

Analysis of Land Value Zone Changes Due to The Construction of The Kediri International Airport in Grogol Sub-District, Kediri Regency

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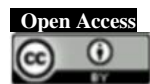
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Abstract

Grogol Sub-district is one of the areas in the administration of Kediri district. Kediri District continues to carry out development, one of which is the Kediri International Airport Development. The development of Kediri International Airport in the Grogol District area began from 2019 until 2023. The research data used the 2016 Land Value Zone Map data of 17 zones, in 2019 with 20 zones, and in 2023 with 20 zones. The method used is the overlay method analysis to find out how many land value changes occur. The analysis method uses a regression test to determine the effect of airports and provincial roads on the land value zone (ZNT). During the period 2016 to 2023, the results of data processing showed the development of land value zones in 20 zones. Between 2016 and 2019, there was an increase in the Average Indicated Value (NIR) in the Cerme Village area in zone number 528 of Rp. 125,000 with a percentage of 78.13%. Conversely, in the Datengan Village area, zone 395 experienced a drastic decrease of -95% or IDR -114,000 due to zone restructuring and distance from the airport. Between 2019 and 2023, Grogol Village in zone 568 recorded the highest increase in NIR of IDR 1,013,876, with a percentage of 221.85%. Meanwhile, zone 395 again emerged with an increase in NIR of Rp. 5,274 or 4.4%. The results showed the influence of airports and provincial roads on ZNT changes in 2016 - 2023 with an R Square value of 0.385 or has an impact value of 38.5% with a negative correlation where the closer the zone is to the airport, the higher the NIR value, on the other hand, the farther the zone is, the smaller the NIR value.

Keywords: Land Value Zone, Land Value Change, Kediri International Airport, Grogol Sub-district, Kediri Regency

1. Introduction

1.1 Background of Research

Airports are critical infrastructure in modern transportation systems that play a vital role in the mobility of people and goods. Airports are the main access points for air travel, allowing people to travel long distances quickly and efficiently. Along with technological development and economic growth, airports have become the center of economic activity, trade, and tourism in various countries around the world. Airport development in an area must be a major influence in all aspects, one of which is the economy, development, land value, and land use. One of them is Kediri International Airport, which was built since the beginning of 2019 in Grogol District, Kediri Regency with an area of 300 Ha. Kediri Airport covers the tourism, agriculture, trade, industry, and

service sectors both in Kediri District and surrounding areas.

Land changes will trigger an increase in land value. This affects the change in value. The development of the West Java International Airport (BIJB) is quite influential on changes in land value prices. The area affected by BIJB has an average increase of 186% (Burhanudin et. al. (2017)).

Based on the background, the change in land use to Kediri International Airport in Grogol District has an influence on the value of land around the research area. The method used is the mass valuation method and the market price cost approach method to determine the price of land in 2023 obtained from field surveys.

1.2 Problem Formulation

The problem formulations of this research are:

1. How did the land value zone change in Grogol Sub-district in 2016, 2019, and 2023?
2. How does Kediri International Airport affect changes in land values in Grogol Sub-district, Kediri Regency in 2016, 2019, and 2023?

1.3 Objectives of Research

The objectives of this research are:

1. To know the dynamics of land price development in Grogol Sub-district.
2. To find out the effect of Kediri International Airport development on changes in land value zones.

2. Research Methodology

In the research methodology, it will explain the research tools and data, research location, and research stages.

