VILLAGE DEVELOPMENT: SPATIAL EFFECT VS THE PERFORMANCE OF THE VILLAGE GOVERNMENT?

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ABSTRACT

Village funding in the amount of Rp 257.2 trillion in the past five years (2015-2019) uses a scheme that shares funding equitably. This is evident from the proportion of village funds (90 percent) that was divided equally (2015-2017) (Ministry of Finance, November 2017). This study aims to prove that the achievements of village development are not only due to the impact of the Village Fund Program, but are also based on government policies from the central government to the village. Seeing village development only from the perspective of the Village Fund is a relative undertaking. It is necessary to analyze the performance of village development to determine whether village (neighborhood effect) that have an effect on village development performance. The methodology used in this study is spatial econometrics. Testing was conducted on all villages in Indonesia (75,436 villages) sourced from Podes 2018 data. The findings show that village development by the local village government did not have a significant impact on the progress of village development. Village development in neighbouring rural areas has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village administration has a significant impact on the progress of village admini

Key words: Village Development, Spatial Effect, Village Fund budget

Background

Village development is not solely a consequence of disbursements from the Village Fund. Villages are the target of all policies at the central, provincial, regency, to the village government itself. The provision of village funds which has reached more than Rp 257 trillion uses a basic allocation which is distributed equally. Village Fund disbursements in 2019 were allocated in the ratio AD:AA:AF³ (72:3:25), therefore, viewing development only from Village Fund alone becomes a relative undertaking.

Since the acceleration of village development in Indonesia in 2015, numerous villages have experienced development growth. One of the indicators of such growth is increased economic activity in the villages-for example, some villages have succeeded in earning more from Village Own-source Revenues (Pendapatan Asli Desa: PADes) than from the Village Fund. Villagers, families, or households who became economic operators or agents play an important role in economic growth as well as a beneficiary of this growth. The communities as economic agents play an important role as the economic driver of a region (Birdsall et al. 2001). This movement has an impact on the household economy (Foster and Rosenzweig 2002), however, such economic movement needs to be supported by regional infrastructure.

The village development paradigm has now changed and infrastructure can be developed starting from the lowest administrative region. The empowerment of residents in labor-intensive programs is strengthened through village government institutions (Antlöv et al. 2016). The budget increase for village development through the Village Fund offers new hope for village development as well as a stimulus for the village economy.

As a stimulus, the Village Fund is expected to be able to accelerate growth in the village economy. Actualizing this stimulus is in the form of development of infrastructure to support economic access, people's empowerment in the form of labor-intensive work programs for fiscal stimulation, and other activities which support economic acceleration. The successful acceleration of village economic progress is also inseparable from the active role of the village government itself in empowering its people. The village head is the key figure in moving the village economy. The village government has a separate authority that does not involve the regency government to build their village by developing and formulating village regulations (Antlöv 2003).

The development of economic infrastructure at the local level supports economic circulation in a village and its surrounding area. The existence of markets, store groups, shops/groceries is an illustration of local economic circulation at the village level. Infrastructure may improve performance with the infrastructure-economy interaction model in predicting the distribution of economic opportunities at the village level in a region (Wismadi et al. 2012). Research on infrastructure at the local village level has been conducted in India by observing the economic growth at the village level as well as its connectivity. The result is that economic infrastructure has significant potential to lift economic growth at the village level and even affects the GDP (Chakraborty and Guha 2009). The existence of economic infrastructure facilities, such as markets, plays a significant role in the economic life of rural areas.

³ AD: Alokasi Dasar (Basic Allocation); AA: Alokasi Afirmasi (Affirmation allocation); AF: Alokasi Formula (Formula allocation).

The introduction of lump-sum village grants in 2014 has given a little incentive to the fiscal and funding effort to improve productivity by regional governments (Dick 2019). Through the Village Fund, the government generally divides village expenditures into four categories, namely the government administration, village development, community empowerment, and social development (Regulation of the Minister of Finance 2017). Such expenditures are set out in detail in the Village Budget (Anggaran Pendapatan dan Belanja Desa: APBDes). The village government through the role of village head in the lowest administrative region serves as the representation of the people's aspirations (Deggs and Miller 2013).

In addition to the four allocations for government administration; community development; development; and community empowerment; the Village Fund can also be used for capital participation in village-owned enterprises (Badan Usaha Milik Desa: BUMDes) (Regulation of the Minister of Finance 2017). Budget management at the village level shares the role of accelerating the process of rural economic growth (Alam et al. 2018) The allocation of a precise budget and investment by the village government not only serves as the current engine room of the village economy, but rather, it can also have a spillover effect on the surrounding villages.

The development of a village may have an impact on surrounding villages. An example of this is the rural market in the United States in the period of 1870 to 1900 which accelerated urban growth through the substitution of urban production for non-agricultural goods and services (Ermisch and Weiss 1968). The market contains all kinds of products that are produced in the village and outside the village. Meanwhile in Indonesia, the government has been facilitating the growth of, and access to, market facilities at the village level since 2015. Such village development is, however, highly dependent on the community's role through village consultation and the ability of village officials to allocate the budget in the village.

Until 2018, the human resources capacity of the managers of village development was still limited. The publication of Village Potential (Podes) 2018 identified 1,017 village heads who had never attended school, 907 village heads who had not finished elementary school, 1,656 village heads with an education level of elementary school or the equivalent, and 7,545 village heads with an education level of junior high school or the equivalent. In addition, there were still 327 village secretaries who had never attended school, 461 village secretaries who had not finished elementary school, 1,302 village secretaries with an education level of elementary school or equivalent, and 3,615 village secretaries with an education level of junior high school or the equivalent. As the motor of the village economy, the human resources quality of village officials still needs to be improved so they are better able to perform their duties.

