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Spatial Modeling on Net Enrollment Rate of Junior High in Mataram

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Abstract:- Net Enrollment Rate (NER) is one of educational indicators used to assess the access and equity of educational institution services. The NER of Mataram has not met the target of SDGs and the program of WAJAR DIKDAS 9 years in Junior High just reaches 75.81%. The value of NER in an area has a variance and tends to affect each other. Thus, by considering the effect of location, this study aims to develop educational participation model associated with infrastructure, accessibility, and demographic condition of the citizen in Mataram. It employed multiple spatial regressive method utilizing GeoDa software. It used primary and secondary data; the primary data were obtained from field observation on the coordinates of the students' residences and schools; the secondary ones were taken from the data of Ministry of Education and Culture of 2018, viz. Data Pokok Pendidikan (DAPODIK), Central Bureau of Statistics (BPS), and other secondary sources. The samples were 342 students using the technique of random sampling. This study results in spatial lag (SAR) to model the NER of Mataram. From 8 independent variables, it is derived 4 variables which give significant effect to improve educational participation, i.e. road condition, mileage from home to school, ratio of students to teachers, ratio of female students to male students and income level of parents.

Keywords:- *Education, Net Enrollment Rate (Ner), Spatial Modeling.*

I. INTRODUCTION

Education will establish individual quality. Educated people are supposed to be able to engage themselves in competition and support economic development and societal changes of a country (Ray., 2018)[16]. The agenda transition of global development from MDGs (2005-2015) to SDGs (2015-2030) in the field of education of 4th goal emphasizes on the manifestation of inclusive and equitable education in which all people without exception have right and opportunity to learn in lifetime, better known as *universal primary education* and Indonesia becomes the country having the global commitment to realize the goals of SDGs. Another fact showing the low quality of education in Indonesia is recorded in *Education Index*; Indonesia is in the 108th position of the world, while in ASEAN it is in the 7th position with score of 0.603 lower than Thailand and Sri Lanka. The causes of the low educational achievement are inequality on access and educational equity among regions, and inequality on the opportunity to get education between male and female; it is recorded that on the average Indonesian people can only take education for 8.5 years or complete their education on the second grade of Junior High (BPS., 2018)[4]. Whilst the national program of Indonesian government in education, WAJAR DIKDAS 9 years, requires every region to reach educational completeness in the year of 2008. In fact, up to today there are still many provinces in Indonesia, specially the eastern part of Indonesia, which do not obtain the target. Mataram as the capital of Nusa Tenggara Barat becomes one of cities with low educational quality with NER achievement that has not fulfilled 100% of SDGs target, that is 75.81% (BPS. Kota Mataram, 2017)[5].

Research on community participation in education has been conducted several times. According to (Glewwe, 2006)[8] which discusses school participation in developing countries that are influenced by the family wealth which poor family would not able to finance for education, the educational level of parents, and gender gap. Research by (Grimm M., 2011)[9] concluded that family income has an influence on school participation. For example, in Burkina Faso, Afrika it was found that family income represented with low purchasing power, no saving account, and no educational insurance will affect on the school participation. If family income decreases, it will cause gender inequality in educational participation at the age of 6-13 years between male and female, which female has lower school participation value than male. Besides, the opportunity to get education is also influenced by school availability, unbalance of *demand* and *supply* that is region with high *demand* had low school availability, and region with low social economic background will have low spatial educational index (Lange, 2011)[11]. Condition, quality, and availability of infrastructure also bring a role to increase citizen participation. (Mandic., S., 2017)[12] stated that well-planned school facilitated with infrastructure and active transportation support from home to school will increase the number of the school applicants. The shortening on distance to school determines educational result viz. raising the number of students enrolling to the

school, reducing dropout rates, and increasing test scores (Burde, 2012)[7]; (Mukhopadhyay, 2016)[13]. In Indonesia, this kinds of research was carried out by Khairunnisa, 2014[10]. The study observed factors determining school participation in West Java. The result shows that the main factor affecting NER in Junior High is social economic factors that consist of PRDB, poverty, level of child labor (13-15 years old), educational level of the head of family, and infrastructure i.e. availability of school does not equal with the number of students. In addition, factors determining the achievement level of educational indicator are also affected by the accessibility and internal condition of individual (Brasington, D., 2016)[6];(Sulistyawati, 2015)[17], and inequality on the ratio of teachers to students, and the more the poors increase, the higher the dropout rates (Mubarokah, 2016)[12].

Referring to Tobler's first law of geography which states "everything is related to everything else, but near things are more related than distant thing" (Anselin, L., 1988)[1], it can be assumed that the variance of NER value in a region will probably has a tendency to affect each other. Hence, this study aims at finding factors affecting the increase of educational participation in Mataram by considering the effect of location through spatial modeling.

II. METHODOLOGY

A. *Kinds and Location of Study*

This study employed quantitative method. Quantitative study should describe obvious goals, factors, complete data sources which are arranged in detail in a designed survey format consisting of preparation and parameter to measure data. Next, the data and fact resulted were analyzed statistically and procedurally, and interpreted objectively (Arikunto S., 2013)[2].