2.1 Tools

The tools employed in this study encompass the following:

1. Hardware
 - a. Laptop
 - b. Smartphone
 - c. Printer
2. Software
 - a. Ms. Word 2019
 - b. Ms. Excel 2019
 - c. ArcMap 10.7.1
 - d. IBM SPSS Statistic 25
 - e. Google Earth Pro

2.2 Data

This study employs two types of data, there are:

1. Spatial Data
 - a. Administrative Map of Grogol Sub-district, Kediri Regency obtained from the Public Works and Housing Office of Kediri Regency
 - b. Land Use Map of Grogol Sub-district, Kediri Regency in 2018 and 2021 from the Public Works and Housing Office of Kediri Regency
 - c. Land Value Zone Map of Grogol Sub-district, Kediri Regency in 2016 and 2019 obtained from the Regional Office of ATR/BPN of East Java Province
 - d. Land Value Zone Map of Grogol Sub-district, Kediri Regency in 2022 obtained from the Regional Office of ATR/BPN of Kediri Regency
 - e. Road Network Map of Grogol Sub-district, Kediri Regency obtained from the Public Works and Housing Office of Kediri Regency
2. Non-Spatial Data
 - a. Data on transaction prices and land offers in Grogol Sub-district, Kediri Regency in 2023 obtained from field surveys

2.3 Location of The Research

The location of the study area in the Land Value Zone research is located in Grogol Sub-district, Kediri Regency, Indonesia. The study area has geographical coordinates of 07° 45' 21" south latitude and 111° 53' 06" east longitude, with an area of 3,482 hectares (Ha) and an altitude of about 78 meters above sea level (mdpl). Grogol Sub-district consists of 9 villages, namely Bakalan Village, Sonorejo Village, Cerme Village, Wonoasri Village, Datengan Village, Gambyok Village, Grogol Village, Sumberejo Village, and Kalipang Village.

2.4 Stages of Research

The stages of the research are as follows:

1. Preparation
This preparation stage consists of identifying problems, studying literature from various research and journal articles regarding research, and conducting preliminary surveys.
2. Data Collection
Data collection involves gathering both spatial data and non-spatial data. Spatial data is obtained from several agencies and non-spatial data is obtained through surveys.
3. Creating Land Value Zone Map
The creation of a land value zone map consists of several steps:
 - a. Initial zone creation based on the 2022 land value zone map data. The initial zones totaled 20 zones.
 - b. A field survey of land price data was done to identify the value of land transactions/bids in the market of the study area. The sample points in this study were 233 points.
 - c. The process of land price data correction is conducted to obtain an accurate land value. This involves four adjustments in the land value calculation, including rectifying transaction data, refining transaction timing, aligning rights status, and computing the building RCN.
 - d. The NIR calculation is obtained by calculating the average land value of representative sample points within a given zone, to ensure that it accurately represents the land value of the zone with a standard deviation of less than 30%.
 - e. The creation of the land value zone map was generated by overlaying the 2015, 2019, and 2023 land value zone maps.
4. Linear Regression Analysis
 - a. Calculation of the distance from the sample ground field to the predefined variables that have been defined using the network analysis tool in the ArcGIS application.
 - b. Statistical calculations were performed using IBM SPSS 26 software. The tests carried out are the classical assumption test, the linear regression test, and the correlation test.

3. Result and Analysis

The results and analysis of this research are as follows:

3.1 Analysis of Land Value Zone

1. Analysis of Land Value Zone in 2016

The land value zones in Grogol Sub-district in 2016 were divided into 17 zones. The area of each zone varies according to the division of zones that has been made by the Regional Office of ATR/BPN. Based on Figure 1, the land value zone map of Grogol Sub-district in 2016 is classified into 8 classes with an interval of Rp. 34.750 for each class. The land value zone map of Grogol Sub-district in 2016 is shown in Figure 1.

