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## **Social and Institutional Factors Capable of Improving Environmental Qualities: A Case Study of 5 ASEAN Economies**

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### ABSTRACT

This study aims to analyze the impact of social (human, educational, and financial development) and institutional factors (corruption and administrative effectiveness) on environmental quality. Data were obtained from 5 ASEAN economies from 2000-2018, with the Breusch-Pagan Lagrange Multiplier (LM) and Pesaran Cross-Sectional Dependence (CD) used to test the cross-section dependency of variables. The results showed that OLS depicted positive effects of human, educational, and financial development, with administrative effectiveness on environmental quality, with negative effects due to corruption. In recommendation, the government needs to promote social and institutional factor in order to improve environmental performance.

## INTRODUCTION

Over the last decade, numerous studies have been carried out on the varying policies regarding ways to improve the environmental ecology to enhance the quality of the environment (Salman et al., 2019). Currently, the environment has become the main area of concern for policymakers at the micro and macro levels. At the micro-level, managers are highly concerned on the environmental quality of their industries. Meanwhile, at the macro level, the environmental quality of nations is explained as its capability to produce public goods (Eisenstadt et al., 2019). Therefore, every nation is answerable to its citizens for its environmental strategies. According to Ervine (2018), administrative entrants need to ensure their subordinates are probable to knowledge regarding environmental quality.

Benedetta and Vincenzo (2019) stated that the linkage between environmental quality and different exogenous variables at the macro level has been examined in different studies. However, the focus of most of the studies was limited to economic factors concerning environmental degradation (Iwińska et al., 2019). In addition, many other variables have significant effects on the environment, such as social, institutional, socio-economic, and structural factors (Ciarli & Savona, 2019).

Environmental modernization theory depicts the association between economic development and deterioration, which is realizable in progressive industrialized countries (Morse, 2018). This theory deliberates many other characteristics such as “role of science and technology, the importance of financial development, the role of administrative effectiveness and the ideology of social movements” (Maurer, & Bogner, 2019). Furthermore, this theory is essential for better environmental performance and shows that society transforms their organizations to ecological complications, which invariably improves the quality of the environment.

Abdel-Basset et al. (2019) stated that social, institutional, political or structural factors are some additional economic related to environmental performance. These studies found significant disparities in the environmental quality of countries with parallel economic intensities and recommended that the quality of environment depends on economic, social and institutional factors.

This study aims to investigate the ability of social and institutional factors to improve environmental quality using 5 ASEAN economies, namely Indonesia, Thailand, Laos, Brunei and the Philippines. The study carried out by Raymond (2004) focused on the economic factors in relation to environmental degradation. According to Welsch (2004), the theory of environmental modernization indicates that society transforms their organizations in response to ecological complications, which also improves the quality of the environment. In addition to economic and social factors, institutional factors tend to have a significant contribution to environmental performance (Meyer, Kooten & Wang, 2003). However, the effects of social and institutional variables are less focused on previous studies in relation to environmental quality. Therefore, this study aims to explore the collective impact of social (financial development, human development, and educational development) and institutional factors (corruption and administrative effectiveness) on the environment. This study collectively contributes to the environmental quality and investigates the impact of social and institutional factors in the 5 ASEAN economies.

Remaining sections of this research are structured as follows: Section 2 presents the review of existing literature, the outline of hypothesis and conceptual framework. Section 3 provides data and methodology. Section 4 depicts the empirical results, while Section 5 concludes the study with some limitations.

## **LITERATURE REVIEW AND HYPOTHESIS**

### **Social Factors and Environmental Quality**

#### ***Human Development (HD)***

Over the past few years, studies have been carried out on the relationship between human development and environmental performance. Mukherjee & Chakborty (2012) investigated the influence of human development on environmental performance and found positive linkage. Costantini and Monni (2011) stated that human development leads towards a sustainable environment. Their study further suggested that human progress need to be the first objective of any nation in order to achieve a sustainable environment. Similarly, Uddin (2014) carried out a research using a 1990-2013 data obtained from Bangladesh with the VECM technique, to examine the relationship between human development and environmental quality. The study showed a positive association between human development and environmental quality in the long run. Furthermore, Dhahri and Omri (2018) used the data of 20 developing countries from 2000-2013 to examine the association between human development and environmental degradation, which revealed a negative linkage. Therefore, an increase in human development reduces environmental degradation.