The economic movement at the village level driven by the village government is realized in the form of BUMDes. In order to realize BUMDes, the village government must have the ability to identify the resources and opportunities available at the village level. Utilization of the Village Fund can, therefore, be used for capital participation (BUMDes) (Regulation of the Minister of Finance 2017). BUMDes plays an important role in village autonomy by earning PADes. In addition, community empowerment and investment can be developed in the business units of BUMDes. The existence of BUMDes affects people's businesses in villages by encouraging the people to start a new business according to the potential existing in the villages (Caya and Rahayu 2019). In addition to BUMDes, the management of the village budget also affects village development and can be utilized by the surrounding villages.

From the residents' point of view, this spillover is felt through circular migration. A household has at least one circular migrant, and based upon the gender and age of the household head. The household income from short-term circular migration supports numerous medium and high-income households (Hetler 1989). The benefits resulting from village development can be felt by residents of the surrounding villages. In addition to the residents who live in the village, the people from outside the village are also interested in improving the village economy which is still developing.

The spillover effect of village development is not only utilized by the people living in the village, but also by the residents of the surrounding villages. The village is not the object of unilateral development, so its development is inseparable from development of the surrounding areas. In 1968, research on village-city development was closely related to the population size as well as entrepreneurial decisions, both of which are the key to the growth process locally (Hart et al. 1968).

On the other hand, theoretically the effects of village budget autonomy on village development cannot yet be proven. This is because village development has given an assurance that if villages are able to manage their budget properly, it will have a direct impact in improving the welfare of people in the villages. This condition opened up a study discourse, namely as to whether village development is caused by inclusive development at the village level or by other matters outside the village that affect the performance of village development.

This research resulted in a number of important contributions for literature and policies.

- Firstly, this study looks at the location of village development concentration in the form of spatial clustering because the performance of village development cannot be separated from the surrounding villages. Empirical evidence is, therefore, needed to show that the progress of village development is also significantly affected by the spillover effect of the development of the surrounding villages;
- Secondly, in order to obtain such empirical evidence, this research studies the impact of development of rural areas;
- Thirdly, this research simultaneously studies the performance of village government as a reflection of the driving motor of village development through the allocation of APBDes, human resources at the village level, and investments in the business units of BUMDes; and
- Fourthly, this research studies the leadership capacity of the village heads along with their officials in implementing village development.

This study is divided into several sections namely: the theoretical framework; description of the main data series used; a description of village development to date; the research results; and the conclusions.

Theoretical Framework

This study discusses the important role of the village government in village development. The first matter discussed is the village government's ability to allocate the budget in accordance with the applicable provisions. The second issue is the education level of the village head, village secretary, and village officials. Third, investment in the business field in BUMDes. These three domains are growing from within the village.

The allocation of village fund budget is already regulated in Regulation of the Minister of Finance (Peraturan Menteri Keuangan, 2017). The distribution is regulated in the village expenditures for the organization of government, village development, and community empowerment. In addition, the leadership in the village, starting from the village head to its officials is a legal mandate (Law No. 6/2014). The main concern raised is regarding the village's capacity to manage the increased volume of funds (Antlöv et al. 2016). If the village government does not have capacity to develop the village effectively, it will diminish the quality of village development itself.

Investments at the village level are also driven by the village government itself. Under Law No. 6/2014 on Villages, village governments can develop BUMDes). The establishment of BUMDes itself is a prerequisite for the disbursements from the Village Fund, however, this may lead to ineffective growth of BUMDes as it only serves as a requirement for budget disbursement. On the other hand, linkages with the same parameters for neighbouring villages are also evaluated, in order to show the spillover effect from each region. The variables predicted in this research are the results of village development that are reflected in the scores of the Village Development Index (Indeks Pembangunan Desa: IPD) (Table 1).

Notation	Variable	Regulation/Publication/Research Source		
Y	Village Development Index (Indeks Pembangunan Desa/IPD).	2018 Village Development Index from Statistics Indonesia (Badan Pusat Statistik: BPS) 2018.		
X1	Village expenditures for government administration.	Village expenditures from the report on use of village funds (Regulation of the Minister of Finance		
X2	Village expenditures for implementation of development.	2017). Benefits of Allocation of Village Fund on Rural Development (Alam et al. 2018).		
X3	Village expenditures for empowerment.			
X4	Village expenditures for mentoring.			
X5	Village expenditures for other purposes.			
X6	Highest education level of the Village Head.	Leadership in the village, village head and its		
Х7	Highest education level of the Village Secretary.	officials constitute the mandate of Law No. 6/2014. The main concern raised is regarding the village's		
X8	Number of village officials.	capacity to manage the increased fund (Antlöv 2016).		
Х9	Number of business units of BUMDes.	Effect of BUMDes on the Community's Welfare in Aik Batu Buding Village, Belitung Regency, Bangka Belitung Province (Caya and Rahayu 2019).		

Table 1: Variables of the Research

Source: processed by TNP2K, 2019

The general overview of inter-variable relationship in this research is quoted from a previous research on the agglomeration of small and micro industries that have experienced group concentration, as well as to observe the spatial effect from the surrounding regions (Suchaini and Lupiyoadi 2013).



Figure 1: Frame of Thought of the Research

Source: Wismadi et al. (2012) and Suchaini and Lupiyoadi. (2013).