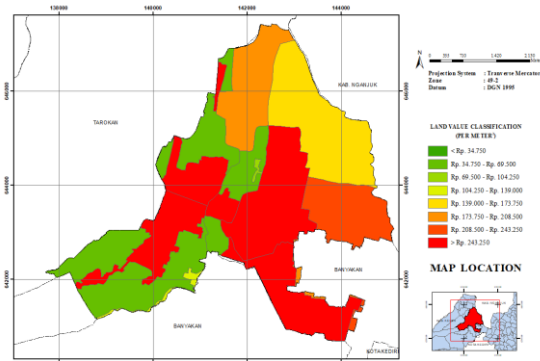


Fig 1. Land Value Zone Map 2016

The zone with the highest NIR is located in zone 569 with an NIR of Rp. 313.000/m². This zone is located in a strategic area, close to the provincial road that connects Kediri and Nganjuk Regency. Zones with the lowest NIR are located in zones 528, 529B, and 570, each of which has a zone area of zone 528 with an area of 128.5 hectares, zone 529B with an area of 75.3 hectares, and zone 570 with an area of 29.5 hectares with a zone price of Rp. 35.000/m². This is because zones 528, 529B, and 570 are rice fields located far from the provincial road access.

2. Analysis of Land Value Zone in 2019

Land value zones in Grogol Sub-district in 2019 were divided into 20 zones. There was an addition of zones by the Regional Office of ATR/BPN. Based on Figure 2, the 2019 Grogol Sub-district land value zone map is classified into 8 classes with an interval value of Rp. 51.000 for each class. The land value zone map of Grogol Sub-district in 2019 is shown in Figure 2.

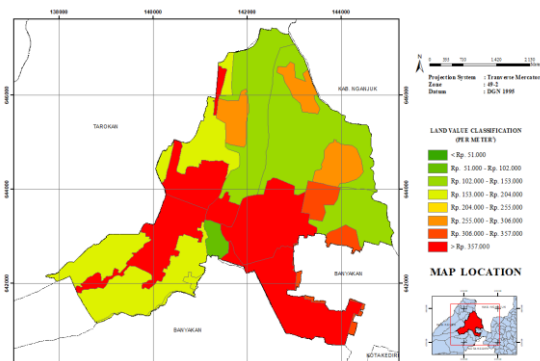


Fig 2. Land Value Zone Map 2019

The zone with the highest NIR is located in zone 569 at with an NIR of Rp. 466.000/m². This zone is located in a strategic area that is close to the

provincial road connecting the Kediri and Nganjuk Regency. The zone with the lowest NIR is located in zone 570 which has an area of 29.5 hectares with a zone price of Rp. 58.000/m². This is because zone 570 is a rice field area located far from the provincial road access.

3. Analysis of Land Value in 2023

Land value zones in Grogol Subdistrict in 2023 are divided into 20 zones. The 2023 Land Value Zone Map of Grogol Sub-district is the result of processing field survey data using market prices in Grogol Subdistrict, Kediri Regency. Based on Figure 3, the land value zone map of Grogol Sub-district in 2019 is classified into 8 classes with an interval of Rp. 168.200 for each class. The land value zone map of Grogol Sub-district in 2023 is shown in Figure 3.

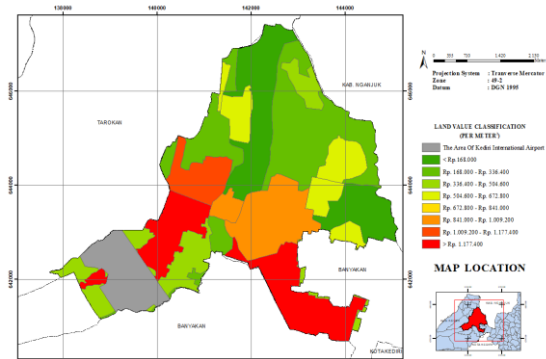


Fig. 3 Land Value Map 2023

The zone with the highest NIR is located in zone 568 with an NIR of Rp. 1.470.000. This zone is located in a strategic area which is close to the airport, close to the market, and there are many shops for both food and daily necessities. The zone with the lowest NIR is Rp. 125.000 which is located in zone 395. The low NIR value in zone 395 is due to the fact that the area is a rice field area and there is a lack of road access to get to the rice fields also airport and provincial road.