*H1a: Human development has a positive and significant relation with environmental quality.*

#### ***Educational Development (ED)***

Educational development is an essential factor with significant contributions in environmental performance. Ervine (2018) stated that a nation with high educational progress is capable of handling more ecological disputes with assistance plans. Cracolici et al. (2010) reported that education development is proficient in apprehending the variances among nations regarding ecological and social dimensions. The study revealed a positive relationship between educational progress and environmental quality. Sohag et al. (2019) analyzed the effect of educational development on environmental performance, using literacy rates and CO<sub>2</sub> emissions as a proxy of educational development, and environmental quality, respectively. The study indicated that the higher the literacy rates, the lower the CO<sub>2</sub> emissions because the well-educated person portrays a higher level of information regarding ecological disputes. Therefore, the study concluded that there is a positive effect of literacy rates on environmental performance.

*H1b: Educational development has a positive and significant relation with environmental quality.*

#### ***Financial Development (FD)***

Frankel and Romer (1999) stated that financial development and ecological apprehensions are interdependent with the ability of financial development to promote FDI, which leads towards economic growth (EG). According to Islam et al. (2013), EG needs higher energy demand to degrade the environment resultantly. Financial progress permits investors to use advance technologies that are environmentally friendly with less significant contributions in increasing CO<sub>2</sub> emissions and attaining economic development (Dhahri & Omri, 2018). Several studies have been carried out to determine the relationship between financial development and environmental performance, however, the results were conflicting.

Tamazian and Rao (2010) stated that financial progress tends to increase CO<sub>2</sub> emissions, which reduces the quality of the environment. Similarly, Al-mulali & Sab (2012) reported that there are negative effects of financial development on environmental performance using data obtained from 12 MENA countries. Ozturk & Acaravci (2013) stated that environmental performance enhances financial development, thereby making it possible for industries to access advanced types of machinery which contribute less to environmental degradation. Similarly, Adam et al. (2018) examined the influence of financial progress on environmental quality and stated that a positive linkage existed between financial development and environmental quality. Furthermore, the study claims financial division as a means of reducing CO<sub>2</sub> emissions.

*H1c: There is a significant relationship between financial development and environmental quality.*

### **Institutional Factors and Environmental Quality**

#### ***Corruption (CR)***

Welsch (2004) carried out a research, which analyzed the relationship between corruption and environmental quality. The study stated that the negative effect of corruption on the environmental quality of a nation tends to increase pollution. Welsch (2004) examined the effect of control of corruption on environmental performance and stated that both variables are positively related to each other. Welsch (2004) reported that the quality of the environment enhances when corruption is controlled. Gallego-Álvarez, García-Rubio & Martínez-Ferrero (2018) carried out a research to determine the effects of corruption on the performance of the environment using data from 12 developing countries. They stated that corruption tends to reduce environmental performance. Chen et al. (2018) conducted a valuable work on the relationship between corruption and environmental quality using data from 20 provinces in China from 1988-2018. The study concluded that an increase in the number of dishonest executives weakens the environmental conventions and increases illegal construction as well as manufacturing which in turn increases CO<sub>2</sub> emissions.

*H2a: There is a significant relationship between corruption and environmental quality.*

#### ***Administrative Effectiveness (AE)***

Esty et al. (2008) carried out a research on the relationship between government effectiveness and environmental performance using the two proxies of environment, namely "carbon dioxide and sulfur dioxide". The study found that administrative effectiveness is partially positive with CO<sub>2</sub> emissions and marginally negative with sulfur emissions. Moreover, government effectiveness has positive effects on water quality and health ozone (Fiorino, 2011). Yin et al. (2015) stated that there is a positive linkage between government effectiveness and environmental quality. Therefore, when the government is efficient, it tends to make policies for improving the quality of the environment, which in turn improves the performance of the environment.

*H2b: There is a significant relationship between administrative effectiveness and environmental quality.*

## **METHODOLOGY**

This study aims to investigate the effect of social (financial development, human development, and educational development) and institutional (corruption and administrative effectiveness) variables on environmental quality (EQ). The samples consist of 5 ASEAN

economies, namely Indonesia, Thailand, Laos, Brunei and Philippines with data obtained from world bank from 2000-2018. The Breusch-Pagan Lagrange Multiplier (LM) Test (Breusch-Pagan, 1980) and Pesaran Cross-Sectional Dependence (CD) Test (Pesaran, 2004) were used to test the cross-section dependency of study variables. Meanwhile, Augmented Dickey Fuller (ADF) Test (Fuller, 1976) and ordinary least square (OLS) model were used to test the stationarity and estimate the results. The study further analyzed the country-specific long-run associations among the variables across the selected countries.