Source of Data

In this study, the source of data used is the data on Village Potential (Potensi Desa/Podes) of 2018 (Table 2). Podes data contain all regional data on the lowest level of government in Indonesia, namely villages/subdistricts. The data are obtained from data collection activities in all villages, subdistricts, and transmigration settlement units (Unit Permukiman Transmigrasi – UPT) / transmigration settlement system (Sistem Permukiman Transmigrasi - SPT. The Podes data constitute the only regional data collected by BPS as a framework of census, namely the basic data on preparation for population census, agricultural census, and economic census. For village administrative regions in particular, the Podes data contain sufficiently comprehensive information.

Table 2: Source of Research Data

Variable Type	Variable	Unit of measurement for the model	Data Source	Data Conversion
Eksogen	Village expenditures for government administration	Million rupiah per village	PODES code 1402a	Percentage with Natural Logarithm
	Village expenditures for implementation of development	Million rupiah per village	PODES code 1402b	Percentage with Natural Logarithm
	Village expenditures for empowerment	Million rupiah per village	PODES code 1402c	Percentage with Natural Logarithm
	Village expenditures for mentoring	Million rupiah per village	PODES code 1402d	Percentage with Natural Logarithm
	Village expenditures for other purposes	Million rupiah per village	PODES code 1402e	Percentage with Natural Logarithm
	Highest education of the Village Head	Million rupiah per village	PODES code 1701a	Original data with the scale of 1 – 9
	Highest education of the Village Secretary	Level of Education	PODES code 1701b	Original data with the scale of 1 – 9
	Number of village apparatuses	Level of Education	PODES code 1702	Original data with the scale of 1 – 100
	Number of business units of BUMDes	Million rupiah per village	PODES code 1404a	Original data with the scale of 1 – 9
Endogenous	Village Development Index (IPD)	Index with the scale of 0-100	Village Development Index	Original data with the scale of 0-100

Source: processed by TNP2K, 2019

One of the major issues when evaluating development at the village level is inter-regional inequality that results in data abnormalities and outliers of development outcomes. Prior to processing the data, there is a need to cleanse the data in order to remove outliers from the existing data. Nevertheless, the Podes data can be used as the source of census data on all of the lowest administrative regions at the village level. The information that we use from this data source are population, number of families, number of economic facilities (markets, stores, minimarkets, and grocery stores), business units in BUMDes, as well as the village government's expenditures for development, empowerment, mentoring, and government administration.

Village Development

The measurement of village development by using the IPD was performed twice, namely during planning and evaluation. In the planning stage, the villages listed in the Minister of Home Affairs Regulation No. 39/2015 were measured in 2015. The village data used was sourced from Podes 2014 data. The results of IPD 2015 are set out in the book titled "Village Development Index 2014: Challenges in the Fulfillment of Village Minimum Service Standards" ("Indeks Pembangunan Desa 2014: Tantangan Pemenuhan Standar Pelayanan Minimum Desa") published in the same year, and constitutes the results of a collaboration between the National Development and Planning Board (Badan Perencanaan dan Pembangunan Nasional: Bappenas) and BPS.

In the evaluation stage, the IPD was calculated again in 2018 using the list and data on villages produced from the 2018 Podes Data Collection. The results of this calculation are presented in a book titled "Village Development Index 2018" (Indeks Pembangunan Desa 2018) prepared by BPS. This book discusses the results of village development through IPD in every village, province, and large island region. The IPD summarizes the outcomes of diverse village development according to the locality needs of each village.

In this study, the results of village development are used as endogenous variables, the effect of village government performance. The approach used the IPD that describes the availability and accessibility of various basic services for village communities. Village development in 2018 provides a description of the villages with the status of underdeveloped, developing, and independent. The results of this IPD categorization are 14,461 underdeveloped villages (19.17 percent), 55,369 developing villages (73.40 percent), and 5,606 independent villages (7.43 percent).

The dimensions of village development increased in 2018, compared to 2014. The five dimensions are the Basic Services Dimension, Infrastructure Condition Dimension, Transportation Dimension, Public Services Dimension, and Village Government Administration Dimension. The dimension with the highest increase was Village Government Administration, namely by 9.81 points. Furthermore, the dimension with the lowest increase was Basic Services, namely by 0.92 points. The number of developing villages fell by 6,518 compared to 2014. At the same time, the number of independent villages increased by 2,665 (BPS 2018).

The improvement in village development as described in the IPD is quite varied. One of the indicators that saw a significant improvement in the Basic Services Dimension is Availability of and Access to High School or the equivalent with an increase in the number of villages. Furthermore, in the Infrastructure Condition Dimension, the indicator with the highest increase is Cooking Fuel, indicated by the increased number of villages with LPG stations/agent/sellers.

Method of Analysis

In this study, the data review was performed in three stages. First, preparation of variables and cleansing the outlier data. Second, specifications test on the model prepared through several equations which are divided into typologies of village development regions. The test simultaneously assesses the variables of village government performance, including the allocation of a village government budget, village officials human resources, as well as investments in the business units of BUMDes at the village level. Third, testing the effect of rural area development which are bordered by neighbouring village regions.

In this study, the test is performed by testing the effect of exogenous variables on the endogenous. The types of exogenous variables used are the economic activities in the village, business operators and consumers at the village level, and village investments in business. The first variable type can be observed from the number of store groups, markets, minimarkets, as well as grocery stores, while the second variable type is observed from the total population and number of families in the village. The third exogenous variable type is observed from the existence of BUMDes and village government expenditures for development, empowerment, mentoring, and village government administration. On the other hand, the endogenous variables used are the village development achievements reflected in the IPD.

The units of analysis in this study are villages. The village is the lowest administrative region in Indonesia and is the subject of development at the village level. The villages evaluated are all villages in Indonesia– a total of 75,436 villages.