4. Analysis of Land Value Change in 2016-2019

Land value changes in Grogol Sub-district in 2016-2019 were classified into 8 classes with an interval of Rp. 34.000 for each class of change. The largest changes in NIR in terms of value from 2016 to 2019 are zone 568 and zone 569. In zone 568, there was an increase in price of Rp. 150.000, while in zone 569, there was an increase in price of Rp. 153.000. Zone 568 is located in Grogol Village, while zone 569 is located in Wonoasri Village. Both villages have easy access to provincial roads, business areas and the airport. The highest percentage increase is 78.13% in Cerme Village. This drastic increase occurred due to the planned Kediri International Airport, which resulted in Figure 4 that an increase in demand and property transactions in zone 528 in 2019. The land value in this zone increased from Rp. 35.000 to Rp. 160,000 in that time.

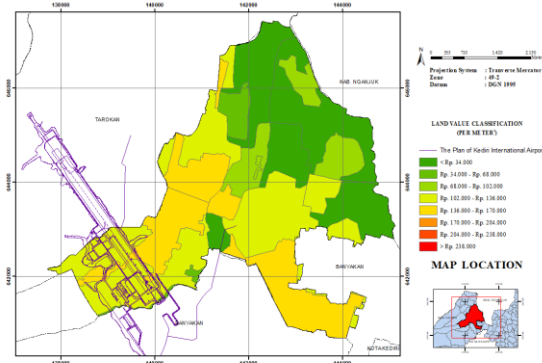


Fig. 4 Land Value Change Map 2016-2019

The extent of land value change in Grogol Sub-district in 2016-2019 can be seen in the Table 1.

Table 1. Land Value Change in 2016-2019

No	ZNT 2016		ZNT 2019		Change	
	Zone	Land Value	Zone	Land Value		
1	53	Rp 129.000,00	53	Rp 193.000,00	Rp 64.000,00	33,16%
2	70	Rp 206.000,00	70	Rp 541.000,00	Rp 135.000,00	39,59%
3	97	Rp 173.000,00	97	Rp 127.000,00	Rp -46.000,00	-36,22%
			796(97A)	Rp 257.000,00	Rp 84.000,00	32,68%
			797(97B)	Rp 257.000,00	Rp 84.000,00	32,68%
4	129	Rp 246.000,00	97C	Rp 127.000,00	Rp -119.000,00	-93,70%
5	139	Rp 41.000,00	129	Rp 366.000,00	Rp 120.000,00	32,79%
6	391	Rp 219.000,00	139	Rp 159.000,00	Rp 118.000,00	74,21%
7	395	Rp 234.000,00	391	Rp 325.000,00	Rp 106.000,00	32,62%
			395	Rp 120.000,00	Rp -114.000,00	-95,00%
			750(395A)	Rp 348.000,00	Rp 114.000,00	32,76%
			751(395B)	Rp 348.000,00	Rp 114.000,00	32,76%
8	528	Rp 35.000,00	528	Rp 160.000,00	Rp 125.000,00	78,13%
9	529	Rp 177.000,00			Rp -43.000,00	-32,09%
10	529-1	Rp 89.000,00	529	Rp 134.000,00	Rp 45.000,00	33,58%
11	529-2	Rp 35.000,00			Rp 99.000,00	73,88%
12	529C(749)	Rp 177.000,00	749(529C)	Rp 263.000,00	Rp 86.000,00	32,70%
13	530	Rp 282.000,00	530	Rp 419.000,00	Rp 137.000,00	32,70%
14	568	Rp 307.000,00	568	Rp 457.000,00	Rp 150.000,00	32,82%
15	569	Rp 313.000,00	569	Rp 466.000,00	Rp 153.000,00	32,83%
16	570	Rp 35.000,00	570	Rp 58.000,00	Rp 23.000,00	39,66%
17	571	Rp 298.000,00	571	Rp 444.000,00	Rp 146.000,00	32,88%
18	572	Rp 298.000,00	572	Rp 444.000,00	Rp 146.000,00	32,88%

The smallest change occurred in zone 97C, originally zone 129 in 2016, then changed to be part of zone 97 in 2019, with a price decrease of IDR -119,000 (percentage -93.70%). Zone 97 was originally designated as paddy land in 2016, then merged into zone 129 in 2019.

