Analysis of Tax Object Sale Value (NJOP) and Land Value Change On Integrated Zoning Area (Study Case: Pakal and Benowo District, Surabaya City)

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Abstract. The urban development generally will only be focused on certain areas as a center of business and government activities. This causes unbalanced situation at certain areas. The Government of Surabaya City then released Surabaya City’s Regional Medium-Term Development Plan (RPJMD 2016-2021) which stated that the Surabaya City has a strategic area that has the potential to be developed sustainably to support the existence of the development of urban areas in the future. One of them is the integrated area of West Surabaya which located at Pakal and Benowo District. The changes of land value can be analyzed through Land Value Zone Map (ZNT) of 2016 as the beginning period of the RPJMD that has been overlaid with ZNT map of 2020 as the current land value condition and then visualized in thematic maps in the form of bar charts, choropleth and bivariate maps. From this study 66 new land value zones were produced according to land characteristics with the highest Average Indication Value (NIR) Zone in the RKB1 which is Rp 26,623,238/m² with range of NJOP Rp 23,000,000 - Rp 31,000,000. While the lowest zone is at KMP4 zone with NIR Rp 1,587,922/m² and range of NJOP Rp 1,490,000 - Rp 1,655,000. Changes of land values in the districts of Pakal and Benowo as Integrated Areas of West Surabaya have increased significantly each year. The highest increase was in the RKB1 zone that located in Sememi Sub-district with 5537.724% of land value changes. While the lowest increase was in the KMP4 zone that located in Pakal Sub-districts with 50.5% of land value changes. Through buffering analysis of some public facilities objects in Pakal and Benowo Districts, it is known that the development carried out by the government of these objects affects the increase of land value around them.

Keywords: Land Value Zone, NIR, Thematic Map

1. Introduction
Surabaya City as the capital of East Java Province is one of the cities with high population density. [1] For solving the problem of unbalanced situation between areas, The Government of Surabaya City then released Surabaya City’s Regional Medium-Term Development Plan (RPJMD 2016-2021) [2] which stated that the Surabaya City has a strategic area that has the potential to be developed sustainably to support the existence of the development of urban areas in the future. One of them is the integrated area of West Surabaya which located at Pakal and Benowo District. These areas then experiencing changes in land value for the last several year.
Land value is a measurement based on the ability of the land economically in relation to its productivity and economic strategy [3]. The factors that influence land prices are many and varied. One of the Government factors that affect land value changes is land zoning [4]. Because through zoning a designation of functions and activities to be developed in the region can be determined which can then affect changes in land prices in it.

In this study, the land value changes will be determined from several thematic maps using the overlay method between maps and also buffering on several public facilities objects.

2. Methodology

2.1. Study area
The research location was conducted in Pakal and Benowo Districts which are Integrated Area of West Surabaya. Pakal and Benowo Districts are located in the West Surabaya area with their respective area 22.07 km² and 23.73 km². The research location locations can be seen in figure 1.

![Figure 1. Area Study. (Source: Inageoportal)](image)

2.2. Data and equipment
The data survey used to support this research are:

- Sample data from market price surveys in Pakal and Benowo districts in 2020.
- Location coordinates of sample points of land price surveys.
- NJOP Data of Pakal and Benowo Districts in 2016-2019.
- Shapefile data of the West Outer Ring Road (JLLB) of Surabaya City
- Aerial Photos the City of Surabaya in 2016 used as a map basemap.

The equipment used in this research is data processing software, including:

- Microsoft Excel used to calculate adjustment of land value.
- ArcGIS 10.3 is used to make thematic maps
2.3. Processing data
In this research, the steps of data processing are explained in the following subsections.

a) Zone Deliniation.
Based on Director-General of Tax Circular number SE-25 / PJ.6 / 2006 an imaginary boundary of the new zone containing land value data is made by classifying zones that have similar characteristics in a ZNT by considering the indications of land values and similar characteristics.

b) Adjustment and Land Value Correction.
The price of land obtained from field survey results cannot be used directly for research material. Therefore it is necessary to make some adjustments to the land price. The land price samples should be fulfilled the quantitative requirements of the difference in land values between the samples in each zone that is <30%.

c) Average Indication Value (NIR) Calculation.
NIR is the average of market value that can represent the value of land in a each ZNT [5]. After adjusting the land value, the NIR calculation can be done by adding a minimum of 3 land value data and calculating the average so that NIR is obtained in each zone.

d) Thematic Maps of Land Value Changes.
The data obtained from the results of processing and adjustments are visualized in the form of a thematic map. Visualization of changes in land values was carried out to provide an overview of changes in land values that occurred in Pakal and Benowo Districts. In this study the thematic maps used as a means of visualizing changes in land values include the Map of NJOP Bar Changes Diagram of Pakal and Benowo Districts in 2016-2019 and the Bivariate Map of Prices and Changes Land Values of Pakal and Benowo Districts in 2016 and 2020.