Data Cleansing

In this section, the researchers present the data spread used to undertake the analysis. The objective is to observe the data outliers that may disrupt the calculation. These data are made by using the scatter plot technique with the results presented in Figure 2.







Source: Podes 2018.

Note: X constitutes exogenous variable and Y constitutes endogenous variable.

Translation of texts in Figure 2:

Indeks Pembangunan Desa (IPD)	Village Development Index (IPD)
Pengeluaran desa untuk penyelenggaraan pemerintahan desa	Village expenditures for village government administration
Pengeluaran desa untuk pelaksanaan pembangunan desa	Village expenditures for implementation of village development
Pengeluaran desa untuk pemberdayaan masyarakat	Village expenditures for community empowerment
Pengeluaran desa untuk pembinaan kemasyarakatan	Village expenditures for social mentoring
Pengeluaran desa untuk lainnya (belanja tak terduga, konsumsi rapat, dll.)	Village expenditures for other purposes (unexpected spending, consumption for meetings, etc.)
Pendidikan tertinggi Kepala Desa	Highest education level of the Village Head
Pendidikan tertinggi Sekretaris Desa	Highest education level of the Village Secretary
Jumlah aparat desa	Number of village officials
Jumlah unit usaha BUMDes	Number of BUMDes business units
Endogenous	Village Development Index (IPD)

Source: processed by TNP2K, 2019

From the scatter plot, it can be observed that nearly all variables experience data outliers. Data outliers occurred at the highest value, therefore, the data with outliers are entered by removing the outlier or replacing the outlier figure with the highest value.

Spatial Autocorrelation

In this test, grouping or clustering is conducted on the village development regions. The test is performed on the inter-regional interdependence relationship which is stated in the framework of spatial autocorrelation weighting matrix. Each structural composition that connects the N sample unit can be represented as matrix $N \times N$ (Dow and Eff 2008). In this study, the weighting matrix is used in regions that are directly adjacent geographically. The data used are the 2018 IPD data. The results are used to observe which regions experience significant concentration of village development.

The Pearson's Correlation by units follows the equation:

$$r(x, y) = \frac{[\Sigma_i(x_i - x_m)(y_i - y_m)]/N}{[\sqrt{\Sigma_i(x_i - x_m)^2/N}][\sqrt{\Sigma_i(y_i - y_m)^2/N}]}$$

The spatial autocorrelation in this study uses the Pearson correlation derivative that involves the neighbouring regions, therefore, the following equation is obtained:

$$\frac{[\Sigma_{ij}w_{ij}(y_i - y_m)(y_j - y_m)]/S}{[\Sigma_i(y_i - y_m)^2/N]} = \frac{N}{S} \frac{[\Sigma_{ij}w_{ij}(y_i - y_m)(y_j - y_m)]}{\Sigma_i(y_i - y_m)^2}$$

(Dow and Eff 2008)

Predictor Effect

Own Effect

This test is conducted to identify the extent to which the policies and economy in the village impact on the results of village development. The test is performed directly on the exogenous variables existing in the village against the effects of village development measured by the government. The test to determine the effect in this section is in the equation:

Where:

Y = IPD

X1 = Village expenditures for government administration

X2 = Village expenditures for implementation of development

X3 = Village expenditures for empowerment

- X4 = Village expenditures for mentoring
- X5 = Village expenditures for other purposes\
- X6 = Highest education level of the Village Head
- X7 = Highest education level of the Village Secretary
- X8 = Number of village officials
- X9 = Number of business units of BUMDes

Neighbourhood Effect

In this test, the test of the effect several X variable on Y which occurs within the village is undertaken by involving the neighbouring villages. Direct test is performed on the exogenous variables existing in the village on the effects of village development measured by the government (Suchaini and Lupiyoadi 2013). Meanwhile, in order to observe the interregional relationship, the test uses the autocovariate model. This model is used for observing the spatial autocorrelation by estimating how many response variables in one location reflect the response values in the surrounding locations. The autocovariate is aimed at capturing the spatial autocorrelation that originates from the endogenous process, such as the relationship between individuals (Dormann et al. 2007). The autocovariate is added to change the linear predictor from the usual form model:

Y=
$$\beta X + \epsilon$$
... equation 1Into:... equation 2Y= $\beta X + \rho A + \epsilon$... equation 2in which: β = vector of the intercept and coefficient that describe the X variable ρ = coefficient of autocovariate A

Meanwhile, the autocovariate from the observation environment (neighbourhood) is described by:

A_i=∑_{jeki}w_{ij} y j_i

... equation 3

The predictor variable is simultaneously described through its relationship with the Spatial Auto Regressive (SAR) model. The first SAR model assumes that the autoregressive process only occurs on the response variables or the predicted variables (Y), therefore, including the term (ρ W) for spatial autocorrelation in the response variable Y, but also the standard term for predictor and error (β X+ ϵ) as used in the Ordinary Least Squares (OLS) regression. The spatial autocorrelation in the response may occur, and usually leads to a directed spatial effect.

Therefore, an equation is obtained from equation 2 as follows:

 $Y = \beta X + \rho A + \varepsilon$ $Y = \beta X + \rho W Y + \varepsilon$ $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_7 X_7 + \varepsilon$... equation 4 $Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_7 X_7 + \rho W Y + \varepsilon$... equation 5

STUDY RESULTS

Descriptive Analysis

In this study, data cleansing is performed in order that the effects of the analysis are not affected by the data outlier. The data cleansing is aimed more at removing the data outlier and making the scales uniform but not changing the data distribution pattern. The scale used is the scale of 0-10. This adjustment is made to facilitate interpretation and formulation of policies related to the predictor variables.