The area of study covered the whole administration area of Mataram of 61.30 km^2, consisting of 6 subdistricts i.e. Subdistric of Ampenan, Mataram, Cakranegara, Sekarbela, Selaparang, Sandubaya, and 50 wards.

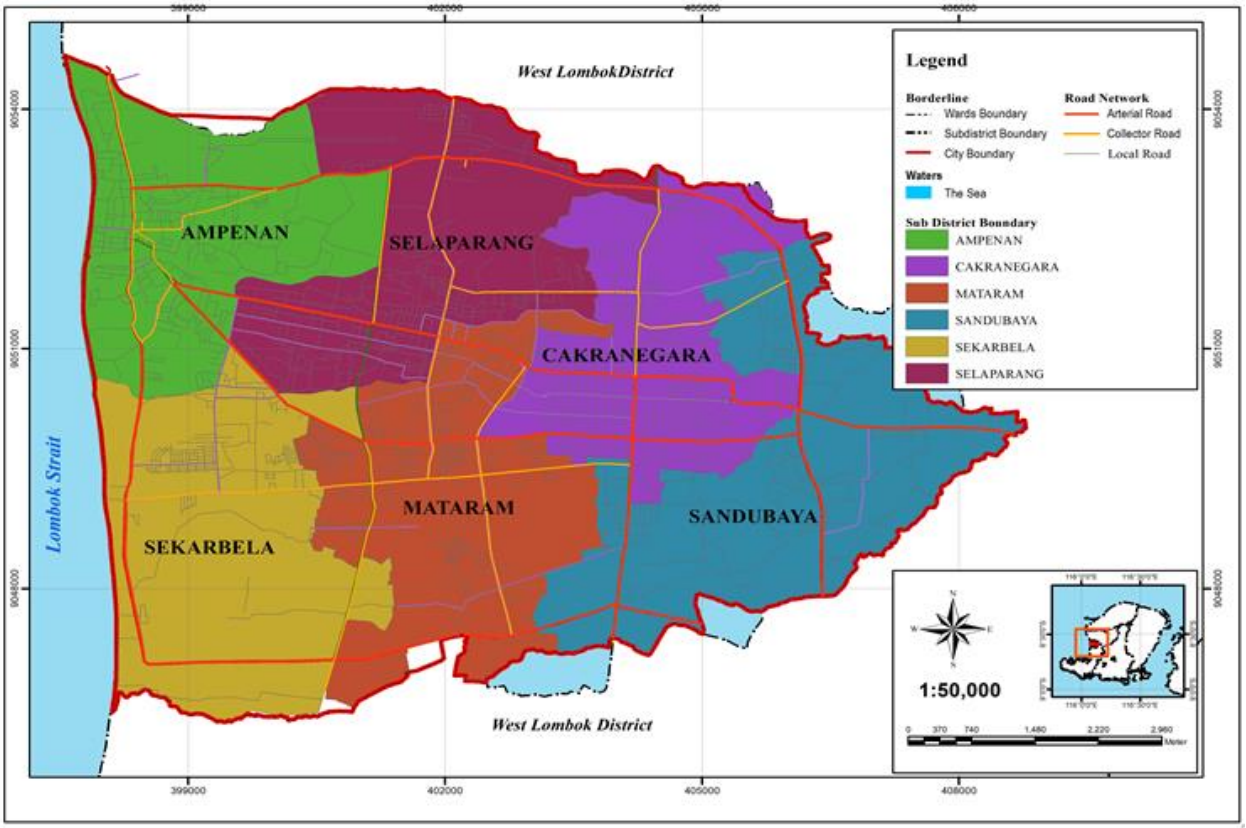

Fig 1:- The Map of Research Area
Source: RTRW Kota Mataram 2011-2031

B. *Variable of Study*

The variables of the study are in the form of syntheses from theories and previous researches, covering:

- *Net Enrollment Rate* with measurement parameter of the number of Junior High students at 13-15 years old and the number of citizen at 13-15 years old.
- Road condition is the route taken by students from home to school considering the length and the condition resulting in road classification: good, medium, and bad.
- Mileage is a number of miles travelled by the students from home to school. The data of mileage are obtained through field survey to collect the coordinates of the students's house and the school location.

- Transport mode is the kinds of transportation that the students take to school, such as on foot, motorcycle, public transportation, or private vehicle.
- Ratio of students to teachers is the proportion between the number of students and teachers.
- Ratio of students to classes is the proportion between the number of students and the classes available.
- Ratio of female students to male ones is the proportion between the number of female students and the male students.
- Education level is the highest grade completed by the students' parents.
- Income level is the money earned per month by the students' parents.

C. Data Collection

The data were collected by utylizing primary and secondary surveys. Primary survey was carried out to obtain data of students' house and school coordinates for the input of mileage variable. Secondary survey was to obtain data from document related to education on 39 Junior Highs in Mataram and several institutions.