The study used CO<sub>2</sub> emissions as a proxy of environmental quality, with literacy rates, corruption control and government effectiveness used for educational development, and the control of corrupt and administrative proxies. All data were gathered from the World Bank, except those of EQ, which were available in index form. The following econometric model is used to investigate the influence of social and institutional factors on environmental quality:

$EQ_{it} = \beta_0 + \beta_1 (HD)_{it} + \beta_2 (ED)_{it} + \beta_3 (FD)_{it} + \beta_4 (CR)_{it} + \beta_5 (AE)_{it} + \mu_t$  -----(1)  
Where "EQ denotes the environmental quality, HD is human development, ED is educational development, FD is financial development, CR is corruption, and AE is administrative effectiveness  $\beta_0$  is intercept and  $\beta_1$  ----  $\beta_5$  are coefficients of variables for time  $t$ , and countries  $i$  while  $\mu$  is the stochastic (disturbance/residual) error term."

## FINDING

Table 1 shows the results of the Breusch-Pagan LM Test and Pesaran CD tests applied for checking the cross-section dependence of variables which means that they shock in a selected country with a possible tendency to be transferred. The research obtained a Null hypothesis, which is accepted, thereby indicating the absence of cross-section dependence among variables.

**Table 1: Cross-section Dependence**

| <i>Variables</i> | <i>Breusch-Pagan LM</i> | <i>Pesaran CD</i> | <i>Decision</i>               |
|------------------|-------------------------|-------------------|-------------------------------|
| <i>EQ</i>        | <i>0.8364</i>           | <i>0.9823</i>     | <i>H<sub>0</sub> Accepted</i> |
| <i>HD</i>        | <i>1.7399</i>           | <i>1.7636</i>     | <i>H<sub>0</sub> Accepted</i> |
| <i>ED</i>        | <i>1.8322</i>           | <i>0.9264</i>     | <i>H<sub>0</sub> Accepted</i> |
| <i>FD</i>        | <i>0.9264</i>           | <i>1.8364</i>     | <i>H<sub>0</sub> Accepted</i> |
| <i>CR</i>        | <i>0.6727</i>           | <i>0.8265</i>     | <i>H<sub>0</sub> Accepted</i> |
| <i>AE</i>        | <i>1.7836</i>           | <i>0.9264</i>     | <i>H<sub>0</sub> Accepted</i> |

Table 2 consists of 2 parts, namely panel A and B, which shows the results of descriptive statistics and correlation matrix, respectively. Panel A shows the mean, median and standard deviation of the data. Furthermore, it also shows the maximum and minimum values of the data, with the Normality of residuals checked through the Jarque-Bera test. The probability values of the residuals are normal and insignificant in providing reports. Therefore, the null hypothesis was rejected. Panel B elaborates the results of correlation matrix used to check the multicollinearity among the variables. The result showed that there is no multicollinearity in the data, with the highest correlation value between FD and EQ at obtained at 0.35, while the lowest correlation value of HD and EQ is 0.04.

**Table 2: Descriptive Statistics and Correlation Matrix**

| <b>Panel A: Descriptive Statistics</b> |           |           |           |           |           |           |
|----------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Variables</b>                       | <b>EQ</b> | <b>HD</b> | <b>ED</b> | <b>FD</b> | <b>CR</b> | <b>AE</b> |
| <b>Mean</b>                            | 47.63864  | 4.050909  | 0.855455  | 63.56955  | 6.584000  | 93.50455  |