Variable	Min	Mean	Мах	Standard Deviation	Deviasi Standar
Y	Village Development Index (IPD)	12.54	59.36	93.37	13.04
X1	Village expenditures for village government administration	0.00	5.54	9.21	1.29
X2	Village expenditures for implementation of village development	0.00	6.19	9.21	1.36
X3	Village expenditures for community empowerment	0.00	4.13	9.21	1.45
X4	Village expenditures for social mentoring	0.00	3.32	9.21	1.72
X5	Village expenditures for other purposes (unexpected spending, consumption for meetings, etc.)	0.00	3.28	9.21	2.88
X6	Highest education level of the Village Head	0.00	4.96	9.00	1.53
Х7	Highest education level of the Village Secretary	0.00	5.17	9.00	1.61
X8	Number of village officials	0.00	22.09	125.00	17.87
Х9	Number of business units of BUMDes	0.00	0.79	9.00	0.95

Table 3: Description of Data

Source: processed by TNP2K, 2019

Spatial Clustering

In this section, we undertake a test with spatial autocorrelation to determine the locations where village development is concentrated. This concentration of village development has a pattern, namely some regions have high concentration. The results show that the regions of Sumatra, Java, Bali, and the western part of NTB have significant concentration of development–marked in Figure 3 with a dark color–where there are groupings of IPD which are quite high.

Figure 3: Concentration of Village Development (2018)



Concentration of village development, rate of significance reached 5 percent. Source: Processed from Podes 2018.

Massive village development is still occurring in the western part of Indonesia. The significant grouping is shown by the regions with (dark) red color. These regions constitute the village clusters with a high IPD score with neighbouring villages that also have high IPD scores. Statistically, such regions have a high significance rate so concentration of village development in NTT, Kalimantan, Sulawesi, Maluku, and Papua did not occur evenly. Outliers of village development occur in certain regions and are not evenly distributed.

Numerous BUMDes have begun to grow, and their concentration is related to village development. Despite the fact that the growth of BUMDes is still focused in western Indonesia, BUMDes in the regions of Kalimantan, Sulawesi, Maluku, and Papua have started developing. The significant growth of BUMDes is shown by the regions with (dark) red color, namely village clusters which have BUMDes related to the IPD (Figure 4). Statistically, the growth of BUMDes indicates significant value with a score of 0.05 percent. The success of village development and BUMDes is also attributable to the leadership in the village.



Figure 4: Concentration of Village Development According to Existence of BUMDes (2018)

Source: Processed from Podes 2018.

Note: Villages coloured in red denote the concentration of BUMDes that is correlated to village development has reached a significance rate of 5 percent.

Most village heads in Indonesia have a senior high school education (Figure 5). The spread of villages based on the education level of the village heads is almost evenly distributed in Indonesia, except in Papua and West Papua. This is consistent with the enforcement of Law No. 6/2014 on Villages which requires that the minimum education standard of a village head is senior high school. The villages that have conducted village head elections have also applied this rule. In carrying out the village development duty, a village head is assisted by a village secretary.



Figure 5: Concentration of Villages by Education Level of Village Head (2018)

Source: Processed from Podes 2018.

Most village secretaries in Indonesia have a senior high school education (Figure 6). The spread of villages based on the education level of the village secretary is almost evenly distributed in Indonesia, except in Papua and West Papua. The village secretary plays an important role in assisting the village head in village development, starting from administrative affairs to disbursements from the Village Fund.







Source: Processed from Podes 2018.

OLS Diagnostics

The OLS in this section is to identify the pattern of village development behaviour from the data. The village development behaviour in different village typology illustrates the condition in the field. Analysis of the OLS is used to ensure that the data used are already aligned with the reality occurring in village development progress.

This section assesses the following data behaviour using several equations which are tested simultaneously, and then comparing the results with one another. Each equation is used to observe the consistency of the effect of exogenous variables on endogenous variables. Each equation is also differentiated according to the village typology, namely the rural-urban, coastal-noncoastal, and forest area-outside forest area status.

The regression modeling resulted in consistent models. Of the six models implemented according to the village typology, only one has a different pattern, namely villages with an urban typology. Meanwhile, the models with other typologies-rural, coastal, and forest area-have similar patterns. Villages with an urban typology have basic service infrastructure that is relatively complete in comparison with rural villages.

Model	Parameter	β0	β1	β2	β3	β4	β5	β6	β7	β8	β9
Urban	R ² :0,165 P-Val: 0,000 SE:6,642 N: 9.774	56.618 (+)*	0.795 (+)*	0.054 (+)	0.018 (+)**	0.201 (+)	0.000 (+)	0.633 (+)*	0.443 (+)*	0.084 (+)*	0.351 (+)*
Rural	R ² :0,345 P-val: 0,000 SE:10,279 N: 65.662	24.192 (+)*	1.239 (+)*	0.581 (+)*	-0.305 (-)*	0.428 (+)*	0.284 (+)*	1.936 (+)*	1.259 (+)*	0.220 (+)*	2.049 (+)*
Coastal	R2:0,240 P-Val: 0,000 SE:10,22479 N: 11.385	33.17 (+)*	0.781 (+)*	0.151 (+)	-0.204 (-)*	0.216 (+)*	0.342 (+)*	1.009 (+)*	1.517 (+)*	0.217 (+)*	2.014 (+)*
Non- Coastal	R2:0,385 P-Val: 0,000 SE:10,378 N: 64.051	22.904 (+)*	1.526 (+)*	0.613 (+)*	-0.265 (-)*	0.480 (+)*	0.247 (+)*	2.175 (+)*	1.143 (+)*	0.217 (+)*	1.870 (+)*
Around Forest Area	R2:0,447 P-Val: 0,000 SE:11,261 N: 20.682	15.265 (+)*	1.067 (+)*	0.592 (+)*	-0.171 (-)*	0.568 (+)*	0.367 (+)*	2.118 (+)*	1.613 (+)*	0.299 (+)*	2.71 (+)*
Outside Forest Area	R2:0,276 P-Val: 0,000 SE:9,117 N: 54.754	36.059 (+)*	1.105 (+)*	0.285 (+)*	-0.138 (-)*	0.332 (+)*	0.171 (+)*	1.461 (+)*	0.815 (+)*	0.185 (+)*	1.238 (+)*

