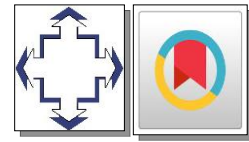


Discriminant Study with Classification of Underdeveloped and Developing City Districts in West Papua Province



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ABSTRACT

This study aims to determine whether there are clear differences between groups on the dependent variable. This analysis uses the independent variable Life Expectancy (X_1), Number of Health Facilities (Puskesmas) (X_2), Number of Facilities (Supporting Puskesmas) (X_3), Polindes Facilities (X_4), percentage of households that do not use electricity (X_5). The dependent variable is the regencies / cities lagging behind and developing in West Papua. The research sample uses secondary data, which are the results of the 2017 National Socio-Economic Survey (SUSENAS) conducted by the West Papua Statistics Agency (BPS). The discriminatory method is to test the difference between the stipulation of disadvantaged districts / cities and the stipulation of a Presidential Decree. 131 of 2015, concerning disadvantaged districts / cities in West Papua with normality test data. The object applied is all districts / cities in West Papua. Discriminant analysis can separate lagging and developing districts / cities in West Papua province by calculating function scores by comparing with interrupted scores, the results of the study are 5 districts / cities classified as disadvantaged districts and 6 districts / cities classified as developing districts/city. the influencing factor is facilities (village polyclinic) and the percentage of households that do not use electricity with a percentage decision 100%, theoretical evidence that the five variables prove that the discriminant analysis method shows the same results as the results issued by the Presidential Decree. 131 of 2015 with the percentage of decisions is 100%.

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1. Introduction

The neo-classical view warns that development can lead to polarization of regions, namely developed regions and underdeveloped regions, or central and peripheral regions. The Indonesian context shows Java Island and urban areas as developed and central regions, while outside Java and village areas are underdeveloped and fringe areas. The city is crammed with people until it reaches its saturation point. Residents are increasingly difficult to access basic needs, such as living land, clean water, healthy environment, to find work. The implication of this is the presence of increasingly complicated city problems. Poverty continues to creep up, slums and squatter settlements increasingly spread, unemployment rises, congestion runs rampant, social outbreaks plague, and others (Kunjana, 2018). The fact is that some city residents are still excluded from various urban facilities due to poverty, injustice, the process of disbanding parts of the city, and unequal urban economic growth, this situation also occurs in eastern Indonesia.

In research (Rosmeli, 2014) in the Comparative Study of Regional Inequality Between Western Indonesia and Eastern Indonesia, with the results of the study it is known that Western Indonesia has higher inequality compared to Eastern Indonesia, with an average index of 0.83 for Western Indonesia and 0.45 for Eastern Indonesia. While from the results of the correlation of people it is known that in the Western Region of Indonesia, regional inequality has a negative and very strong relationship to the workforce of 0.905 at a confidence level of 99 percent while for Eastern Indonesia it is known that the relationship of regional inequality with labor produces a positive and not so relationship strong of 0.599.

As reported by the State Secretariat, disadvantaged regions are regency regions with less developed regions and communities compared to other regions on a national scale. An area can be defined as a disadvantaged area based on community economic criteria, human resources, facilities and infrastructure, regional financial capacity, accessibility, and regional characteristics. It can be seen that the most disadvantaged areas are in eastern Indonesia, one of which is Papua and West Papua. The government set 122 regions as disadvantaged areas. That was stated in the Presidential Regulation Number 131 Year 2015 concerning Determination of Disadvantaged Regions in 2015-2019.

Table 1. Appendix List of Backward Regions Year 2015-2019

No.	Code Kabupaten	Province	District
90	9103	West Papua	Teluk Wondama
91	9104	West Papua	Teluk Bintuni
92	9106	West Papua	Sorong Selatan
93	9107	West Papua	Sorong
94	9108	West Papua	Raja Ampat
95	9109	West Papua	Tambrauw
96	9110	West Papua	Maybrat

Source: Appendix Presidential Decree 131 2015

In the Presidential Regulation it is mentioned that the disadvantaged areas are regencies whose regions and communities are less developed compared to other regions on a national scale. An area is determined as lagging based on criteria: a) Community economy, b) Human resources, c) Facilities and Infrastructure, d) Regional Financial Capability, e) accessibility and f) regional characteristics. "The criteria for underdevelopment as referred to are measured based on indicators and sub-indicators. Provisions regarding indicators and sub-indicators as referred to are governed by ministerial regulations that carry out government affairs in the field of development of disadvantaged regions," reads article 2, paragraph 2 and 3 of the presidential regulation. (Yunita, 2015).