|                                    |           |           |           |           |           |           |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Median</b>                      | 52.10000  | 4.330000  | 0.895000  | 67.91500  | 3.850000  | 94.25000  |
| <b>Maximum</b>                     | 64.30000  | 7.670000  | 0.990000  | 92.33000  | 13.28800  | 103.5000  |
| <b>Minimum</b>                     | 24.30000  | 1.010000  | 0.690000  | 38.40000  | 7.788300  | 73.10000  |
| <b>Jarque-Bera</b>                 | 2.392460  | 0.413963  | 2.178024  | 1.447608  | 1.272793  | 4.668132  |
| <b>Probability</b>                 | 0.302332  | 0.813035  | 0.336549  | 0.484904  | 0.529196  | 0.096901  |
| <b>Panel B: Correlation Matrix</b> |           |           |           |           |           |           |
| <b>Variables</b>                   | <b>EQ</b> | <b>HD</b> | <b>ED</b> | <b>FD</b> | <b>CR</b> | <b>AE</b> |
| <i>EQ</i>                          | 1         |           |           |           |           |           |
| <i>HD</i>                          | 0.0462    | 1         |           |           |           |           |
| <i>ED</i>                          | 0.2794    | 0.2219    | 1         |           |           |           |
| <i>FD</i>                          | 0.3552    | 0.1843    | 0.2327    | 1         |           |           |
| <i>CR</i>                          | 0.0524    | 0.1202    | 0.1429    | 0.2222    | 1         |           |
| <i>AE</i>                          | 0.0779    | 0.2418    | 0.1737    | 0.1337    | 0.2720    | 1         |

Table 3 shows the findings of the ADF test in terms of the unit root used to test the stationarity and order of integration data. Therefore, a non-stationary data produces spurious results. This research produced a null hypothesis with a non-stationary series. The table indicates that all variables are significant at all levels, thereby indicating that the data are stationary.

**Table 3: ADF Test**

| <i>Variables</i> | <i>Level</i>     |                            | <i>Decision</i> |
|------------------|------------------|----------------------------|-----------------|
|                  | <i>Intercept</i> | <i>Trend and Intercept</i> |                 |
| <i>EQ</i>        | 2.8464 **        | 4.9933 **                  | <i>I (0)</i>    |
| <i>HD</i>        | 4.8274 **        | 3.8264 *                   | <i>I (0)</i>    |
| <i>ED</i>        | 2.9475 *         | -4.8113 ***                | <i>I (0)</i>    |
| <i>FD</i>        | -4.8267 **       | 4.8224 **                  | <i>I (0)</i>    |
| <i>CR</i>        | -4.8726 **       | 5.9274 ***                 | <i>I (0)</i>    |
| <i>AE</i>        | 3.9847 **        | 3.8264 **                  | <i>I (0)</i>    |

Note: “\*, \*\*, \*\*\* represent level of significance at 1%, 5% and 10% respectively”

Table 4 shows the results of OLS regression, with a negative coefficient value of HD (-.4434) which is significant at the level of 5%. This depicts that 1-unit increase in HD tends, reduces CO<sub>2</sub> emission by -0.4432 units, which means that HD has positive effects on EQ, therefore, H1a is accepted.

Similarly, the coefficient of ED (-0.2927) is negative and significant at 5% with positive effects of ED on EQ. The results further show that 1-unit increase in ED tends to reduce CO<sub>2</sub> emissions by 0.3987 units, therefore, H1b is also accepted.

Coefficient of FD (-0.1982) is also negative and significant at 10% level of significance. Hence, an increase in 1-unit leads to a rise in FD tends, and a decrease in CO<sub>2</sub> emissions by 0.1982 units. Results elaborate on the positive effect of FD on the quality of the environment, therefore, Hypothesis H1c is also accepted.

Meanwhile, a positive coefficient value of CR (0.1626) indicates negative effects of CR on EQ. The result shows that a 1-unit increase in CR tends to increase CO<sub>2</sub> emissions by 0.1626 units. A coefficient is significant at 10% level of significance, therefore H2a is accepted.

Finally, the coefficient of AE (-0.2436) also shows positive effects of AE on EQ, with a coefficient significant at 10% level, thereby depicting that 1-unit increase in AE tends to reduce CO<sub>2</sub> emissions by 0.2436 units, therefore, hypothesis H2b is accepted.

Furthermore, the value of adjusted R square is 0.9283, thereby indicating that 92.63% variations in EQ are collectively explained by Social (HD, ED and FD) and institutional (CR, AE) factors.