Table 4: Coefficient of OLS According to Village Typology (Badan Pusat Statistik (BPS), 2018)

Source: Processed from Podes 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

R²: R-Squared; SE: Standard Error of Estimation; β_0 = Intercept coefficient; β_1 :Village expenditures for government administration; β_2 : Village expenditures for implementation of development; β_3 : Village expenditures for community empowerment; β_4 : Village expenditures for social mentoring; β_5 : Village expenditures for other purposes (unexpected spending, consumption for meetings); β_6 : Highest education level of the Village Head; β_7 : Highest education level of the Village Secretary; β_8 : Number of village officials; and β_6 : Number of business units of BUMDes.

The results of the OLS diagnosis indicate that only one variable-community empowerment-has a negative impact on village development. At the same time, the other seven variables have a positive effect on village development. This model has a consistent result as confirmed by the scatter plot between the Y value and the predicted result of Y value (Figure 7). Only one equation does not describe a particular pattern, namely the first model equation. This model equation exists in villages with an urban status.



Figure 7: Scatter Plot Y with Y Prediction According to Village Typology

Source: Processed from Podes 2018. Note: X constitutes the endogenous variable, Y constitutes the Predictor.

Villages With Urban Status

Villages with urban characteristics have the most divergent pattern to villages in general. This behaviour is reflected in the existence of subdistricts with city characteristics but whose status has changed to village. Villages with an urban status have differences in the shape of village development, government empowerment, and village expenditures in other forms that are insignificant. In this kind of village, the government spends funds for social mentoring and government administration that usually delivers quite significant results. In addition, village heads make a greater contribution compared to village secretaries, and there are more village officials. Villages in this urban category also have BUMDes that make a significant contribution to village development.

In addition to the differences described above, villages with an urban status also have relatively good basic service infrastructure. Village policies can, therefore, be optimized by mentoring the community to improve their quality of life. One of the methods to optimize the services of village government is by observing the highest education level of the candidates for village head and village secretary during the election for the sake of effectiveness of services and development of the village community.

Villages With Rural Status

The government's expenditures for development in villages with a rural status make a positive and significant contribution after government administration. Community empowerment, however, makes a negative contribution to village development. This is because the empowerment of village communities is undertaken in a labor-intensive way but is attached to infrastructure development. The effect is that the community empowerment activities form a part of village development, whereas infrastructure development is still needed. On the other hand, village expenditures for mentoring and other purposes have a positive and significant effect on village development.

In addition to village expenditures, the education level of village officials is related to village development. The education background of village heads in particular will have a more significant effect on village development in comparison with the education level of village secretaries. This condition is indicated by β_6 (1,936) which is higher than β_7 (1,259). In addition, the increasing number of village officials also makes a positive and significant contribution to village development but not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes provides a positive and significant contribution. BUMDes make the greatest contribution to the performance of village government in comparison to the expenditure and village officials variables.

Coastal Villages

In general, the performance of coastal village governments has a different pattern to that of rural villages. Village government expenditures for other purposes has the greatest contribution if compared to development, empowerment, and mentoring. In fact, the expenditures for village development did not reach a significance rate of 5 percent alpha. Furthermore, the village expenditure for community empowerment is also negative.

In addition to the above, the education level of village secretaries has a more significant effect in comparison with that of village heads. This condition is indicated by β_7 (1.517) that is higher than β_6 (1.009). The increasing number of village officials makes a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes has a positive and significant contribution. BUMDes make the greatest contribution to village government performance in comparison with the expenditure and village officials variables.

Non-Coastal Villages

The performance of village government in noncoastal regions is indicated by the expenditure pattern for government administration which makes the highest contribution compared with village expenditures for other purposes. For villages in this category, the government's expenditure for village development has a positive and significant contribution to village development, however, the expenditures for community empowerment have a negative and significant contribution.

In addition, the education level of village heads has a more significant contribution if compared to village secretaries. Village heads play an important role in village development. This condition is indicated by β_6 (2.175) that is higher than β_7 (1.143). The increasing number of village officials also makes a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes has a positive and significant contribution. BUMDes make the greatest contribution to village government performance compared with the expenditure and village officials' human resources variables.

Villages Around Forest Areas

The performance of village government in villages around forest areas has the same pattern, between village development and social mentoring. Government administration is the highest contributor compared with village expenditures for other purposes. Expenditure for community empowerment, however, makes a negative and significant contribution.

Beyond the matters described above, village heads play an important role in village development. The education level of village heads makes a more significant contribution if compared to that of village secretaries. This condition is indicated by β_6 (2.118) that is higher than β_7 (1.613). The increasing number of village officials also has a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes makes a positive and significant contribution. BUMDes make the greatest contribution to village government performance compared with the expenditure and village officials' human resources variables.

Villages Outside Forest Areas

The performance of village governments outside forest areas that have a social mentoring pattern make a better contribution to village development. Government administration makes the highest contribution compared with village expenditures for other purposes, however, expenditures for community empowerment make a negative and significant contribution.

