- X2: number of students
- X3: land area.
- X4: classroom area
- X5: parking area
- X6: number of classrooms

The main dependent variables in the models are:

- Y1: Trips attracted by motorcycle
- Y2: Trips attracted by car

Table 3. Characteristic of Research Sites.

NO	School Name	X1	X2	X3	X4	X5	X6
1	SMA Negeri 1 Kota Ternate	78	1288	5370	52	108	41
2	SMK Negeri 1 Kota Ternate	45	602	3080	48	32	23
3	SMA Negeri 10 Kota Ternate	50	912	1045	72	80	28
4	SMK Negeri 5 Kota Ternate	34	302	750	64	26	15

3.2 Correlation Test

Correlation Test Results of the Independent Variable (X) on the dependent variable of pull movement using a motor (Y1) can be seen in table 4.

Table 4. Correlation Test Y1.

No	Independent Variable	R Value	Interpretation R Value
1	Number Of Teachers (X1)	0.811	Tall
2	Number Of Students (X2)	0.796	Enough
3	Land Area (X3)	0.897	Tall
4	Classroom (X4)	0.644	Enough
5	Parking (X5)	0.622	Enough
6	Number Of Classrooms (X6)	0.83	Tall

Correlation Test Results of the Independent Variable (X) on the dependent variable of pull movement using a motor (Y2) can be seen in table 5.

Table 5. Correlation Test Y2.

No	Independent Variable	R Value	Interpretation R Value
1	Number of Teachers (X1)	0.968	Tall
2	Number of Students (X2)	0.889	Tall
3	Land Area (X3)	0.783	Enough
4	Classroom (X4)	0.578	Slightly Low
5	Parking (X5)	0.787	Enough
6	Number of Classrooms (X6)	0.942	Tall

3.3 The Results of The Best Models

Trip pull model by using a motorcycle
 $Y1 = 248,511 + 0,153 X3$
 $R^2 = 0,804$

Trip pull model by using a car
 $Y2 = -11,068 + 0,895 X1$
 $R^2 = 0,936$

4 Conclusion

The results of the analysis and discussion resulted in the following conclusions:

1. Several factors that influence the pull of vehicle movement in the education area of Jalan K.H Dewantara Ternate City which is the independent variable X, namely the number of teachers, number of students, building area, classroom area, parking area, and number of classrooms. All independent variables have a good influence on the pull of the vehicle by using a motorbike or by using a car
2. Trip pull model by using a motorcycle $Y1 = 248,511 + 0,153 X3$ and trip pull model by using a car $Y2 = -11,068 + 0,895 X1$

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