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Regressıon Modelıng ın Accredıtatıon Assessment Senıor Hıgh School

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Abstract

Improving the quality of education in Indonesia has experienced a less than optimal increase in the process of equalizing the quality of education in Indonesia. The education quality assurance system, especially the assessment of accreditation, has not worked optimally in improving the quality of education in Indonesia. The purpose of this study was to analyze the regression model of the accreditation criteria on the value of the high school level accreditation. The analysis used is descriptive statistics and multiple regression analysis using secondary data from educational institutions. The results showed that the accreditation assessment model formed was Accreditation Value = 0.848 + 0.339 Graduate Quality + 0.280 Learning Process + 0.165 Teacher Quality + 0.184 S/M Management. Testing of accreditation assessment criteria has a significant effect on the value of accreditation in the Education unit. In determining alternative strategies, the quality criteria for graduates and the learning process are the main factors to be improved in the assessment of high school accreditation in Indonesia.

Keywords: Accreditation, Regression, SMA.

I. INTRODUCTION

National Education Standards (SNP) are part of the government's efforts to ensure the quality of education nationally. The National Education Standards developed by the National Education Standards Agency (BSNP) as an independent institution are effective and binding on educational units. This national education standard consists of assessment standards, graduation competency standards, standards for educators and teaching staff, facilities and infrastructure standards, content standards, cost standards, management standards, and process standards.

One of the efforts made by the government in order to improve the quality of national education gradually, planned and measured in accordance with the mandate of Article 60 of the Law on the National Education System (UU Sisdiknas) Number 20/2003 is accreditation, namely determining the feasibility of programs and educational units in the education pathway. formal and non-formal at every level and type of education. Furthermore, in Article 86 paragraph 1 of Government Regulation Number 19 of 2005 it is also stated that the Government conducts accreditation at every level and education unit to determine the feasibility of the program and/or educational unit. Accreditation of schools and madrasas is a comprehensive assessment process of the eligibility of schools/madrasas, the results of which are realized in the form of recognition of eligibility carried out by an independent and professional institution.

The National Accreditation Board for Schools/Madrasah (BAN-S/M) has been regulated through Permendikbud Number 13 of 2018 article 8, which among other things sets out the duties of BAN-S/M, namely establishing policies and developing an accreditation system in accordance with the

principle of continuous quality improvement nationally; formulate accreditation criteria and instruments to be proposed to the Minister. Furthermore, Article 20 paragraph (1) states that the Minister shall determine the criteria and instruments for accreditation by taking into account the National Education Standards. Determination of accreditation criteria and instruments as referred to in Article 20 paragraph (1) is delegated to the Head of the Research and Development Agency, after coordinating with the relevant Directorate General.

Factors that affect the quality of education, which is reflected in the results or achievements of accreditation, at the education unit level include: budget provision, teacher quality, and school facilities. The school budget allocated to support the fulfillment of these eight national education standards is reported into the School Activity Plan and Budget Application (ARKAS) information system. The ARKAS application was developed by the Ministry of Education and Culture as an effort to improve budget management in education units so that it can support the achievement of SNP (Fiqri MN, Susetyo B, Sadik K, Wibowo S, 2021).

The results of the 2017 to 2019 high school/MA level accreditation in Indonesia issued by the National Accreditation Board for Schools/Madrasah show a diversity of scores (various results). This indicates that the national education standard, which is the minimum criterion for the education system in Indonesia, has not yet been fully and evenly met by all educational institutions throughout Indonesia. Information on mapping the quality of education nationally needs to be reviewed so that the government can more easily determine priorities and actions to be taken to improve the quality of education in Indonesia. (Bahar R, Silvianti P, and Susetyo B, 2021; Saputra, MD, Joyoatmojo S, Wardani DK, and Sangka KB, 2019).

Then the results of accreditation tend to still have not been utilized by various stakeholders at the provincial/district/city level, especially in terms of quality improvement by referring to the status of the accreditation results per component of the national education standard. The budget allocated is more on the implementation of socialization about the importance of accreditation and increasing the allocation of quotas for the implementation of accreditation for educational units that have not been accredited. This is due to the fact that the results and accreditation reports have not been detailed to operational aspects in the form of a systematic analysis of the recommendations of each component analyzed according to the instruments used, and there are no clear recommendations on follow-up actions that should be carried out by stakeholders at the education unit level. in order to improve in the future to improve its accreditation status or ranking (Hendarman, 2013; Totalia SA, Martono, Bandi, Muhtar, 2022).