In addition, village heads play an important role in village development and their education level makes a more significant contribution than that of village secretaries. This condition is indicated by β_6 (1.461) that is higher than β_7 (0.815). The increasing number of village officials also makes a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes makes a positive and significant contribution. BUMDes make the lowest contribution to village government performance in comparison with the education level of village heads.

Predictor Effect

This study produces four equations that are tested simultaneously, and then compared to each other. One other equation is used to measure errors of the regional development effect.

Model	Parameter	β _o	β,	β ₂	β₃	β4	β _s	β ₆	β ₇	β ₈	β,	W_Y	λ
OLS	R ² :0,364 P-Val: 0,000 SE: 10,399 N: 75.436	24,710 (+)*	1,413 (+)*	0,548 (+)*	-0,269 (-)*	0,420 (+)*	0,264 (+)*	1,962 (+)*	1,190 (+)	0,222 (+)*	1,903 (+)*		
LAG	R ² :0,617 Ll: 0,000 SE: 7,369 N: 71.494	9,405 (+)*	0,423 (+)*	0,175 (+)*	0,045 (+)**	0,215 (+)*	0,076 (+)*	0,809 (+)*	0,643 (+)*	0,099 (+)*	0,770 (+)*	0,599 (+)*	
Error	R ² : 0,659 Ll: 0,000 SE: 6,957 N: 71.494	47,084 (+)*	0,279 (+)*	0,036 (+)	0,049 (+)**	0,195 (+)*	0,053 (+)*	0,594 (+)*	0,594 (+)*	0,145 (+)*	0,537 (+)*		0,750 (+)*

Table 5: Coefficient of the Results of OLS Regression, Spatial Lag, and Spatial Error

Source: Processed from Podes 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

R²: R-Squared; SE: Standard Error of Estimation; β_0 = Intercept coefficient; β 1:Village expenditures for government administration; β 2: Village expenditures for implementation of development; β 3: Village expenditures for community empowerment; β 4: Village expenditures for social mentoring; β 5: Village expenditures for other purposes (unexpected spending, consumption for meetings); β 6: Highest education level of the village head; β 7: Highest education level of the village secretary; β 8: Number of village officials; and β ⁴: Number of business units of BUMDes.

In general, regional development delivers a far better impact. The results of parameter calculations between OLS and Spatial Lag has a difference of 25.3 percent. Generally the development of rural areas produces better parameters on village development.

In addition, the number of BUMDes business units makes a positive and significant contribution to the performance of village development. On the other hand, village expenditures for community empowerment have a negative effect on village development.

Village expenditures for government administration

Government administration makes a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for government administration will increase the outcomes of village development by 0.01413 points-assuming that the other variables remain the same.

Village expenditures for implementation of development

Initiating village development makes a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures to initiate development will increase the outcomes of village development by 0.00548 points–assuming that the other variables remain the same.

Village expenditures for community empowerment

The empowerment of village communities makes a negative and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for community empowerment will reduce the outcomes of village development by 0.00269 points-assuming that the other variables remain the same.

Village expenditures for social mentoring

Village expenditures for social mentoring have a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for mentoring will increase the outcomes of village development by 0.00420 points–assuming that the other variables remain the same.

Village expenditures for other purposes (such as unexpected spending and consumption for meetings)

Village expenditures for other village financing make a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for other costs will increase the outcomes of village development by 0.00264 points–assuming that the other variables remain the same.

Highest education level of the village head

The education level of village heads makes a positive and significant contribution to village development. Each one level increase in the education level of a village head will increase the outcomes of village development by 1.962 points–assuming that the other variables remain the same.

Highest education level of the village secretary

The education level of village secretaries makes a positive and significant contribution to village development. Each one level increase in the education level of a village secretary will increase the outcomes of village development by 1.190 points–assuming that the other variables remain the same.

Number of village officials

The number of village officials has a positive and significant contribution to village development. The addition of one village official will increase the outcomes of village development by 0.222 points-assuming that the other variables remain the same.

Number of BUMDes business units

The number of BUMDes business units makes a positive and significant contribution to village development. The addition of one BUMDes business unit will increase the outcomes of village development by 1.903 pointsassuming that the other variables remain the same.

Simultaneous development of villages

Village development can be described by the allocation of budget in the village, condition of village officials and BUMDes business units. These variables collectively describe 36.4 percent of village development.

Spatial development of villages

Spatial or regional development of villages by engaging the neighbouring villages has an interrelated connection. The development of neighbouring villages has a significant effect on village development. If the neighbouring village increases its development by one village development point, the observed village will increase by 0.599 points and village development simultaneously sees an impact of 61.7 percent. Village development is described by the development of neighbouring villages, village expenditures, education of the village head and secretary, as well as the BUMDes business units in the village.

In addition, village development also has an effect on the development of neighbouring villages. This spillover effect has a positive and significant value of 0.750, namely if the village development increases by one, the neighbouring villages will have an effect of 0.750483–assuming that the other variables remain the same. In other words, village development is not merely an effect of the village development itself, but rather, it also spills over from the development of neighbouring villages.

CONCLUSIONS

This study particularly observed the achievements of village development from the economic aspect and the performance of village government. In general, the outcomes indicate that the success of village development is not merely the effect of the village development itself but the development of neighbouring villages also has a positive and significant effect on village development.

Village development can be described by the performance of village government through the allocation of budget in the village, condition of village officials, and BUMDes business units. These variables overall contributed 36.4 percent to village development, however, at the same time, the spatial (regional) village development has an effect of 61.7 percent on the achievement of village development.