D. Population and Sample

Population in this study was the students from 39 Junior Highs in mataram. The samples were taken from each school using random sampling technique. Based on table *Isaac* dan *Michael* for error rate of 5%, from the total number of 18.776 students the samples were 342 students. Then, the samples per school were counted proportionally.

E. Data Analysis

The data analysis employed multiple spatial regression technique that is an analysis to model data involving aspect of location or space to find out the proximity among locations being observed (Anselin, 1988)[1].

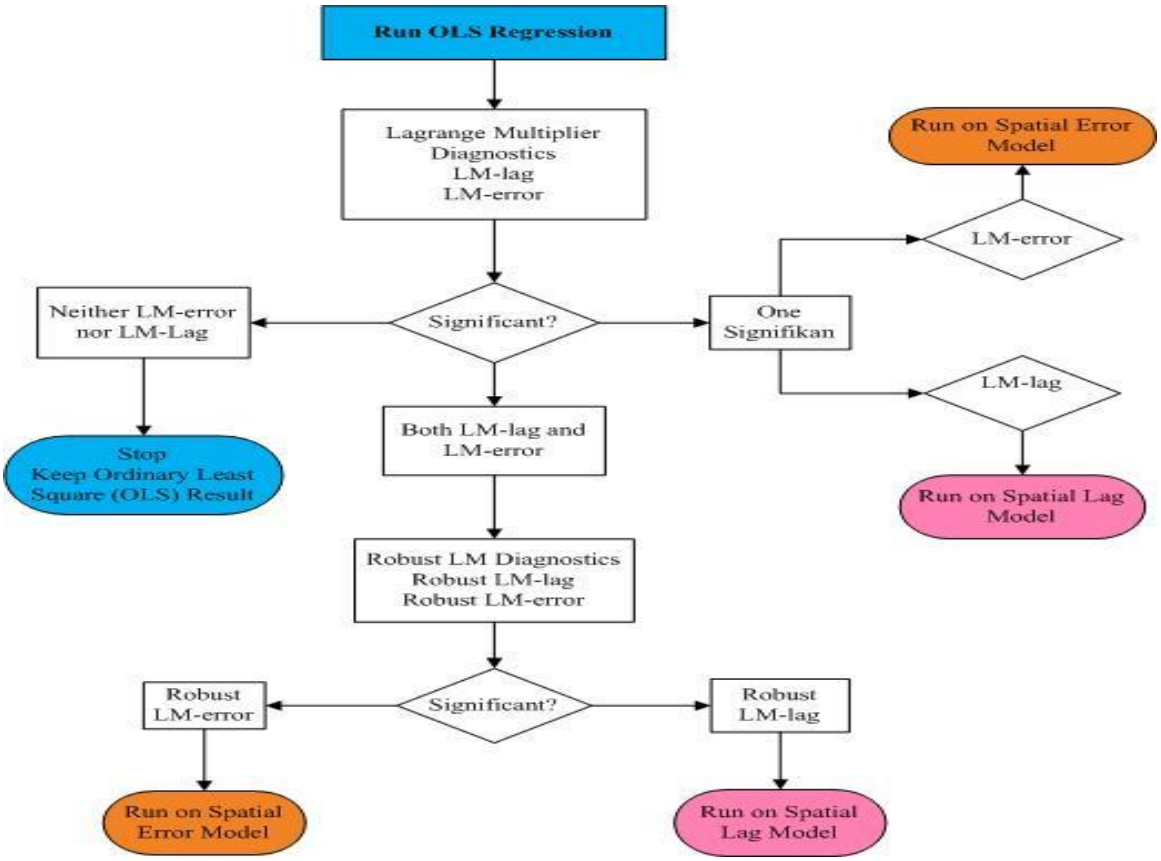

Fig 2:- Spatial Regression Analysis Stage
Source: Anselin (1988)

The steps in the spatial regression analysis (Ningtyas, I.P., 2017)[15] are as follows:

- Conducting data exploration by inputing variable X and Y onto tematic map.
- Carrying out regressive modeling using Ordinary Least Square (OLS) method
- Performing assumption test using classical regressive with the condition that the model is free from multicollinearity and the estimation of model significance is < 0.05.
- Determine spatial weighting with queen contiquity
- Testing the spatial dependence using Moran's I test and Lagrange Multiplier (LM).
- Modeling process, that is whether the data will be modeled using *Spatial Autoregressive Model* (SAR), *Spatial Error Model* (SEM) or *Spatial Autoregressive Moving Average* (SARMA).

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III. FINDING AND DISCUSSION

A. Data Exploration

The early step to conduct spatial regressive analysis is data identification and exploration at 39 Junior High Schools in Mataram, followed with grouping the schools based on the ward they belong to; Mataram has 50 wards, and there are 28 wards covering 39 Junior High Schools. NER is the independent variable and dependent variables consists of road condition (X1) , mileage (X2), transport mode (X3), ratio of students to teachers (X4), ratio of students to classes (X5), ratio of female students to male students (X6), parental education level (X7), and parental income level X8).