Meanwhile, the smallest percentage change also occurred in zone 395. In 2016, zone 395 was a combined residential and rice field zone. In 2019, this zone was split into three zones: 395, 750, and 751, with a price decrease of -95%. This change is because zones 750 and 751 are residential areas in, while zone 395 is rice fields.

5. Analysis of Land Value Change in 2019-2023

Land value changes in Grogol Sub-district in 2019-2023 are classified into 8 classes with an interval of Rp 126,000 for each class of change. The largest NIR change in value is located in zone 568 and zone 530 with a price of Rp. 1,010.000 and the percentage amount is 221,85% in zone 568 and zone 530 with a price of Rp. 900.000 with a percentage of 216,62%. Zone 568 is one of the zones with residential characteristics and zone 530 with residential characteristics. The changes that occur in zone 568 are due to this zone being located in an area close to the entrance to Kediri International Airport, has adequate road access and is close to the Kediri - Nganjuk provincial road, as well as many shops both food and daily necessities.

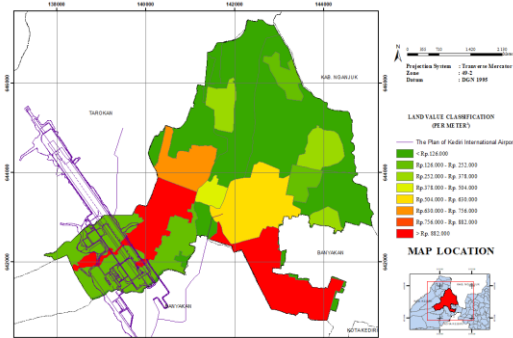


Fig. 5 Land Value Change Map 2019-2023

The extent of land value change in Grogol Sub-district in 2019-2023 can be seen in the Table 2.

Table 2. Land Value Change in 2019-2023

Zone	2019		2023		Change	
	Zone	NIR	Zone	NIR	Value	Percentage
53	Rp 192.000,00	53	Rp 303.756,00	Rp 110.756,00	57,39%	
70	Rp 241.000,00	70	Rp 427.679,00	Rp 86.679,00	25,28%	
97	Rp 127.000,00	97	Rp 175.546,00	Rp 48.546,00	38,22%	
129	Rp 366.000,00	129	Rp 927.703,00	Rp 561.703,00	153,47%	
139	Rp 159.000,00	139	Rp 389.573,00	Rp 230.573,00	145,01%	
391	Rp 325.000,00	391	Rp 404.324,00	Rp 79.324,00	24,41%	
395	Rp 120.000,00	395	Rp 125.274,00	Rp 5.274,00	4,40%	
528	Rp 160.000,00	528	Rp 195.691,00	Rp 35.691,00	22,31%	
529	Rp 134.000,00	529	Rp 159.415,00	Rp 25.415,00	18,97%	
530	Rp 419.000,00	530	Rp 1.326.618,00	Rp 907.618,00	216,62%	
568	Rp 457.000,00	568	Rp 1.470.876,00	Rp 1.013.876,00	221,85%	
569	Rp 466.000,00	569	Rp 950.185,00	Rp 484.185,00	103,90%	
570	Rp 58.000,00	570	Rp 182.295,00	Rp 124.295,00	214,30%	
571	Rp 444.000,00	571	Rp 1.134.719,00	Rp 690.719,00	155,57%	
572	Rp 444.000,00	572	Rp 540.315,00	Rp 96.315,00	21,69%	
749	Rp 263.000,00	749	Rp 525.433,00	Rp 262.433,00	99,78%	
750	Rp 348.000,00	750	Rp 631.947,00	Rp 283.947,00	81,59%	
751	Rp 348.000,00	751	Rp 528.377,00	Rp 180.377,00	51,83%	
796	Rp 257.000,00	796	Rp 598.022,00	Rp 341.022,00	132,69%	
797	Rp 257.000,00	797	Rp 484.045,00	Rp 227.045,00	88,34%	