The development of neighbouring villages has a significant effect on village development, namely by 0.599. This means that if the neighbouring villages increase by one village development point, the observed village will have an increase by 0.599. This achievement describes an effect of 61.7 percent on village development. On the other hand, village development also has an effect on the development of neighbouring villages. This spillover effect has a positive and significant value of 0.750 so that, if the village development increases by one point, the neighbouring villages will have a spillover effect by 0.750483–assuming that the other variables remain the same. This achievement describes an effect of 65.9 percent on village development.

The village development predictor of achievement can be described by the performance of village development. This performance is indicated from: (i) village expenditures by expenditure category; (ii) village officials' human resources described by the education level of the village head and the village secretary, as well as the number of village officials; and (iii) development of BUMDes business units. These three things have a positive and significant effect on village development achievement.

The results of this study can serve as the benchmark for the formulation of policies:

First, the policies needed for the development of villages with an urban typology are different from the development policies for villages in general. This is because villages with an urban status tend to have complete infrastructure and the communities have quite a good level of education. The direction of policies of the village government are directed more towards community mentoring to earn better income.

Second, the development policies of coastal villages are more inclined to optimize the role of the village secretary rather than the village head. As a community figure, the village head in a coastal village is more prioritized, while the village secretary is more focused on resolving technical issues. Each activity in a coastal village, therefore, tends to be delegated to the village secretary to follow up.

Third, village government expenditures for development of coastal village is not significant and community empowerment has a negative score. Instead, the village's expenditures for government, mentoring, and other village expenditures are significant. The optimum village policies of mentoring for coastal village communities are more prioritized.

Fourth, the development of villages around forest areas optimize government expenditures for government administration, development, and mentoring.

Fifth, in general the empowerment of village communities has a negative score because the labor-intensive context undertaken by the village government is currently attached to the development of village infrastructure. This creates a need for community empowerment efforts rather than infrastructure development.

Sixth, the development of BUMDes will be more effective if it is done jointly.

Seventh, establish cooperation among villages in the development of rural areas so that the progress of village development is accelerated.

Limitations of the Research

At the time this research was conducted, there were several limitations to the research:

- (1) the village neighbourhood is the surrounding village regions which borders the village directly;
- (2) According to the regulations, village government expenditures are limited to four budget items in 2017, namely: (a) government administration; (b) development; (c) empowerment; and (d) community mentoring, while other expenditures are combined under the heading of expenditures for other purposes;
- (3) The capacity of village officials was limited by the education level of the village head and the village secretary;
- (4) The description of investments at the village level was limited by the existence of BUMDes business units; and
- (5) the source of data used was the data collection of *Podes* 2018.

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Appendix

Typology
Village
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Diagnostics
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Table

å	0.351	2.049	2.014	1.870	2.71	1.238
	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
ല്	0.084	0.220	0.217	0.217	0.299	0.185
	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
β,	0.443	1.259	1.517	1.143	1.613	0.815
	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
ຶຍ	0.633	1.936	1.009	2.175	2.118	1.461
	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
B,	0.000 (0,984)	0.284 (0,000)	0.342 (0,000)	0.247 (0,000)	0.367 (0,000)	0.171 (0,000)
B 4	0.201	0.428	0.216	0.480	0.568	0.332
	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)
ß	0.018	-0.305	-0.204	-0.265	-0.171	-0.138
	(0,741)	(0,000)	(0,003)	(0,000)	(0,001)	(0,000)
B ₂	0.054	0.581	0.151	0.613	0.592	0.285
	(0,413)	(0,000)	(0,060)	(0,000)	(0,000)	(0,000)
ß,	0.795 (0,000)	1.239 (0,000)	0.781 (0,000)	1.526 (0,000)	1.067 (0,000)	1.105 (0,000)
ß	56.618	24.192	33.17	22.904	15.265	36.059
	(0,000)	(0,000	(0,000)	(0,000)	(0,000)	(0,000)
Parameter	R ² :0,165	R ² :0,345	R ² :0,240	R ² :0,385	R ² :0,447	R ² :0,276
	P-Val: 0,000					
	SE:6,642	SE:10,279	SE:10,22479	SE:10,378	SE:11,261	SE:9,117
	N: 9.774	N: 65.662	N: 11.385	N: 64.051	N: 20.682	N: 54.754
Model	Urban	Rural	Coastal	Non-Coastal	Around Forest Area	Outside Forest Area

Village Development: Spatial Effect vs The Performance of the Village Government?

Source: Processed from Podes 2018.

~			0,750 (0,000)
۳_Y		0,599 (0,000)	
ß	1,903	0,770	0,537
	(0,000)	(0,000)	(0,000)
ß	0,222 (0,000)	(000'0)	0,145 (0,000)
ß,	1,190	0,643	0,594
	(0,000)	(0,000)	(0,000)
ຍ	1,962	0,809	0,594
	(0,000)	(0,000)	(0,000)
B,	0,264	0,076	0,053
	(0,000)	(0,000)	(0,000)
B 4	0,420	0,215	0,195
	(0,000)	(0,000)	(0,000)
ย์	-0,269	0,045	0,049
	(0,000)	(0,035)	(0,038)
β ₂	0,548	0,175	0,036
	(0,000)	(0,000)	(0,204)
Ę,	1,413	0,423	0,279
	(0,000)	(0,000)	(0,000)
ß	24,710	9,405	47,084
	(0,000)	(0,000)	(0,000)
Parameter	R2:0,364	R2:0,617	R2: 0,659
	P-Val: 0,000	Ll: 0,000	Ll: 0,000
	SE: 10,399	SE: 7,369	SE: 6,957
	N: 75.436	N: 71.494	N: 71.494
Model	OLS	LAG	Error

Table A2: Coefficient of Regression Results

Source: Processed from Podes 2018.

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