B. Classical Assumption Tests

Spatial regression analysis begins with a classic assumption test. This aims to determine whether the data used in the study meets the statistical requirements for Regression analysis or not, both the data on the independent and dependent variables. Classic assumption tests include normality test, multicollinearity, heteroscedasticity.

➢ *Normality*

The normality test is used to find out whether the data used in the regression model have normal distribution or not. In linear regression analysis, it is expected that residuals have normal distribution. To test whether the residual is normally distributed or not, the normality test was done using the Kolmogorov-Smirnov method.

Variable	N	Kolmogorov-smirnov Z	Probability
Y	28	0.097	0.200c,d
X1	28	0.124	0.200c,d
X2	28	0.144	0.144c
X3	28	0.130	0.200c,d
X4	28	0.137	0.055c
X5	28	0.163	0.136c
X6	28	0.145	0.200c,d
X7	28	0.124	0.200c,d
X8	28	0.143	0.152c

Table 2:- The result of Normality test

Table 2 showed that all variables have p-value ≥ *level of significant* (α=5%). Therefore, the residuals have normal distribution.

➢ *Multicollinearity*

Multicollinearity testing is intended to determine whether there is a relationship between independent variables or not. In linear regression, there must be no relationship between independent variables. Multicollinearity testing is done by looking at the Variance Inflation Factor (VIF) or tolerance value of each independent variable. If the VIF value is less than 10 or the tolerance value is greater than 0.1, then there is no multicollinearity issue.

Independent Variables	Collinearity Statistics	
	Tolerance	VIF
X1	0.608	1.645
X2	0.450	2.222
X3	0.221	4.530
X4	0.185	5.397
X5	0.315	3.180
X6	0.644	1.552
X7	0.283	3.537
X8	0.181	5.524

Table 2:- The Result of Multicollinearitytest

Table 2 shows that the independent variable has a VIF value smaller than 10 with a tolerance value greater than 0.1. Thus, it is stated that all independent variables do not have multicollinear symptoms, or in other words. The assumption of multicollinearity tests has been fulfilled.

➢ *Heteroscedasticity*

Heteroscedasticity test is used to determine whether the residuals in the regression model have a homogeneous variance. In linear regression analysis, it is expected that residuals have a homogeneous variance. The assumption of heterocedasticity can be detected by the Scatter Plot. If the residuals spread randomly in a scatter plot, then it can be stated that residuals have homogeneous variance.

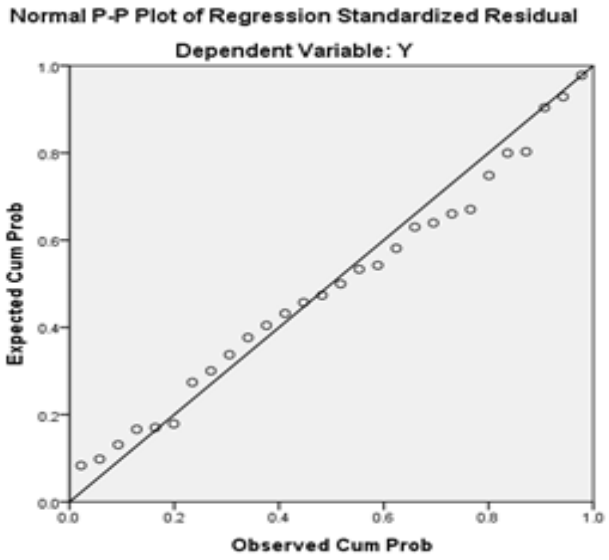

Fig 3:- The result of Heteroscedasticity test (Scatter Plot NER)

The heteroscedasticity assumption test was carried out on 8 independent variables, namely road conditions, distance to school, transportation mode, student and teacher ratio (RMG), student and classroom ratio (RMK), ratio of female students to male (GPA), education level income level on the dependent variable (NER). The results show scatter plots with residuals that spread randomly. Thus, the residuals are expressed as having a homogeneous variety, or heteroscedasticity assumptions have been fulfilled.

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C. Spatial Weights

The formation of spatial weighting is intended to provide an overview of neighboring relations between regions. The spatial weighting type used in this study is Queen Contiguity, namely the concept of intersection between sides and angles, where value 1 for regions that intersect and angles are i-region adjacent to –j region while value 0 is given if region i is not adjacent with j-area. The spatial weight formed will be used for the analysis of the Moran's I and LISA (Local Indicator of spatial autocorrelation) indexes.