**Table 4: OLS Regression**

| Variables               | EQ          |          | Decision                   |
|-------------------------|-------------|----------|----------------------------|
|                         | Coefficient | P-value  |                            |
| C                       | 0.3545      | 0.0457** | H <sub>1a</sub> : Accepted |
| HD                      | -0.4434     | 0.0056** | H <sub>1a</sub> : Accepted |
| ED                      | -0.3987     | 0.0323** | H <sub>1b</sub> : Accepted |
| FD                      | -0.1982     | 0.0982*  | H <sub>1c</sub> : Accepted |
| CR                      | 0.1626      | 0.0827*  | H <sub>21</sub> : Accepted |
| AE                      | -0.2436     | 0.0773*  | H <sub>2b</sub> : Accepted |
| R <sup>2</sup>          | 0.9938      |          |                            |
| Adjusted R <sup>2</sup> | 0.9263      |          |                            |

Note: “\*, \*\*, \*\*\*” represents the significance at 1%, 5% and 10% respectively.”

The study further analyzes the country-specific long-run associations among the variables across the selected countries. Table 5, shows the findings for individual countries with a significant positive effect of HD on EQ in all the sample countries. This tends to decrease CO<sub>2</sub> by 0.3462 units in Indonesia, 0.5547 units in Thailand, 0.2534 units in Laos, 0.2331 units in Brunei and 0.4351 units in the Philippines. Similarly, ED also has positive effects on enhancing EQ by reducing CO<sub>2</sub> emissions.

**Table 5: Country Specific Long-Run Outputs**

| Variables      | Indonesia |            | Thailand |           | Laos    |           | Brunei  |          | Philippines |            |
|----------------|-----------|------------|----------|-----------|---------|-----------|---------|----------|-------------|------------|
|                | Coef.     | p-value    | Coef.    | p-value   | Coef.   | p-value   | Coef.   | p-value  | Coef.       | p-value    |
| C              | 0.3454    | 0.0023 *** | 0.2674   | 0.07322 * | 1.6365  | 0.0933 *  | 1.9634  | 0.0374** | 1.9983      | 0.0032 *** |
| HD             | -0.3462   | 0.0543 **  | -0.5547  | 0.0364 ** | -0.2534 | 0.0254 ** | -0.2331 | 0.0273** | -0.4351     | 0.0042 *** |
| ED             | -0.2983   | 0.0036 *** | -0.3748  | 0.0732 *  | -0.4563 | 0.0363 ** | -0.2098 | 0.0744*  | -0.3987     | 0.0372 **  |
| FD             | 0.0836    | 0.0567 **  | -0.1734  | 0.0834 *  | -0.1672 | 0.0263 ** | 0.0243  | 0.0364** | 0.0053      | 0.0947 *   |
| CR             | 0.1983    | 0.0635 *   | 0.1324   | 0.0364 ** | 0.1783  | 0.0857 *  | 0.2816  | 0.0832 * | 0.2552      | 0.0367 **  |
| AE             | -0.2073   | 0.0355 **  | -0.3582  | 0.0264 ** | -0.3674 | 0.0327 ** | -0.1982 | 0.0872 * | -0.2874     | 0.0263 **  |
| R <sup>2</sup> | 0.8394    |            | 0.8386   |           | 0.7165  |           | 0.7639  |          | 0.78833     |            |

“\*\*\* and \*\*” shows level of significance at 1% and 5%, respectively”

The table 5 shows that 1-unit increase in ED leads to a decline in CO<sub>2</sub> emissions by 0.2983 units in Indonesia, 0.3748 units in Thailand, 0.4563 units in Laos, 0.2098 units in Brunei, and 0.3987 units in the Philippines. Meanwhile, FD has mixed effects in selected countries. For instance, it has positive effects in Thailand and Laos which means that 1-unit increase in FD tends to reduce CO<sub>2</sub> emissions in Thailand by 0.1783 units and in Laos by 0.1672 units.

Furthermore, it has negative effects on the rest of the countries which means that 1-unit increase in FD leads to a rise in CO<sub>2</sub> emissions by 0.0836 units in Indonesia, as well as 0.0243 and 0.0053 units in Brunei and Philippines, respectively. CR causes a decline in EQ in all the sample countries which means that 1-unit increase in CR tends to increase CO<sub>2</sub> emissions by 0.1983, 0.1324, 0.1783, 0.2816, and 0.2552 units in Indonesia, Thailand, Laos, Brunei, and the Philippines. AE has a positive effect on EQ, with a 1-unit increase in AE capable of reducing CO<sub>2</sub> emissions in Indonesia, Thailand, Laos, Brunei and Philippines by 0.2073, 0.3582, 0.3674, 0.1982 and 0.2874 units, respectively

## DISCUSSION

Over the last decade, numerous studies have been carried out on the varying policies regarding ways to improve the environmental ecology in order to enhance the quality of the

environment. Currently, the environment has become the main area of concern for policymakers at the micro and macro levels. At the micro-level, managers are highly concerned on the environmental quality of their industries.