The number of indicators and sub-indicators that are always changing in determining districts / cities are lagging and developing so that it is difficult for readers to distinguish between disadvantaged districts and developing districts. with multivariate techniques related to the separation of objects in different groups and allocating objects into a group that has been previously determined. With the aim of testing West Papua Central Statistics Agency (BPS) data published with Presidential Decree No.131 of 2015 concerning underdeveloped and developing villages in West Papua (Government, Republik Indonesia., 2015)

2. Literature Review

In this research, besides using theories, previous research results are also used as a reference and illustration in conducting this research.

Definition of underdeveloping area

Based on Presidential Regulation of the Republic of Indonesia Number 131 Year 2015, Determination of Underdeveloped Regions in 2015-2019. Article 1 Paragraph 1 Underdeveloped Regions are regency regions whose regions and communities are less developed compared to other regions on a national scale. Article 2 paragraph 1 An area is determined as a Disadvantaged Region based on the following criteria: a). community economy; b). human resources c). facilities and infrastructure; d). regional financial capacity; e). accessibility; and f). regional characteristics. Lagging areas are regency / city areas that are relatively less developed compared to other regions on a national scale and have relatively disadvantaged populations. The National Strategy for the Development of Underdeveloped Regions states that the scope of disadvantaged areas is the autonomous region of the district / city. Determination of the status of disadvantaged areas considers the following matters, namely: social, economic, cultural, and regional conditions (inter and intra spatial functions both in natural aspects, human aspects, and supporting infrastructure) of each region. These conditions are used as a basis in determining the level of underdevelopment of an area by using calculations of general criteria, sub-criteria and indicators that have been assigned weights.

Research (Muhtar, 2011) with the title Underdeveloped Communities states that underdeveloped areas are regency areas where the people and their regions are relatively less developed compared to other regions on a national scale (Saifullah, 2006). Related to that, according to Bappenas (2006), an area is categorized as lagging behind, because: (a) geographically, it is relatively difficult to reach because it is located far inland, hills / mountains, islands, coast, and remote islands or due to geomorphological factors others making it difficult to reach by the network both transportation and communication media; (b) in terms of natural resources, do not have the potential, or have large natural resources, but the surrounding environment is a protected or non-exploitable area, and the area is left behind due to excessive exploitation of natural resources; (c) in terms of human resources, generally the people in disadvantaged areas, their level of education, knowledge, and skills are relatively low as well as underdeveloped adat institutions; (d) limited infrastructure and means of communication, transportation, clean water, irrigation, health, education, and other services that cause difficulties in carrying out economic and social activities; (e) frequently (an area) experiences natural disasters and social conflicts resulting in disruption of social and economic development activities; and (f) an area is lagging behind, due to a number of inappropriate policies, such as: lack of support for the development of disadvantaged areas, mistakes in approaching and prioritizing development, and the inclusion of indigenous peoples' institutions in planning and development.

Definition of developing area

Based on regulation of the village minister (Permendesa) Number 2 of 2016 concerning the Building Village Index (IDM), the purpose of the underdeveloped, developing, advanced and independent villages categories is explained. The understanding of the village category is as explained below:

1. Independent Village Category

Independent Village or also known as Sembada Village is Independent Village which has the ability to carry out village development to improve the quality of life and life as much as possible for the welfare of the village community with social security, economic security, and ecological security in a sustainable manner.

2. Advanced Village Category

Advanced Village or also known as Pre-matched Village is a village that has the potential of social, economic and ecological resources, and the ability to manage it to improve the welfare of the village community, the quality of human life, and poverty reduction.

3. Developing Village Category

Developing Villages or also called Madya Villages are potential villages to become Developing Villages, which have potential social, economic and ecological resources but have not optimally managed them to improve the welfare of the village community, the quality of human life and poverty alleviation.

4. Underdeveloped Village Category

Disadvantaged Villages or also known as Pre-Intermediate Villages are Villages that have potential social, economic and ecological resources but have not, or lack of management in efforts to improve the welfare of rural communities, the quality of human life and poverty in various forms.

5. Very Underdeveloped Village Category

Very Disadvantaged Villages or also called Primary Villages, are Villages that experience vulnerability due to natural disasters, economic shocks, and social conflicts so that they are not able to manage the potential of social, economic and ecological resources, and experience poverty in various forms (Minister Republik Indonesia, 2016).

Other research writes (Satria, 2018) The development process is basically not just an economic phenomenon. In addition to considering aspects of growth and equity, it also considers economic aspects of social life only. More than that, in the development process efforts were made aimed at changing the structure of the economy for the better (Kuncoro, 2000). In the development of a country it is inseparable from regional development evenly according to the opinion according to (Lincoln, 2010) which states that regional economic development is a process in which local governments and communities manage existing resources and form partnerships between local governments and the private sector to creating new jobs and stimulating the development of economic activities. However, in the process of continuing the development of an area there must be a major problem that results in economic disparities between regions / regions because the ability of a region / region to drive the development process is not the same.