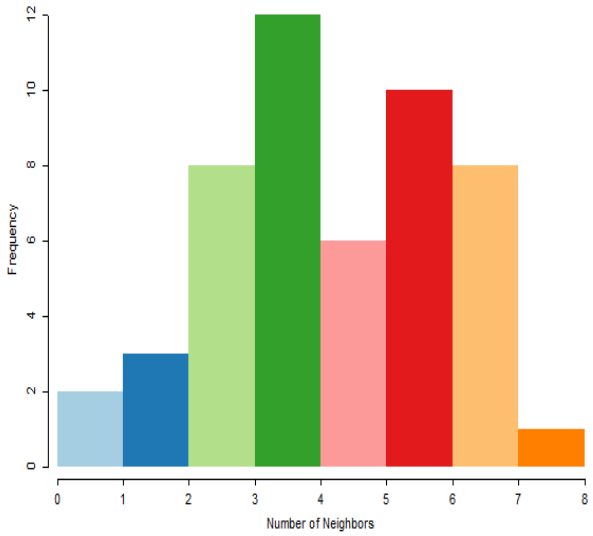

Fig 4:- NER Histogram of connectivity

Figure 4 shows the number of neighborhoods formed by spatial weighting of NER in SMP data using spatial weighting type queen contiguity. The highest number of neighbors is shown in the green bar diagram, which is as many as 7 neighbors and the lowest number of neighbors on the orange bar diagram does not have neighboring. The more neighbors the greater the NER value in a region.

D. Spatial Dependence

The Moran's Index is used to determine the spatial dependencies or correlations between observations or locations. The hypothesis is:

H_0: I = 0 (There are no spatial autocorrelation)
H_1 : I ≠ 0 (There is spatial autocorrelation)

The value of spatial autocorrelation ranges from -1 and 1. If it gets closer to the value of 1, the spatial autocorrelation that is formed is getting stronger. The results of Moran's I NER test of the data of junior high school in Mataram City were shown in the Moran's I Scatter plot (Figure 5).

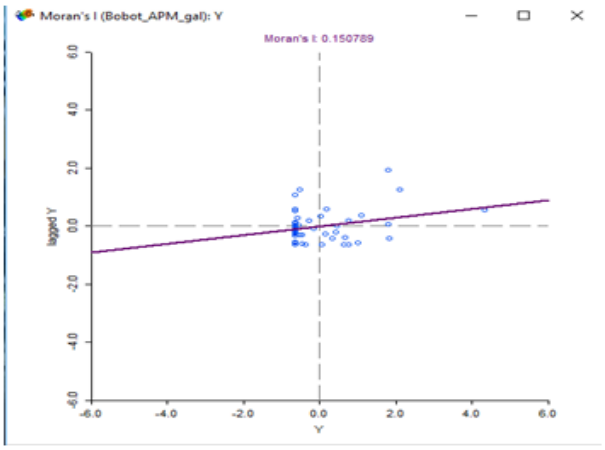

Fig 5:- Moran's I NERof SMP Kota Mataram

Figure 5 shows the value of Moran's I for the Mataram City Middle School NER with weighted queen contiguity formed in quadrant I (High-High) and Quadrant III (Low-Low) of 0.150789. so, there is a spatial autocorrelation between the independent variable and the dependent variable that is positive and tends to cluster into clusters.

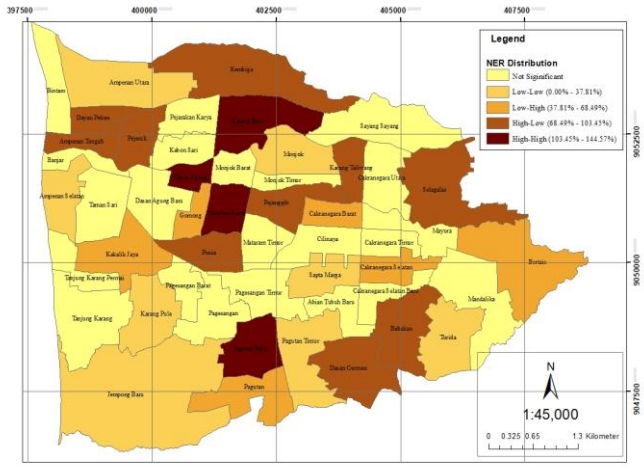

Fig 6:- The Map of NER Distribution on Junior High in Mataram

Fig 6 is the result of the Spatial Autocorrelation Cluster Map Local Indicator (LISA) which divides the NER distribution into 5 categories:

- The High-High category includes 4 sub-districts, including West Mataram, Pagutan, Punia and Dasan Agung wards. In the four wards, there is a high spatial relationship and high participation rates, namely areas with high NER values surrounded by areas that have high NER values. High spatial linkages are caused because this region has many educational facilities. Thus, many school-age students enroll in schools which ultimately contribute to participation in these 3 regions.

- Low-Low category includes 8 wards; North Ampenan, South Ampenan, Karang Pule, Jempong Baru, East Pagutan, Turida, Sapta Marga, Monjok. This area has a

low NER value and is surrounded by areas that have a low NER. In this region, there are 1 junior high school education facilities and very few students enrolled. Thus, the NER in the current ward is low and needs special handling from both the school and the government so that the NER increases.

- The Low-High category includes 6 wards; Gomong Ward, Kekalik Jaya Ward, Cakranegara Barat Ward, Cakranegara Selatan Ward, Bertais Ward, Pagutan Ward. This category shows areas with low NER values surrounded by areas that have high NER. In this region, the number of students enrolled is small but surrounded by surrounding areas has a large number of students. Thus, the existence of schools in the ward with a small NER value needs to improve its quality so that the participation of the population to attend school increases.