Meanwhile, at the macro level, the environmental quality of nations is explained as its capability to produce public goods. The present study aims to investigate the effect of social and institutional factors on the quality of the environment with data obtained 5 ASEAN economies, namely Indonesia, Thailand, Laos, Brunei and Philippines from 2000-2018. The Breusch-Pagan LM Test and Pesaran CD tests were used to test the cross-section dependency of study variables. Meanwhile, ADF and ordinary least square model were used to test the stationarity and estimate the results.

Human development has a positive relation with environmental quality, with the ability to increase human welfare and provide a sustainable path. This research is consistent with the studies carried out by Costantini & Monni (2011). Moreover, Mukherjee & Chakborty (2012) on their found that human development has a positive relation with environmental quality while Dhahri & Omri (2018) suggest the same finding. The results of the study also in line with Lai and Chen (2020) and Mrabet et al. (2020).

Educational development has a positive relation with environmental quality as a nation with high educational progress capable of handling more ecological disputes with assistance plans. This is in accordance with the studies carried out by Cracolici et al. (2010). Moreover, the result is also consistent to Boca and Saraçlı (2019) and Edsand and Broich (2020) that found educational development has a positive effect to environmental quality.

Financial development positively contributes to improving the quality of the environment because financial progress permits investors to use advance technologies that are environmentally friendly with less significant contributions in increasing CO<sub>2</sub> emissions. It also helps in attaining economic development. These results are consistent with the studies carried out by Islam et al. (2013) and Tamazian & Rao (2010). Also, the result in line with Ahmed et al. (2020) and Batool et al. (2020).

There is a negative effect of corruption on environmental quality, which reduces the income of a nation and increases pollution. Furthermore, a rise in the number of dishonest executives weakens environmental conventions. It increases illegal construction and manufacturing, thereby leading to a rise in CO<sub>2</sub> emissions that degrade the quality of the environment. These results are similar to the research carried out by Welsch (2004) and Morse (2006). The result is also consistent to Sekrafi and Sghaier (2018) and Habib et al. (2018). Ganda (2020) and Habib et al. (2020) on their study also showing that inline with the result of this study.

Administrative effectiveness positively contributes to improving environmental quality. This result in accordance with the research carried out by Wiengarten and Pagell (2012) and Radu and Antohe (2014). Moreover, Esty et al. (2018) and Allur et al. (2018) found that Administrative effectiveness positively contributes to improving environmental quality which inline to this study. Lastly, Hunjra et al. (2020) also showing their result of study that in line with this study.

## **CONCLUSION AND FUTURE STUDY**

The study concludes that human development, Educational development, and financial development, and administrative effectiveness depicted positive effects on environmental quality, and negative effects due to corruption.

This study used only 5 ASEAN economies and examined linear relationships, therefore, future study needs to be carried out using all ASEAN economies and studies need to be carried out to examine nonlinear relationships.

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## [JSP:JGP] Do Social and Institutional Factors Improve the Quality of Environment? Evidence from 5 ASEAN Economies

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**Achmad Nurmandi** <journalumy@gmail.com>

3 Januari 2021 08.36

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4 Januari 2021 08.13

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2 Januari 2021 05.09

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Our decision is to accept your paper. Your paper will be published at March's edition 2021. Thankyou for your contribution to JSP for the venue of your research output and we hope you can submit other paper in the future.

Achmad Nurmandi, Prof  
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1 Januari 2021 21.00

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Dear Editor,

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Agussani Agussani:

We have received your paper. We have some notes as follows

- a. Add discussion after findings at your paper
- b. No numbering in paper.

Regards

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Our decision is minor revisions as attached document

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## [JSP:JGP] Submission Acknowledgement

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**Achmad Nurmandi** <journalumy@gmail.com>

14 Desember 2020 15.13

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