Research on growth was conducted by (Unggul, 2017) the Center for Growth Theory The growth center theory or Growth Poles Theory was introduced by French economist Francis Perroux. Situmorang (2008) explains Perroux's theory of pole croisanse or pole de development, which means the center of growth as an industrial device that is undergoing development and is located in an urban area and encourages further development of economic activity through its area of influence. He also said that "growth does not growth", he found in his analysis of the vehicle industry which tends to be clustered in certain regions. Thus economic growth tends to be concentrated in certain regions that are driven by the benefits of agglomeration (Agglomeration Economies) arising from the concentration of

economic activity. The emergence of some of these concentrations of economic activity will further encourage an increase in the efficiency of economic activities which will have a positive impact on national economic development. "

The central place theory was put forward by a German geographer Walter Christaller. Hartono (2007) explains Christaller's theory of a central city which is the center for the surrounding area which is the link of trade with other regions. According to Christaller, each order has its own hexagonal region. This form of hexagonal service pattern is theoretically capable of obtaining optimization in terms of transportation, marketing and administration efficiency (Hagget, 2001). Cities as service centers are expected to have service facilities such as, a). The center and shops as the focus point of a city; b). Transportation facilities and infrastructure; c). Recreation and sports venues; d). Means of education, health, tourism. Thus the city provides all facilities for life both social and economic, so that both residence and work and creativity can be done within the city (Jayadinata, 1992).

Regional Autonomy Based on Law No. 32 of 2004 Article 1 number 5, regional autonomy is the right, authority and obligation of autonomous regions to self-regulate and manage government affairs and the interests of local communities in accordance with statutory regulations. Haris explained Smith's role of government in a democratically run region would provide greater space for the community to share their sovereignty. This will not only strengthen the local democratic process, but also contribute to democracy and national integration (Ahmad, 2006).

Discriminant Analysis

Discriminant analysis is a statistical method for grouping or classifying a number of objects into several groups, based on several variables, so that each object is a member of more than one group. In principle, discriminant analysis aims to group each object into two or more groups based on the criteria of a number of independent variables. Discriminant analysis is a multivariate technique that includes the dependence method, namely the presence of dependent and independent variables. Thus there are variables whose results depend on the independent variable data. Discriminant analysis is similar to multiple linear regression (multivariable regression). Discriminant analysis is an accurate technique to predict which category a person belongs to, with a record of the data involved in ensuring its accuracy.

Various statistical discriminant methods used by researchers (Afianti, 2014) Research title Village / Kelurahan Separation in Semarang Regency According to Regional Status Using Classical Quadratic Discriminant Analysis and Robust Quadratic Discriminant, Discriminant analysis can be used to separate villages / kelurahan in Semarang Regency into urban or rural groups. As it is known that classical estimates for sample average vectors and sample covariance matrices are very sensitive to outliers on observations, causing classification functions to be robust. Estimator that can be used to overcome data that contains outliers is the Minimum Covariance Determinant because this estimator can be calculated for large data sets in a very short time (Hubert and Driessen, 2004). Research results (1). The separation of villages / kelurahan in Semarang Regency with a classic quadratic discriminant analysis gives the results of 183 villages / kelurahan having a rural status and 52 villages / kelurahan having an urban status. (2). The separation of villages / kelurahan in Semarang District with robust quadratic discriminant analysis gives results 167 villages / kelurahan have a rural status and 68 villages / kelurahan have an urban status. (3) The application of robust quadratic discriminant analysis is more in accordance with the 2011 Village Potential data in Semarang Regency which contains outliers because it is able to provide the accuracy of the separation results of 89.79%, while the classical quadratic discriminant has the accuracy of the separation results of 87.23%.

The Discriminant Method was also investigated by (Lendi, 2019) under the title Determinants Self Sufficiency Of Rice In Supporting Food Independence with the MAPE (Mean Absolute Percentage Error), MAD (Mean Absolute Deviation), MSD (Mean Absolute Deviation) are different

for each model. With the aim of measuring the difference between rice self-sufficiency during the New Order (1970-1998) and the reform period (1999-2016) caused by an increase in population because rice demand continued to increase but was not matched by rice productivity and significant support of agricultural technology. This proves that the government's support for the development of the agricultural sector is inconsistent so that rice self-sufficiency cannot yet be overcome by relying only on local rice production. Based on the analysis of rice self-sufficiency trends, there is a tendency to continue to increase in the future. This is inseparable from the determinants of rice self-sufficiency (productivity and application of technology) which are still being sought to increase. The welfare of farmers has not gone hand in hand with the achievement of food independence. Ironically, even increasing rice self-sufficiency has reduced the welfare of farmers. This is due to the low bargaining power of farmers, which is evidenced when the price of rice on the market has increased, not followed by an increase in grain prices at the farm level. Thus those who can enjoy the benefits of the rice trading system are large traders.