Based on the description above, the researcher is interested in modeling the accreditation assessment. This is to provide an overview of the factors related to accreditation assessment in order to determine the right education quality assurance strategy.

II. PROBLEM FORMULATION

The formulation of the problem in this study is how the regression model of the accreditation criteria on the value of accreditation at the high school level?

III.RESEARCH PURPOSES

The purpose of this study is to analyze the regression model of the accreditation criteria on the value of accreditation at the high school level

IV. RESEARCH METHOD

Data source

In this study, the data source used was secondary data. Secondary data for accreditation in 2021 from the National Accreditation Board for Schools/Madrasah (BAN-S/M). Suryabrata (1998) and Hasan (2002) state that secondary data is data obtained or collected from existing sources. For example from institutions that publish data, research supporting institutions or organizations that

have data. This data is used to support primary information that has been obtained from library materials, literature, previous research, books, and so on.

The data collection technique is that the researcher chooses a random sampling technique or random sampling/probability sampling added to the POP unit. Where the technique and the sample that the researcher uses are random, regardless of the sample on the basis of strata or social status in any way.

V. ANALISIS DATA

a. Analisis Statistika Deskriptif

Descriptive statistical analysis is an analysis related to the collection and presentation of data so as to provide useful information. This analysis aims to show the properties or characteristics of a situation and make a systematic and accurate description or picture of the facts and characteristics being investigated (Walpole, 1995).

According to Sumarwan (2011), descriptive analysis is a method used to collect actual information, describe an ongoing situation and examine the causes of a symptom, cannot control an event and measure what has occurred. in the form of tables, graphs, or diagrams, sorted and grouped and presented with the help of SPSS application software. In this study, descriptive statistics will be carried out on research data and respondents. The description of the research data includes a description of the variables, indicators and research instruments along with their characteristics. While the description of respondent data includes school status, school location, and others.

b. Regressions Analysis

Multiple regression analysis is a method to predict the value of the influence of two or more independent variables on one dependent variable. It is easier to prove whether there is a relationship between two variables or more than two independent variables X1, X2, X3,....,Xi towards one dependent variable Y. General equation of regression analysis:

$$Y = \beta X + \varepsilon \ (1)$$

Where:

Y = Dependent variable

β = Parameters

X = Independent Variable

ε = Error

According to Drapper and Smith (1992) the relationship between one dependent variable and one or more independent variables can be expressed in multiple linear regression. The relationship can be stated in general as follows:

$$Yi = \beta 0 + \beta i\, Xi1 + \beta 2\, Xi2 + \ldots + \beta k\, Xik + \varepsilon i$$

Where :

: dependent variable for observation to i = 1,2,...,n.

$\beta 0, \beta 1, \ldots, \beta k$: parameters

$Xi1, Xi2, \ldots, Xik$: independent variable

εi: error (ε) for observation to i

The statistical approach to performing regression analysis using the OLS method must first fulfill the assumption test or test the analysis requirements. The description of the assumption test of the regression analysis requirements is as follows:

a. Normality

The assumption of normality requirements must be met to determine whether the residuals/errors from the data are normally distributed or to determine whether the sample data comes from a normally distributed population. The statistical test used is the Kolmogorov-Smirnov. The hypothesis used is as follows:

H0 : data is normally distributed

H1 : data is not normally distributed

Significant level = 5% Decision making: If p-value <0.05 then H0 is rejected.

b. Autocorrelation

The autocorrelation test is used to determine whether or not there is a deviation from the classical assumption of autocorrelation, namely the correlation that occurs between the residuals in one observation with other observations in the regression model. The requirement that must be met is that there is no autocorrelation in the regression model repository.unimus.ac.id.

The test method that is often used is the Durbin-Watson test (DW test) with the following conditions:

1. If d is more than dL, it means that the null hypothesis is rejected, which means that there is an autocorrelation.
2. If (d > dL), it means that there is autocorrelation.
3. If d lies between du and (4-dU), then the null hypothesis is accepted, which means there is no autocorrelation
4. If dL < d < dU or (4-dU), it means that it cannot be concluded.

c. Heteroscedasticity

Spatial heteroscedasticity test was conducted to find out whether there were characteristics or uniqueness in each observation location. The existence of spatial heterogeneity can produce different regression parameters at each observation location. Spatial heterogeneity was tested using the Breusch-Pagan test statistic with the following hypothesis:

H0 : $\alpha 1^2 = \alpha 2^2 = \ldots = \alpha i^2$ (homoscedasticity)

H1 : at least one $\alpha 1^2 \neq \alpha i^2$ (heteroscedasticity)