- The High-Low category includes 10 wards; the Rembiga ward, Peken Dayan ward, Central Ampenan ward, Pejeruk ward, Pejanggik ward, Punia ward, Karang Taliwang ward, Selagalas ward, Dasan Cermen ward, Babakan ward, and Selagalas ward. The area has a high NER value and is surrounded by areas that have a low NER. The high value of NER in this region is due to the large number of students enrolled while the surrounding area has a low participation rate. Thus, the existence of schools in the 10 urban wards needs to maintain the existence of quality and quality so that the level of participation does not decrease.

- The insignificant category covers 22 wards. This is because the area has high population of school-age at the junior high level but without the support of educational facilities.

E. Spatial Modeling

The construction of spatial modeling of NER was started by conducting classical regressive analysis *(Ordinary Least Square)* on 8 independent variables. After obtained the variable which has level of significance < 5%, then the second phase of classical regression was conducted. During the second OLS, the spatial dependency test, and the spatial lag test was carried out to find out the spatial correlation in the model being observed, whether or not it has significance on *lagrange multiplier* (*lag*) or on *lagrange multiplier* (*error*) with the criteria Ho is rejected if the probability is < $\alpha = 0.05$. If the probability value of *lagrange multiplier* (*lag*) is < $\alpha = 0.05$, then the analysis is continued using the regression of *spatial lag model (SAR)*. Nevertheless, if the value of *lagrange multiplier* (*error*) is < *level of significance* ($\alpha = 0.05$), then the analysis is continued with the regression of *spatial error model* (SEM). The result of analysis using spatial model for NER on Junior High in Mataram processed with GeoDa software is represented as follows:

- *Estimation of Classical Regressive Model (OLS)*

Classical regressive test is first performed to all independent variables i.e. road condition (X_1), mileage to school (X_2), students' transport mode to school (X_3), ratio of students to teachers (X_4), ratio of students to classes (X_5), ratio of female students to male students (X_6), education level of the head of family (X_7) and income level (X_8). The criteria of test is determined based on the probability value from all variables < *level of significance* ($\alpha = 0.05$). The result of estimation of classical regression on 8 variables is presented in **Table 2**:

Variable	Coefficient	Probability
Constant (β_0)	0.190454	0.91556
X1	8.63513	0.00004*
X2	-14.6064	0.00000*
X3	-3.60412	0.28594
X4	2.87463	0.00019*
X5	0.101224	0.81858
X6	27.6133	0.01214*
X7	-1.18012	0.67316
X8	13.0057	0.00004*
$R^2 = 0.968353$ or 96.83%		
*) Level of significant α =5%		

Table 2:- The result of estimation of first-phase classical regression model

Based on table 2, It is obtained that the value of R-*squared* is 0.968353. It means that all independent variables affect dependent variable NER of 83.60% and the rest or 16.4% is affected other variables which are not included in this study. From 8 independent variables, there are 5 variables showing probability < $\alpha = 0.05$ toward dependent variable, viz. road condition (X_1) which has probability of 0.00004, mileage (X_2) which has probability of 0.00000, ratio of students to teachers (X_4) which has probability of 0.00019, ratio of female students to male students (X_6) which has probability of 0.01214, and income level (X_8) which has probability of 0.00005, while 3 other variables viz. students' transport mode to school (X_3), ratio of students to classes (X_5), and percentage of the head of family with the last education at Senior High (X_7) have probability > $\alpha = 0.05$. Furthermore, the process of iteration of classical regression to the 5 independent variables was done again. The result can be seen in **Table 3**:

Variable	Coefficient	Probability
Constant (β_0)	0.261629	0.88185
X1	8.46792	0.00002*
X2	-13.7197	0.00000*
X4	2.72819	0.00000*
X6	27.0679	0.00289*
X8	10.8418	0.00001*
R-squared = 0.967186 or 96.71%		
*) Level of significant α =5%		

Table 3:- The result of estimation of second-phase classical regression model

Table 3 shows the result of second-phase classical regression test on 5 independent variables resulting in R-squared value of 0.967186. Those five variables (X_1, X_2, X

$_4$, X_6, X_8) have p-value < α=0.05. It means that the variable of road condition, mileage, ratio of students to teachers, index of gender parity, and income level significantly affect the increase of school participation. Model built from the result of classical regressive test (OLS) processed by GeoDa is:

$$Y = 0.26 + 8.46X_1 - 13.71X_2 + 2.72\,X_4 + 27.06X_6 + 10.84\,X_8 \quad (1)$$

➢ *Spatial Dependency Test*

This LM test is intended to find out the correlation among variables based on the *Lagrange Multiplier* value. *Lagrange multiplier* (*lag*) value shows the correlation among independent variables, while *lagrange mutilplier* (*error*) indicates the correlation among errors. The result of spatial dependency test presented in **Table 4.**