Other researchers (Ida, 2017) Title of Discriminant Analysis in the Village Classification in Tabanan District Using the K-Fold Cross Validation Method Based on the results and discussion obtained, conclusions can be drawn, namely: First, the model of village classification in Tabanan Regency in a group of rural or urban areas the quadratic discriminant analysis technique obtained at the time of the experiment $k = 4$ is ^

$$\begin{aligned} \hat{\partial}_1^Q(x) &= -\frac{1}{2} \ln|S_1| - \frac{1}{2} (x - \bar{x}_1)' S_1^{-1} (x - \bar{x}_1) + \ln \left(\frac{78}{99} \right) \\ \hat{\partial}_2^Q(x) &= -\frac{1}{2} \ln|S_2| - \frac{1}{2} (x - \bar{x}_2)' S_2^{-1} (x - \bar{x}_2) + \ln \left(\frac{21}{99} \right) \end{aligned}$$

Secondly, the quadratic discriminant model $\hat{\partial}_1^Q(x)$ and $\hat{\partial}_2^Q(x)$ has the smallest total misclassification probability between each experiment for $k = 2, 3$ and 4 which is 0.09 and has accurate and consistent classification results. Third, the results of the classification of villages in Tabanan Regency with quadratic discriminant analysis techniques using k -fold cross validation for $k = 2, 3$ and 4 in each experiment are accurate and consistent. The advice that can be given in future research is to use quadratic discriminant analysis techniques with a larger number of groups with the k -fold cross validation method for $k > 4$. Second, it is recommended to overcome outliers in the data and use data with an equal number of individuals in each group. Third, based on outlier test results, especially for villages with urban status, there were 12 villages detected as outliers from 28 villages with urban status. This allows for new groupings of outliers (transition villages). So for further research it is advisable to expand the village area or to group more than two groups for the status of the village area.

Panel data discriminant research with transformation in logarithms used by (Wibowo, 2019) Based on the above research results it can be concluded that the population growth rate, life expectancy and average length of school have a significant influence on poverty alleviation in districts / cities in Central Java. That is, various government policies and programs in poverty alleviation through education, health have shown good results. While in terms of per capita GRDP and per capita expenditure have not shown significant results. There must be various government policies and programs such as the ease of licensing capital intensive investment, infrastructure facilitation so that investors are interested in investing in cities and regions. So an increase in per capita income and balanced employment with balanced development will reduce the number of poor people. In addition, it is hoped that the central and regional governments will increase the percentage of the state budget and regional budgets to increase human development, especially in the health and education sector because this study shows that education and health variables have a greater elasticity compared to other variables. a minimum 12 year compulsory education scholarship, encouraging and facilitating vocational education to be able to provide skills so as to produce direct labor and public health

insurance. There needs to be an awareness and education that maintaining a healthy lifestyle and higher education will build a better and more sustainable economy.

Discriminant Analysis

Discriminant analysis is "the dependent technique in which the independent variable is non metric" (Widarjono, 2010). Discriminant analysis is one of the statistical techniques that can be used in dependency relationships (relationships between variables where it can be distinguished which response variable and which explanatory variables) Discriminant analysis is useful in situations where the total sample can be divided into groups based on the characteristics of the variables known from some cases. The main purpose of multiple discriminant analysis is to find out the differences between groups. Discriminant analysis is one of multivariate analysis using the dependency method. Where there are two methods in multivariate analysis, namely the dependency method and the interdependency method. The dependency method is that the variables are not interdependent, while the interdependency method is interdependent.

Discriminant analysis is a method for finding the basis for grouping individuals based on more than one independent variable. The analysis is used to answer the question how individuals can be put into groups based on several variables. Discriminant analysis aims to classify an individual or observation into mutually exclusive / disjoint and exhaustive groups based on a number of explanatory variables. Assumptions in this analysis include:

1. The absence of multicollinearity between independent variables (linear relationship between independent variables).
2. The independent variable follows the normal distribution.
3. The homogeneity of variance between groups of data (Variance-covariance matrix of explanatory variables of size b_p, x_p in both groups must be the same).

Discriminant analysis model Discriminant analysis is included in the multivariate dependence method, with the model:

$$Y = b_0 + b_1x_1 + b_2x_2 + \dots + b_px_p$$

Fisher discriminant analysis

The main principle of Fisher's discriminant function is the separation of a population. The discriminant function that is formed can be used for grouping observations based on certain groups. Fisher's method does not assume the data must be normally distributed, but in the calculation of one of the conditions that must be considered is the data used must have the same covariance matrix for each given population group.