Test statistics:

$$BP = (1/2)\, f^t Z (Z^t Z)^{-1} Z^t f$$

With the element vector f is $f_1 = (et^2/(\alpha^2 - 1))$ where $ei = yi - \hat{yi}$ is the least square residual for the ith observation and z is a matrix of size (n x (p+1)) containing normalized vectors standard for each observation. Rejection area Reject H0, if > 2 or if p-value < alpha where p is the number of predictors.

d. multicollinearity

One of the conditions that must be met in the formation of a regression model with several predictor variables is that there is no case of multicollinearity or there is no correlation between one predictor variable and another predictor variable. In the regression model, the correlation between predictor variables causes the resulting estimated regression parameters to have a very large error. The detection of multicollinearity cases was carried out using the VIF (Varian Inflation Factor) criteria of greater than 10 indicating the presence of multicollinearity between predictor variables. The VIF value is stated as follows:

$$VIF = 1/1 - Rj2$$

Where 2 is the coefficient of determination between one predictor variable Xj with other predictor variables.

Model Parameter Test

Linear Regression This parameter test aims to determine whether or not there is an effect of the independent variable on the dependent variable, either simultaneously or partially. Simultaneous parameter testing is as follows:

H0 : Variables X1, X2, ..., Xk simultaneously have no effect on the dependent variable

H1 : Variables X1, X2, ..., Xk simultaneously affect the dependent variable.

1. Determine the level of significance (α). The level of significance (α) which is often used in research is 5%.
2. Determine test statistics The test statistics used are:

$$\boldsymbol{MSR = \frac{SSR}{PM}}$$

$$\boldsymbol{MSE = SSE\ N - P + 1}$$

$$\boldsymbol{F = RKR\ RKE}$$

With :

MSR : Mean of squared regression

SSR : Sum square regression / sum square regression

P : Degrees of freedom

SSE : Sum square error/sum square error

N : Number of variables

3. Determine the critical area (rejection H0).The critical area used is H0 which is rejected if F > F(α; 1,). Where F(α; 1, − p) is called F table. Apart from the critical area above, other critical areas can also be used, namely if the probability value (Sig.) < significant level (α), then H0 is rejected.

VI. RESULT AND DISCUSSION

Accreditation Assessment Profile

In Indonesia, school accreditation is an acknowledgment of eligibility for schools by

awarding accreditation ratings (BAN-S/M 2019), namely A, B, and C ratings. This ranking is based on the level of fulfillment of the educational eligibility component consisting of the system, students, teachers, education staff, curriculum, and facilities provided by the school. Schools that get an A accreditation rating show compliance with the standard with a very good status with a score range of 86-100. Schools with an accreditation rating of B show compliance with standards with a Good status with a score range of 71-85. Then, schools with an accreditation rating of C show compliance with the standard with Enough status with a score range of 56-70. Meanwhile, schools that have a score below 56, then the school is not yet eligible to get accredited status so that the predicate given to this school is Not Accredited. In addition to rankings, the results of accreditation also provide information about the level of achievement of meeting each standard in the education unit. This information can be used as a school's self-reflection regarding the components of the SNP that need to be prioritized for follow-up.

Accreditation assessment will be seen by district/city, provincial and national. This is to facilitate stakeholders in determining policies in their respective regions. With this assessment, it is hoped that the quality assurance strategy will be more precise and better.

In the accreditation assessment, four criteria are divided, namely the quality of graduates, the learning process, the quality of teachers and the management of S/M. Each criterion has a number of different questions. Then each criterion is given a weight of each so that the final results of the assessment are then categorized as previously explained.

In the accreditation assessment in 2021, there is a quality disparity which can be seen in Figure 1 which shows different colors. The closer to the blue color means the quality in the area is still low. Several provincial areas on the island of Sumatra and the island of Kalimantan have low accreditation values. The following is an image of the accreditation mapping in 2021.