e) Analysis the Effects of Public Facility Objects
From the results of the Bivariate Map of Prices and Land Value Changes in Pakal and Benowo Districts, in 2016 and 2020 two analyzes were conducted, namely patterns of distribution of land values and changes in land values using buffering with a radius of 3 kilometers at several points of public facility objects. Buffering analysis aims to determine the effect of the development of each public facility object toward prices and land value changes around them. In this study the selected public facilities for analysis included Gelora Bung Tomo (GBT) Stadium that located on Pakal District and Outer West Ring Road (JLLB) that located on Benowo District.

f) Analysys of Land Value Changes.
Analysis of land values is done by overlaying between ZNT Maps in Pakal and Benowo Districts. Difference is calculated between each zones so that it can be seen the amount of change that occurs in land values.

3. Results and discussion

3.1. Result and Analysis of Deliniation
The process of making the initial zone delineation in Pakal and Benowo Districts is based on similarities and the influence of the surrounding environment such as land location and accessibility. Delineation is used to assist in taking samples of land price points which are then plotted in each zone. Each zone is taken at least 3 sample points by the provisions of the Director-General of Tax Circular Number: SE-25 / PJ.6 / 2006 [5]. From the results of the deliniation of the initial zone, 66 zones are found in figure 2.
3.2. Result and Analysis of Land Values Calculation

In this study, the sample of land price data used is the selling price data which is information in the form of transaction prices or bid prices of a land and/or building. To get the Average Indication Value (NIR) in each zone, it is necessary to have an adjustment in each data sample obtained through a field survey. Adjustments were made in accordance with the Indonesian Appraisal Standards (SPI) Edition VI 2015 by The Indonesian Appraisal Professional Society (MAPPI) [6]. The following is an explanation from the adjustment of land price data:

a) Adjustment of Data Types
In the type of data adjustment consists of data types in the form of offers or transactions. In this study, the offer price obtained from the direct owner will be given a percentage of -5%, while from the broker, developer or agent is given the percentage of -10%.

b) Adjustment of Data Sources
Adjustments to the data source consist of the owner and broker. Land price information obtained from direct owners will be given a percentage of 0%, for information on land prices obtained from brokers given the percentage of -2%.

c) Adjustment of Zone Usage
If the usage of land is equal to the majority usage of land in a zone, then the land is given a percentage of 0%. For different types of land usage with the majority in the vicinity such as warehousing, shophouses and others, an increase or decrease in percentage of 15%-10% is carried out.

d) Adjustment Physical Condition
- Contour
In the case study area, a percentage of 0% is given for adjustments to contours.
- Area
In this study the % value given to the sample depends on the size of the land. The amount given will increase every multiple of 100 m² in land area.
- Location
On the adjustment of the location of the land in the housing is divided into road hooks, street corners and middle of the road. The hook adjustment is given a percentage of -2% and the street corner is given a percentage of 2%, because the position of the hook or the corner of the road affects the high price of the land. Whereas with land located in the middle of the road a percentage of 0% will be given.
e) Adjustment of Types of Land Right
For land that has a types of land title (SHM) is given a percentage of 0%, Building Rights Certificate (HGB) 5%, Petok D and others are given a percentage of 10%.

f) Adjustment of Time
If the transaction / offer data is price data before or after March 2020, an increase or decrease of 1% will be given each month.

3.3. Result and Analysis Calculation of Average Indication Value

a) NIR Calculation of Each Zone
Each zone is calculated to get an Average Indication Value (NIR). NIR can be obtained by calculating the average of the land market price indication data contained in the same zone. Here are some of the results of the calculation of NIR Indications:

| No | Zone | Average Indication Value (Rp/m²) | Location |
|----|------|---------------------------------|----------|
| 1  | PRP11 | Rp 12.395.717, Rp 12.395.718, Rp 10.541.527 | Pakal Districts |
| 2  | KMP3  | Rp 5.032.997, Rp 3.402.809, Rp 5.107.361 | Pakal Districts |
| 3  | GDB2  | Rp 5.199.424, Rp 3.409.316 | Benowo Districts |
| 4  | TBP6  | Rp 4.320.000, Rp 2.600.000 | Pakal Districts |
| 5  | RKB1  | Rp 39.331.852, Rp 36.368.889 | Pakal Districts |

b) Calculation of NIR from other NIR Zone
In this study, there are several zones that do not have sample data in the form of land market price information, so to calculate the NIR in the zone can be done using the surrounding zones, this is based on the Circular of the Director General of Tax number SE-25 / PJ.6 / 2006 concerning the calculation of Land Value Zones. Here are some zones where NIR values are obtained from other NIR land value zones:
Table 2. NIR Calculation from Other Zone