Changes in NIR from 2019 - 2023 in the form of zone distribution are not as significant as in the period 2016 - 2019 where there is no intersection or change in ZNT made by the National Land Agency, so that in terms of the shape of the zone in 2019 and 2023 it is relatively the same and does not experience a decrease in land prices. Based on the field survey, there is the least increase in zone 395, which is Rp. 5.274 with a percentage of 4,4%. Zone 395 is located in Datengan Village, where zone 395 is a rice field area in Datengan Village with relatively difficult road access and far from the provincial road.

3.3 Analysis of the Effect of Kediri International Airport on Land Value Zone

1. Analysis of Variable Distance Calculation

The total centroid zone is 20 points. The average distance of the zones to Kediri International Airport is about 4.588 meters. The farthest distance is zone 97, with a distance of 7.164 meters from Kediri International Airport. This zone has an NIR of Rp. 175.000. The closest distance is zone 53 with a distance of each is 1.036 meters and Kediri International Airport has an NIR of Rp. 304.000. The average distance of zones in Grogol Sub-district to the provincial road is 2.009 meters. The farthest distance is zone 33, with a distance of 4.271 meters from the national road and has an NIR of Rp. 175.000. While the closest distance is zones 569 and 571 with a distance of 240 meters and 307 meters because the zone centroid is right near the national road.

2. Analysis of Assumption Test

a. The normality test is used to assess whether the residuals produced from regression are distributed normally or not. The following Figure 11 is a Normal Probability Plot (P-Plot) of NIR for the year 2023.

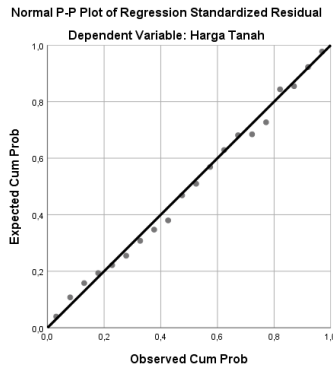


Fig. 6 P-Plot of Normality Test

The P-Plot graph shows that there are plots that follow the linear line and there are some that move away from the linear line. The data spreads around the diagonal line and follows the direction of the histogram line towards the normal distribution pattern, so it can be concluded that the residuals are normally distributed. The assumptions of the visual normality test have been met.

b. The multicollinearity test has several conditions, namely the VIF or Variance Inflation Factor value has a value of less than 10. It can be seen on Figure 7 that the test results have a VIF value of 1.966.

Model	Collinearity Statistic	
	Tolerance	VIF
(Constant)		
Jarak Centroid ke X1 (Bandara)	,504	1,986
Jarak Centroid ke X2 (Jalan Provinsi)	,504	1,986

Fig. 7 Multicollinearity Test

The data in NIR 2023 does not have multicollinearity symptoms because there is no VIF value of more than 10.

c. The heteroscedacity test is used to test the inequality of variance from the residuals of one observation to another. A regression model does not experience heteroscedacity if the significance value is more than 0.05 or does not form a certain pattern.

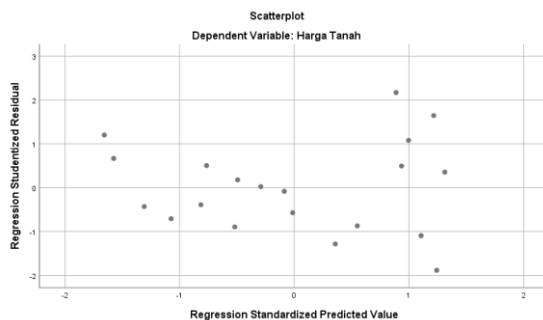


Fig. 8 Heteroscedacity Test

Visually, the points formed from the results of the heteroscedacity test spread and do not form a certain pattern

3. Analysis of Linear Regression Test

In this study using Pearson correlation which aims to determine whether there is a relationship between 2 variables, namely the independent and dependent variables on an interval or ratio scale (parametric). Interval categorization of relationship strength (Safitri, 2016) as follows

Table 3. Correlation Coefficient Interpretation

Correlation Value (r)	Interpretation
0,00 – 1,199	Lowest
0,20 – 0,399	Low
0,40 – 0,599	Moderate
0,60 – 0,799	Strong
0,80 – 1,000	Strongest

The Model Correlation for the linear regression conducted can be observed in Table 4.