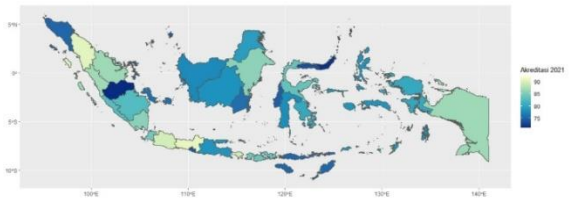

Figure 1 *Mapping of accreditation in 2021*

Multiple regression modeling prerequisite

a. Residual normality

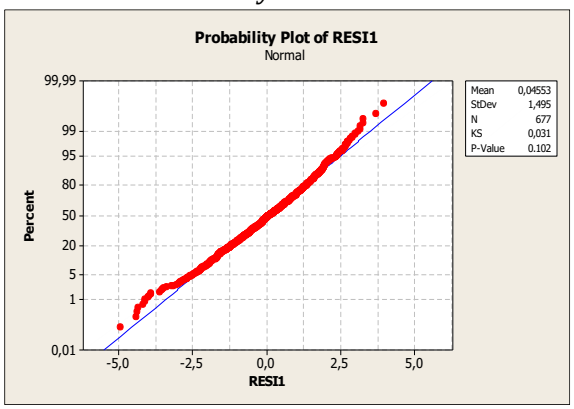

Figure 2 *Plot of residual normality*

The normality test above uses the Kolmogorov – Smirnov test where

H0 : residual is normally distributed

H1: residuals are not distributed normally

It can be seen that the p-value (0.211) > (0.05) then accept H0. This means that the remainder is normally distributed.

b. Residual variance homogeneity

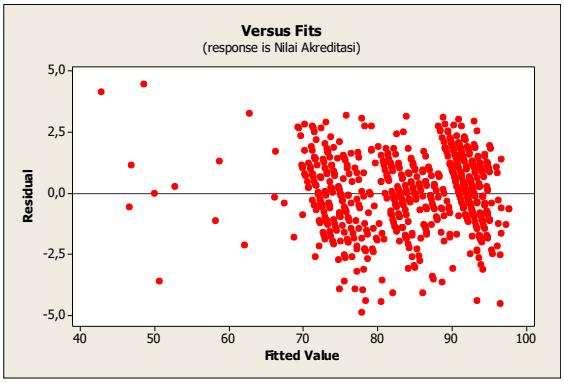

Figure 3 *Plot of homogeneity of residual variance*

Homogeneity of variance can be seen from the plot above. The bandwidth of the plot beside is relatively the same, so it can be said that the residual variance is homogeneous.

Or the homogeneity test of the residual variance can be done by regressing the absolute value of the remainder with all the explanatory variables, where the absolute value of the remainder is used as the response variable. After that do hypothesis testing where
H0 : Homogeneous error range
H1 : The error range is not homogeneous.
Then look at the p-value when the F-test is performed. Reject H0 if p-value < (0.05). This method may be more efficient than the method of detecting graphs because if you use graphs, everyone's interpretation is not necessarily the same.

Table 1 *Analysis of variance*

Source	DF	MS	F	P
Regression	4	0,000	0,00	1,000
Residual Error	672	119	2,232	
Total	676	119		

The ANOVA table above is the result of absolute regression of the remainder with all the explanatory variables. It can be seen that the p-value (1,000) > (0.05) which means accept H0. This means that the variance of the remainder is homogeneous.

c. Residual Freedom

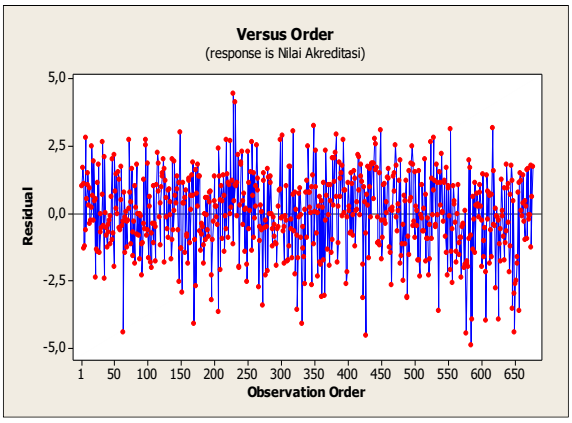

Figure 4 *Plot of residual freedom*

Residual freedom can be known by looking at the residual plot as above. If the shape of the distribution of the plot is not patterned, then the remainder will be independent or there is no autocorrelation. The plot above is not patterned, meaning that there is no autocorrelation.

d. Multicollinearity

Table 2 *VIF score table for accreditation criteria*

Criteria	VIF
Graduate Quality	3,102
Learning Process	3,178
Teacher Quality	2,712
Management S/M	3,206

It can be seen above that for each independent variable has a VIF value that is smaller than 10. This means that each independent explanatory variable has multicollinearity.