In the discriminant analysis the two groups, if the independent variable $X_1, 2, \dots, X_p$, and the linear combination sought is $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_pX_p$ hence the vector $\beta = (\beta_1, \beta_2, \dots, \beta_p)$ need to be chosen so that the quotient $\frac{\beta' \mu_1 - \beta' \mu_2}{\beta' \Sigma \beta}$ reach maximum where dimana $\beta = c \Sigma^{-1} (\mu_1 - \mu_2)$ for any constant $c \neq 0$. Where the combined sample covariance matrix variance is S with the formula:

$$S = \frac{1}{n_1 + n_2 - 2} [(X_1X_1 + X_2X_2) \dots \dots 2.1)$$

Signification Testing

Discriminant analysis also aims to produce a measure of the level of difference between the groups involved. If the discriminant function for the two groups K1 and K2 is $Y = b' X$, the difference between the average discriminant scores is:

$$\begin{aligned} \bar{Y}_1 - \bar{Y}_2 &= b' \bar{X}_1 - b' \bar{X}_2 = b' (\bar{X}_1 - \bar{X}_2) \\ &= (\bar{X}_1 - \bar{X}_2)' S^{-1} (\bar{X}_1 - \bar{X}_2) \end{aligned}$$

The right-hand side size is called the Mahalanobis distance between \bar{X}_1 and \bar{X}_2 , and is expressed by the sign $D^2(\bar{X}_1, \bar{X}_2)$ or D^2 . Size or statistics D^2 can be used to investigate whether there are significant differences between the two vectors on average

Classification

Classification rules or the placement of individuals (objects) into the two groups are used to predict which variables belong to which group will then get a classification matrix, the classification process can also be used to assess the validation of discriminant analysis. Classification rules use the formula:

$$Z_{CU} = \frac{n_1 Z_1 + n_2 Z_2}{n_1 + n_2} \dots \dots \dots (2.2)$$

Information :

- Z_{CU} : critical numbers, which function as cut-off scores.
- n_1 : the number of samples in group 1, which in this case is the group not left behind.
- n_2 : samples in group 2, which in this case is the lagging group.
- Z_1 : centroid number in group 1.
- Z_2 : centroid number in group 2.

3. Research Method

Quantitative approach with descriptive and verification methods, due to the variables to be examined in their relationship, as well as the objective to present a structured, factual, and accurate picture of the facts and the relationship between variables examined with discriminant studies with classification of lagging and developing city districts in the Province West Papua."Descriptive method is for the study of determining the facts with the right interpretation which includes studies to accurately describe the properties of some group and individual phenomena as well as studies to determine the frequency of occurrence of a condition to minimize bias and maximize reliability. This description method is used to answer problems regarding all research variables independently. Verification method is a research method that aims to determine the causality relationship between variables through a hypothesis test through a statistical calculation so that evidence can be produced that shows the hypothesis is rejected or accepted ". (Nazir.Moch, 2011).

The research variables used according to " (Sugiyono, 2014) p: 59 say that the research variable is an attribute or nature or value of people, objects or activities that have certain variations determined by researchers to be studied and conclusions drawn." Operational research variables mean describing variables / subvariables into concepts, dimensions, indicators, etc. to obtain the value of research variables. The research variables which are the objects in this study are: sales forecasting or demand and production planning. As for the definition of each variable as follows: The variables used in this study are Life expectancy (X1), Number of Health Facilities (Community health centers) (X2), number of facilities (Supporting public health centers) (X3), Polyclinic Facilities village (Polindes) (X4), the percentage of households not using electricity (X5).

The data source used in this study is secondary data, which are the results of the 2017 National Socio-Economic Survey (SUSENAS) conducted by the West Papua Central Statistics Agency (BPS).

The data used in the form of data on factors causing the disadvantaged areas for the district / city in West Papua Province consisting of 12 districts and 1 city. The data is adjusted to the availability of existing data.

Table 2. Number District / Town in West Papua

No.	District/City	Status
1	Fakfak	Developed
2	Kaimana	Developed
3	Teluk Wondama	Underdeveloped
4	Teluk Bintuni	Underdeveloped
5	Manokwari	Developed
6	Sorong Selatan	Underdeveloped
7	Sorong	Underdeveloped
8	Raja Ampat	Underdeveloped
9	Tambrauw	Underdeveloped
10	Maybrat	Underdeveloped
11	Manokwari Selatan	Developed
12	Pegunungan Arfak	Developed
13	Kota Sorong	Developed

Source: Appendix Presidential Decree 131, 2015

Data analysis and procedures are used as follows:

Steps in discriminant analysis

1. Separating variables into dependent variables and independent variables.
2. Determine the method for creating discriminant functions. In principle, there are two basic methods for creating discriminant functions, namely:
 - a. Simultaneous estimation
All independent variables are entered together then a discriminant process is carried out.
 - b. Stepwise estimation
Independent variables are entered one by one into the discriminant model. In this process there will be variables that remain in the model and there are variables that are removed from the model.
3. Test the significance of the discriminant function that has been formed, using Wilk's lamda, Pilai, F test and other tests.
4. Test the classification accuracy of the discriminant function and find out the classification accuracy individually with casewise diagnostics.
5. Interpret the discriminant function.
6. Conduct a validation test of the discriminant function.