Table 4. Correlation Test Result (Partial Test)

		Harga Tanah	Jarak Centroid ke X1 (Bandara)	Jarak Centroid ke X2 (Jalan Provinsi)
Pearson Correlation	Harga Tanah	1,000	-,563	-,621
	Jarak Centroid ke X1 (Bandara)	-,563	1,000	,677
	Jarak Centroid ke X2 (Jalan Provinsi)	-,621	,677	1,000
Sig. (1-tailed)	Harga Tanah	.	,005	,002
	Jarak Centroid ke X1 (Bandara)	,005	.	,001
	Jarak Centroid ke X2 (Jalan Provinsi)	,002	,001	.
N	Harga Tanah	20	20	20
	Jarak Centroid ke X1 (Bandara)	20	20	20
	Jarak Centroid ke X2 (Jalan Provinsi)	20	20	20

From the table, it can be seen that the Pearson Correlation value in X1 is -0,563 and in X2 is -0,621. The Summary Model result is created in the Table 5.

Table 5. Model Summary Test (Simultaneous Test)

Model	R	R Square	Sig. F Change
1	,621	,385	,004

Which means that there is an influence of the independent variables, namely the centroid zone distance to the national road and the centroid zone distance to Kediri International Airport is 38,5%.

4. Conclusion

Based on the results of research, processing and analysis, the following conclusions are obtained:

The results obtained from the processing of research data, the development of land value zones increased from 2016 to 2019, and 2019 to 2023 which amounted to 20 zones. In the period 2016 to 2019 there was the largest increase in NIR, namely Rp. 125,000 with a percentage of 78,13% in zone number 528 in Cerme Village with agricultural land designation, then the lowest NIR in zone 395 in Datengan Village with a decrease of -95% or Rp. -114.000 due to a zone reshuffle carried out by BPN with agricultural land designation which was originally in 1 zone having residential and agricultural characteristics. In the period 2019 to 2023 there was the largest increase in NIR with a value of Rp. 1.013.876 with a percentage of 221,85%, which occurred in zone 568 located in Grogol Village with residential characteristics and has close access to airports and provincial roads, then the lowest NIR occurred in zone 395 located in Datengan Village with an increase of Rp. 5.274 with a percentage of 4,4%. It has agricultural characteristics and is far from access to airports and provincial roads..

The results of linear regression tests that have been carried out, there is an influence in partial correlation and simultaneous correlation of the influence of Kediri International Airport and Provincial Road to the Land Value Zone in 2023. The partial correlation results on the influence of the airport on ZNT show the result of r of -0.563 with the amount of influence of 0.563 showing a moderate influence, then on the influence of the provincial road on ZNT shows the result of r of -0.621 with the amount of influence of 0.621 showing a strong influence. The simultaneous correlation results are shown with an R value of 0.621 and an R square value of 0.385 or providing an impact of 38.5% change. This shows that the two variables (Kediri International Airport and Provincial Road) together have a relatively strong influence on the Land Value Zone in 2023, namely by having a negative correlation effect, namely the closer the NIR distance to the two variables, the higher the NIR value, and vice versa, the farther the NIR distance, the smaller the NIR value.

5. Suggestion

Suggestions that the author can give to readers for further research are as follows:

1. Future research can measure through the effect of the airport radius when the airport is completed.
2. Before conducting research, ensure that all the data to be used, both primary and secondary data, are available.
3. Sample transaction and offer data should preferably be collected more closely to reflect the true land value.

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