Accreditation score regression modelling

$$\begin{aligned} Accreditation\ Score &= 0.848 \\ &+ 0.339\ Graduate\ Quality \\ &+ 0.280\ Learning\ Process \\ &+ 0.165\ Teacher\ Quality \\ &+ 0.184\ Management\ S/M \end{aligned}$$

interpretation:
bo = the estimated average value of the Accreditation Score that is not explained by the Quality of Graduates, Learning Processes, Quality of Teachers and S/M Management is 0.848
b1 = the estimated average change of the Accreditation Score will decrease by 0.339 for every one unit increase in Graduate Quality assuming the Learning Process, Teacher Quality and S/M Management remain
b2 = the estimated average change from the Accreditation Score will decrease by 0.280 for every increase in the Learning Process by one unit assuming the Quality of Graduates, Quality of Teachers and Management of S/M remains
b3 = the estimated average change from the Accreditation Score will decrease by 0.165 for every one unit increase in Teacher Quality assuming the Graduate Quality, Learning Process and S/M Management remain
b4 = the estimated average change from the Accreditation Score will decrease by 0.184 for every increase in S/M Management by one unit assuming the Graduate Quality, Learning Process and Teacher Quality remain

F test

Table 3 Analysis of variance (F-test)

Criteria	DF	SS	MS	F	P
Regression	4	54717	13679	6127	0
Residual Error	672	1500	2		
Total	676	56217			

Hypothesis

H0 : Quality of Graduates, Learning Processes, Quality of Teachers and Management of S/M have no significant effect on accreditation scores

H1: Quality of Graduates, Learning Process, Quality of Teachers and Management of S/M have a significant effect on the value of accreditation

Pvalue 0.000 < alpha (0.05) then Reject H0 can be concluded that there is Quality of Graduates, Learning Processes, Quality of Teachers and Management of S/M have a significant effect on the value of accreditation at a significant level of 0.05.

T-test

Table 4 Analysis of variance (t-test)

Criteria	Coef	SE Coef	T	P
Constant		0,8476	0,5524	1,53 0,125
Graduate Quality	0,3393	0,0106	31,90	0,000
Learning Process	0,2795	0,0103	26,96	0,000
Teacher Quality	0,1654	0,0078	20,95	0,000
Management S/M	0,1837	0,0093	19,76	0,000

Graduate Quality Hypothesis

H0 : Graduates' quality has no significant effect on the value of accreditation

H1: Graduates' quality has a significant effect on the value of accreditation

P-value 0.00 < alpha 0.05 then Reject H0 can be concluded that the Quality of Graduates has a significant effect on the value of accreditation at a significant level of 0.05

Learning Process Hypothesis

H0 : The learning process has no significant effect on the value of accreditation

H1: The learning process has a significant effect on the value of accreditation

P-value 0.00 < alpha 0.05 then Reject H0 can be concluded that the Learning Process has a significant effect on the accreditation value at a significant level of 0.05

Teacher Quality Hypothesis

H0 : Teacher quality has no significant effect on the value of accreditation

H1: Teacher quality has a significant effect on the value of accreditation

P-value 0.00 < alpha 0.05 then Reject H0 can be concluded that Teacher Quality has a significant effect on the accreditation value at a significant level of 0.05

Management Hypothesis S/M

H0 : Management of S/M does not significantly affect the value of accreditation

H1 : Management of S/M has a significant effect on the value of accreditation

P-value 0.00 < alpha 0.05 then Reject H0 can be concluded that the Management of S/M has a significant effect on the value of accreditation at a significant level of 0.05

The modeling above shows that the above criteria have a significant effect on the value of accreditation in the education unit. This is evidenced by the F test and T test on the accreditation criteria. The biggest influence is on the quality criteria of graduates and the learning process. In determining alternative strategies, the quality criteria of graduates and the learning process are the main factors to be improved. The resulting regression equation can be used as a basis for determining policy priorities to improve the quality of education.

The goodness of the resulting model is good, the data is seen from the R-adj value of 97.3%. This value shows that the Quality of Graduates, Learning Processes, Quality of Teachers and Management of S/M can explain the accreditation value of 97.3%, the rest is

explained by other factors. so the above model is good.

VII. CONCLUSION

The conclusion in this study is the accreditation assessment model that was formed, namely Accreditation Value = 0.848 + 0.339 Graduate Quality + 0.280 Learning Process + 0.165 Teacher Quality + 0.184 Management S/M. Testing of accreditation assessment criteria has a significant effect on the value of accreditation in education units. In determining alternative strategies, the quality criteria of graduates and the learning process are the main factors to be improved.

SUGGESTION

The focus of this research is on modeling the accreditation assessment criteria carried out in high schools, so a study related to the effect of each question on each criterion is needed to strengthen the accreditation assessment. Then modeling at other levels such as Vocational High School, Junior High School and others so that it can help improve the quality of education in Indonesia.

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