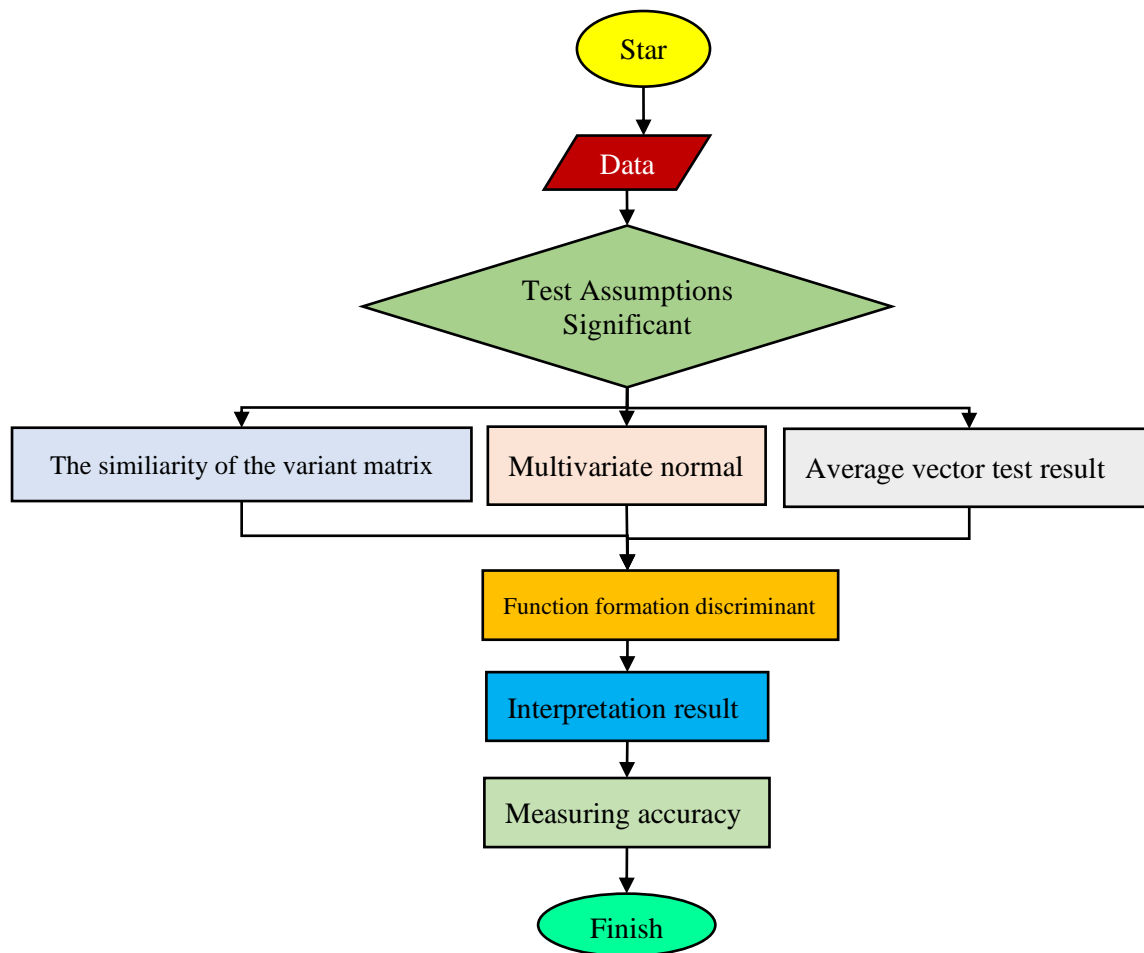


Figure 1 Analysis Procedures

The selection of indicators in determining so many variables in the data of the Central Statistics Agency (BPS) -Papua Barat in 2017, (BPS.Papua.Barat, 2017) the author conducted a test of normality and that meets the criteria of keriteria and the availability of existing data, the indicators selected as follows:

Table 3 Data District / City Developing and Left behind

No.	District / City	Status	Life Expectancy (X ₁)	Medical facility (X ₂)	Auxiliary health center (X ₃)	Village polyclinic (X ₄)	do not use electricity (X ₅)
1	Fakfak	Developed	68	10	38	38	75
2	Kaimana	Developed	64	8	48	12	65
3	Teluk Wondama	Underdeveloped	59	6	36	1	47
4	Teluk Bintuni	Underdeveloped	60	20	39	-	161
5	Manokwari	Developed	68	13	36	9	26
6	Sorong Selatan	Underdeveloped	66	15	36	2	84
7	Sorong	Underdeveloped	66	18	49	31	149
8	Raja Ampat	Underdeveloped	64	19	52	25	109
9	Tambrauw	Underdeveloped	59	10	21	-	132
10	Maybrat	Underdeveloped	65	14	24	3	110
11	Manokwari Selatan	Developed	67	4	11	7	19
12	Pegunungan Arfak	Developed	67	9	18	-	98
13	Kota Sorong	Developed	70	8	26	-	4

Sources : West Papua Central Statistic Agency in 2017

4. Results and Discussion

In the discriminant test the prerequisite tests for normality test, covariance variance matrix test, and average vector test are as follows:

Normality test

This test is carried out with the aim to assess the distribution of data in a group of data or variables, whether the data distribution is normally distributed or not. The normality test on multivariate can be done on each variable with the logic that if individually each variable meets the assumption of normality, then together (multivariate) these variables can also be considered to meet the normality assumption.

Table 4. Tests of Normality

		Tests of Normality					
Category		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Life Expectancy	Underdeveloped	.300	5	.161	.776	5	.050
	Developed	.260	2	.			
Faskes (Public Health Center)	Underdeveloped	.269	5	.200*	.877	5	.296
	Underdeveloped	.260	2	.			
Auxiliary Health Center	Underdeveloped	.189	5	.200*	.945	5	.698
	Developed	.260	2	.			
Not Using Electricity	Underdeveloped	.197	5	.200*	.972	5	.885
	Developed	.260	2	.			
Village polyclinic	Underdeveloped	.278	5	.200*	.802	5	.083
	Developed	.260	2	.			

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source : The data is process by statistical Aplication (SPSS) in 2019

In Table 4. Shows the value of sig. all variables in the kolmogorov-smirnov table > 0.05 then H₀ is accepted. This means that the independent variables are normally distributed. So the independent variables meet the assumptions and can be used for discriminant analysis.

Covariance variance matrix test

This test is used to determine whether the residual covariant variant matrix structure is homoscedastic or heteroscedastic (Green.W.H, 2003). Testing is done to test the variance of each variable using the Box's M test. The assumption that must be met is the group covariance matrices of each variable is relatively the same

Table 5. Test Similarity Matrix Variance / covariance

Test Results		
Box's M		15.720
F	Approx.	500
	df1	15
	df2	454.573
	Sig.	.941

Tests null hypothesis of equal population covariance matrices

Source : The data is process by statistical Aplication (SPSS) in 2019

Because the value of sig. in the Test Results table > 0.05, H₀ is accepted. This means that the covariance matrix group is relatively the same (the two dependent variables are lagging and not lagging having the same variance-covariance matrix in existing groups).

Average vector test

To see the ability of independent variables to differentiate groups multivariately, the Lambda 'wilks test is used

Table 6. Test Vectors

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.163	15.421	5	.009

Source : The data is process by statistical Aplication (SPSS) in 2019

Because the sig value in table 0.009 <0.05, H0 is rejected. This means that the eight independent variables are able to distinguish categories significantly (there is an average difference between the two categories).

Interpretation of Discriminant Functions

The interpretation of the results made is the formation of discriminant functions. In making discriminant functions, the Stepwise Discriminant Analysis method is used. Based on the results of the analysis with the SPSS program, two variables form the discriminant function, namely X₄ and X₅, while the variables X₁, X₂, and X₃ are not included in the discriminant function. Discriminant function According to (Santoso.S, 2010), the use of discriminant function is to find out cases (in this case a district) belonging to one group or another group. In determining discriminant function, it can be seen in the following Statistical Package for the Social Sciences (SPSS):

Table 7. Discriminant Function Coefficients

Canonical Discriminant Function Coefficients	Function 1
Village polyclinic (Polindes) (X ₄)	.412
Not Using Electric (X ₅)	.026
(Constant)	-2.915
Unstandardized coefficients	

Source : The data is process by statistical Aplication (SPSS) in 2019

Discriminant function obtained from the test results:

$$Y = -2,915 + 0,412(X_4) + 0,026(X_5)... (3.1)$$

In addition to the above functions, by choosing the fisher function coefficient in the analysis process, a discriminant function of fisher can be formed which can be seen in the statistical output of the social scientific package (SPSS).