Test	Value	Probability
Moran's I (error)	0.3884	0.69773
Lagrange Multiplier (lag)	0.01621	0.01621*
Robust LM (lag)	0.01437	0.01437
Lagrange Multiplier (error)	0.86306	0.86306
Robust LM (error)	0.62250	0.62250
Lagrange Multiplier (SARMA)	0.04925	0.04925
*) Significant at level α = 5%		

Table 4:- The result of *Lagrange Multiplier* test

Table 4 shows that *lagrange multiplier* (*lag*) test results in probability < α =0.05 that is 0.01621 or H_0 rejected; it means that there is spatial correlation between independent variables and dependent variable in the model being observed, while *lagrange multiplier* (*error*) test results in probability of 0.86306 or H_0 accepted; it means that there is no spatial correlation in the *error* model being observed, so the analysis can be passed on *spatial autoregressive model* (SAR) for those 5 variables.

➢ *Estimation of Spatial Autoregressive Model (SAR)*

After obtaining result from LM test, the analysis was carried on with *spatial autoregressive model*. The following table presents the result of SAR test on 5 independent variables viz. X_1, X_2, X_4, X_6 dan X_8 utilyzing GeoDa software:

Variable	Coefficient	Z-Value	Probability
W_Y	0.12	2.69	0.00702*
Constant (β_0)	- 4.36	-1.89	0.05849*
X1	8.53	5.52	0.00000*
X2	-13.77	-7.05	0.00000*
X4	2.64	6.66	0.00000*
X6	28.79	3.81	0.00014*
X8	11.14	5.84	0.00000*
R-*squared* = 0.971289 or 97.71%			
*) Significant at level α = 5%			

Table 5:- The result of *Spatial Autoregressive Model* (SAR) test

The test result of spatial lag regressive model in table 5 indicates that the 5 independent variables has probability of < α= 0.05, so that those variables deserve to be included in the model. Moreover, from the test *breusch pagan* it is obtained value of 0.00011; it means that the homogenity is not violated including *likelihood ratio* of 0.01<α= 5% which means there is spatial dependency among variables. From the value of R-*squared* of 0.971289, it signifies that the five variables viz. road condition (X_1), mileage (X_2), ratio of students to teachers (X_4), index of gender parity (X_6), and income level (X_8) contribute significant influence to the increase of APM of 97.71% and the rest of 2.29% is affected by other factors which are not included in the study. The rho (ρ) also has probability <α= 0.05 which means that by adding spatial weight, it will also give significant influence for increasing APM.

The lower AIC value can be used to determine the best model. Based on the analysis result of SAR, the AIC value from OLS is 359.093, while the AIC value from spatial lag model is 354.609. It can be concluded that the AIC value from SAR model < the AIC value from OLS model, and spatial lag model is better to model NER. Spatial model of NER built by using SAR method is:

$$Y = 0{,}12 \sum_{j=1,i\neq j}^{n} W_{IJ}y + 8{,}53X_1 - 13{,}77X_2 + 2{,}64X_4 + 28{,}796X_6 + 11{,}14X_8 - 4.36 \quad (2)$$

Information:

Y : Net Enrollment Rate (%)
W : Spatial Weighted
X1 : Road condition (%)
X2 : Mileage (km)
X4 : Ratio of students to teachers
X6 : Ratio of female students to male
X8 : Parental income level (%)

The interpretation of spatial lag (SAR) model on NER of Junior High in Mataram constructed from the equation above is:

NER is an indicator to see the achievement of education level in a region through the citizen participation on education. The higher the NER value, the more the citizen learning at school in a region. It also represents the higher quality of human resources compared to other regions. The high value of NER reflects better condition and performance of educational institutions in a region compared to those with lower value of NER. Based on the analysis of *spatial autoregressive model* (SAR), the level of citizen participation on Junior High in Mataram is affected by five factors like road condition, mileage, ratio of students to teachers, index of gender parity, and income level.

The constants of four independent variables of the model reveal positive sign viz. road condition (X_1), ratio of students to teachers (X_4), index of gender parity (X_6), and income level (X_8); it means that those four independent

variables have a direct correlation to NER and one independent variable viz. mileage (X_2) signifies negative sign which means the variable of mileage has a reverse correlation to variable NER. The regressive model shows the value of X_1 has coefficient of 8.53 which means that if the road condition is good, it will increase 1 percent, so the Y value (NER) will increase of 8.53. The value of X_2 viz. mileage has coefficient of -13.77; it indicates that the influence of mileage on NER is also similar at every region with coefficient of -13.77 which means if other factors are considered constant and the mileage increases one kilometer, The NER value decreases by 13.77. The value of X_4 viz. ratio of students to teachers has coefficient of 2.64; it means that if the ratio is getting lower, it will increase the NER value of 2.64. The value of X_6 viz. ratio of female students to male students has coefficient of 28.79; it means if the ratio increases 1 percent, the Y value (NER) will increase by 28.79. The value of X_8 viz. income level has coefficient of 11,14; it means that if the income raises 1 percent, the Y value (NER) increases by 11.14. The spatial weight value (W) in the model explains about the existing spatial correlation among adjacent wards. The coefficient value of ρ indicates that if a region is surrounded by other regions as many as n region, then the influence from each region can be measured by 0.12 multiplied by the neighbouring matrix. Coefficient ρ has positive sign; it indicates that the neighbouring weight has direct correlation to the Y value (NER) which means the more the number of neighbours, the higher the NER value.