Table 8 Classification Function Discriminant

Classification Function Coefficients	Category	
	Underdeveloped	Developed
Village polyclinic (Polindes) (X ₄)	1.572	.448
Not Using Electric (X ₅)	.114	.043
(Constant)	-9.498	-1.839
Fisher's linear discriminant functions		

Source : The data is process by statistical Aplication (SPSS) in 2019

The discriminant function of Fisher (3.2) is almost the same as the previous discriminant function (3.1), it's just that the division is based on group code:

1. For districts included in the category of Not Disadvantaged

$$\text{Underdeveloped} = -9.498 + 1.572 (X4) + 0,114 (X5)$$

2. For districts included in the category of Disadvantaged

$$\text{Developed} = -1.839 + 0.448 (X4) + 0,043(X5)$$

The difference between the groups not being left behind and being left behind is:

$$Y = -7.695 + 1.572(X4) + 0,071(X5) \dots (3.2)$$

The function that will be used in the application on the score calculation uses the Unstandardized function (3.1). While the Fisher function equation (3.2) is actually proportional to the Unstandardized function, which for this case by multiplying each coefficient of Fisher by the number 0.31 will get an Unstandardized function.

Results Interpretation of discriminant functions

Tabel 9. Function of Group Centroid

Category	Function 1
Underdeveloped	1.258
Developed	-1.467

Unstandardized canonical discriminant functions evaluated at group means

Source : The data is process by statistical Aplication (SPSS) in 2019

From the above table the cut off score will be calculated in equation (2.2) as follows:

$$Z_{CU} = \frac{n_1 Z_1 + n_2 Z_2}{n_1 + n_2}$$

$$\frac{5 \times 1,258 + 5 \times (-1.467)}{5 + 5} = -104.5$$

Use of ZCU figures based on decisions:

1. Case score above ZCU, included in the category not left behind (code 0).
2. Case score below ZCU, included in the category of lagging (code 1)

By using the Unstandardized discriminant function in equation (3.1) the following results are obtained. For example for Fak-Fak Regency, the discriminant function scores are:

$$Y = -2,915 + 0,412 (38) + 0,026(75) = 14.69$$

Because the discriminant score of Fak-Fak Regency is $14.69 > 0$, it is included in the Developing category. For example in Kabupaten Teluk Wondama, the score of the discriminant function is:

$$Y = -2,915 + 0,412 (1) + 0,026(47) = -1.28$$

Because the discriminant score of Teluk Wondama Regency is $-1.28 < 0$, it falls into the underdevelop category.

Accuracy Testing of Classification Results

After the discriminant function is obtained, then testing the discriminant function classification, then it will be seen how much accuracy the classification of that category. This can be seen in the SPSS output in table 10 as follows.

Table 10. Functions Assessing Feasibility Discriminant

		Classification Results ^a			Total
		Category	Predicted Group Membership		
			Underdeveloped	Developed	
Original	Count	Underdeveloped	7	0	7
		Developed	0	6	6
	%	Underdeveloped	100.0	.0	100.0
		Developed	.0	100.0	100.0

a. 100.0% of original grouped cases correctly classified.

Source : The data is process by statistical Application (SPSS) in 2019

Seen in the original section, districts which in the initial data are in the category of not lagging behind and after classification remain in the developing category of 7 districts and 1 city. While districts which in the initial data are in the underdeveloped category and after classification remain in the underdeveloped category as many as 5 districts.

This means that 100% of the 13 regencies / cities that have been processed have been included in the groups according to the original data. When viewed from cross validation, in code c the figure is 90%. The higher the value of validation, including cross validated groups, of course the better, because the more precisely the discriminant function distinguishes the two groups

5. Conclusion

Based on the results of data processing of the causes of disadvantaged areas in West Papua Province in 2017, can be obtained:

1. Discriminant function models that are formed based on the results of data processing are:

$$Y = -2,915 + 0.412 (X4) + 0.026 (X5)$$
2. Factors affecting the differences in disadvantaged districts / cities in West Papua Province are the number of village polyclinic facilities (Polindes) and Village Potentials that do not Use Electricity.
3. The discriminant model formed has a classification accuracy of 100%. So that the above model can be used to classify a regency / city as a lagging or developing category in accordance with Presidential Decree No.131 of 2015.

Based on the results of the research above, the suggestion that the author can convey to the government of West Papua Province, in order to prioritize development in areas that are still relatively underdeveloped by taking into account the factors of Village Infrastructure and Potential Resources. This is intended to make the community prosper. To conduct discriminant analysis the independent variables to be analyzed should have a large influence relationship on the dependent variable, so that the variables worth testing are not small. Then, ensuring the completeness of the data in testing all the assumptions are met in order to obtain a discriminant model with a more accurate level of accuracy.

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