Implications caused by the regressive model (SAR) after derived five independent variables which will increase educational participation are:

- The variable of road condition; The region having medium or bad road condition needs attention to be repaired soon such as the ward of Pagutan, Turida dan Monjok. By repairing the road infrastructure, it is supposed to increase the people mobility and shorten the traveling time to school and other facilities. Better road condition will give *multiplier effect* for surrounding regions to participate in improving the development of intra/among regions.
- The variable of mileage; The result of the study shows that the shorter the mileage, the more the students enrolling to school. Thus, it is oriented to reinforcing the government policy that is to implement and to realize the Law Number 14 of 2018 concerning School Zoning. The result of the study shows that schools located at the center of the city i.e. SMPN 1, SMPN 2, SMPN 15 and SMPN 6 in the ward of Mataram Barat and Karang Baru, subdistrict of Selaparang are schools with high accepting quota for every year so that it has the highest NER of other regions. The zoning policy will certainly support the equal distribution of students in schools, so it will erase the term "*favourite school"* which is generally desired by students form high economic group. There will be renewal on students in term of status, social economic condition, and academic achievement. Hence, it is necessary to perform restructurisation on zoning, area coverage, and quota in every zone.
- The variable of ratio of students to teachers; Based on the Government Regulation 74 of 2008 concerning Teacher, it is stated that minimum ratio of the number of students to teachers in Junior High is 20:1. It means that one teacher should teach twenty students; the lower the ratio, the less the teaching workload so that it will improve the effectiveness of teaching-learning activity in class and enhance the students' achievement. The result also shows the schools with unequal number between students and teachers such as SMPN 2, SMPN 6, SMPN 7, SMPN 13, and SMP Salafiyah Darul Falah. An effort to rearrange teacher replacement needs to conduct in every school.
- The variable of ratio of female students to male students; The result indicates that the more female studying at school, the more increasing the participation with criteria: if IPG is < 1 then female representation is bigger than male. From twenty eight wards, there are six wards with IPG value > 1; it means that male students is more dominating than female. It can be concluded that gender equality has been reached in Mataram regions. It is implicated on the shift of view and stereotype of community about woman position as inferior who must not exceed the man position. If the number of woman accessing education is getting bigger, the wealth of the people will also increase. Effort to keep the gender existence on education can be done through both government and community supports. The government can establish a regulation which protects women's rights on all aspects of life, include gender-based programs in the educational curriculum, involve women on communal organization and religious activities, while the community is supposed to support and succeed the government's gender-based programs and implant gender equlity early starting from the lowest scope that is family.
- The variable of income level of students parents; The result shows that the higher the income, the higher the NER value, and vice versa. Family with high income can guarantee the sustainability of financing education, so that the children will be motivated more to study, and it will minimalize dropout value in a region.

IV. CONCLUSION

The conclusions of this study about spatial modeling on net enrollment rate of junior high school in mataram city are as follows:

- Spatial autoregressive model (SAR) becomes the model for increasing NER because there is spatial dependency on the lag value. If the number of neighbours among the wards is getting bigger,it will relatively increase the citizen participation in education.
- Spatial modeling including eight variables results in five variables significantly affecting to increase educational participation viz. road condition with probability of 0.00000, mileage from home to school with probability of 0.00000, ratio of students to teachers

with probability of 0.00000, ratio of female students to male students with probability of 0.00014 and income level of parents with probability of 0.00000 with R-squared value of 0.971289; it means that those four independent variables siginificantly contribute influence of 97.12% and the rest of 2.88% is influenced by other factor which are not included in this study.

V. SUGGESTION

From the result of the study, it can be derived some suggestions:

- To improve the citizen participation in education, the government should give extra attention to the regions with medium and high NER by implementing programs to enhance road infrastructure with Public Works Office as the leading sector, do rotation and add teacher recruitment with Education Office as the leading sector, conduct socialization for the community about equal opportunity in education for man and woman with Woman Empowerment and Child Protection Agency as the leading sector, and augment the allocation of educational financing with the regional and central government as the leading sector utilyzing Regional Revenue and Expenditure Budget (APBD), Provincial APBD, and State Revenue and Expenditure Budget (APBN).
- Most of the data sources in this study are secondary data, so it is suggested to use primary data for future study employing questionnaire and adding independent variables related to other educational indicators as determined by UNESCO such as the number of dropout students, the number of class-repeating students, governmental expenditure in education (BOS), et cetera.
- The parents of students are supposed to reform the mindset about education. Parents who understand and support their child to complete study will create excellent, successful, and competing generation. Also, they indirectly have made big investation for the wealth of their children in the future.

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