| No | Zone | Comparison | NIR (Rp/m²) | Location   |
|----|------|------------|-------------|------------|
| 1  | TBB5 | TBP1       | Rp3.580.597 | Pakal District |
|    |      | TBP4       |             |            |
|    |      | TBP6       |             |            |
|    |      | KMP1       |             |            |
| 2  | KMP11| KMP6       | Rp3.244.143 | Pakal District |
|    |      | KMP8       |             |            |
|    |      | TBP1       |             |            |
| 3  | TBP2 | TBP4       | Rp1.976.250 | Pakal District |
|    |      | TBP6       |             |            |
|    |      | KMP5       |             |            |
| 4  | KMP9 | KMP6       | Rp2.425.960 | Pakal District |
|    |      | KMP10      |             |            |
|    |      | TBB1       |             |            |
| 5  | TBB3 | TBB6       | Rp3.634.375 | Benowo District |
|    |      | TBP6       |             |            |

3.4. Map of NJOP Bar Change Diagram of Pakal and Benowo District 2016-2019

NJOP data of Pakal and Benowo Districts shows the development of land values in each period from 2016 to 2019 which is marked by the increasing value of NJOP each year as shown in Figure 3 as follows:

In the period of 2016-2017, the highest change in NJOP value of 301.293% occurred in the warehousing area located in Romokalisari Sub-District, Benowo District. For the lowest NJOP value change of 8.545% occurred in the residential zone located in the Sub-District of Babat Jerawat, Pakal District.
In the period of 2017-2018, the highest change in NJOP value of 165.242% occurred in the settlement area located in Benowo Sub-District, Pakal District. Then for the lowest NJOP value change of 8.11% occurred in the warehousing area located in Tambak Osowilangun Sub-District, Benowo District.

In the period 2018 and 2019, a change in NJOP value of 445% occurred in the residential area located in the Sub-District of Babat Jerawat, Pakal District. Whereas the NJOP value for other zones did not change from the NJOP value of the previous year.

3.5. Bivariate Map of Prices and Land Value Changes

From the overlay results of the 2016 Land Value Zone Map of Pakal and Benowo Districts and the Land Value Zone Map of Pakal and Benowo District in 2020, it can be seen the zone and class differences between the new ZNT and the previous ZNT. The difference in change is then represented as a percentage to facilitate analysis of changes in land values in each zone in Pakal and Benowo Districts and then visualized in the Bivariate Map. Bivariate Map obtained two information at once, namely in the form of a large range of land values resulting from delineation in the form of choropleth and a large range of percent change in the value of land in each in each zone in the form of Graduated Symbol.

![Figure 4. Bivariate Map of Prices and Land Value Changes in Pakal and Benowo Districts 2016-2020](image)

In the Bivariate Map of Prices and Land Value Changes in Pakal and Benowo Districts in 2016 and 2020 the price of land survey results with a high value will be more intense when compared to zones that have low land values. In this study the value of land in Pakal and Benowo Districts ranged from Rp 1,587,922 to Rp 26,623,038 and the NJOP range ranged from Rp 1,490,000 to Rp 1,655,000 to Rp 25,300,000 up to Rp 26,690,000.

The highest change in land value is in the RKB1 zone. The RKB1 zone is experiencing a change in the function of land use from vacant land to Central Business District (CBD). The RKB1 zone is located in Sememi Sub-District, Benowo District. Changes in land values that occur in this zone that is equal to 5637.724%. As in the calculation Table 3 below:
### Table 3. Land Value Changes

| Zone | Location      | ZNT 2016  | ZNT 2020  | Changes (%) |
|------|---------------|-----------|-----------|-------------|
| RKB1 | Benowo District | Rp 464.000 | Rp 26.623.038 | 5637.724% |
|      |               | Rp 464.000 |           | 242.225%   |
| KMP4 | Pakal District  | Rp 1.032.000 | Rp 1.587.922 | 53.868%    |
|      |                | Rp 394.000 |           | 303.026%   |

#### 3.6. Analysis the Effect of Public Facility’s Development on Market Price and Land Value Changes

From the results of the Bivariate Map of Prices and Changes in Land Values in 2016 and 2020 (Case Study: Pakal and Benowo Districts) an analysis was carried out using buffering with a radius of 3 kilometers on several public facility objects. Buffering analysis aims to determine the effect of the development of each public facility object on the land value.

a) Gelora Bung Tomo (GBT) Stadium

From the analysis using a buffer with a radius of 3 kilometers from the point of the Gelora Bung Tomo Stadium (GBT) the highest land value was obtained in the RKB2 zone which is a Central Business District (CBD) zone with an NIR of Rp 16,614,804 /m² and an NJOP range of Rp 16,690,000 to Rp 17,800,000 located in Sememi Sub-District, Benowo District. The RKB2 zone is at a radius of 3 kilometers from the center point of the Gelora Bung Tomo Stadium (GBT) object. The lowest land value was obtained in the KMP4 zone which is a settlement zone with an NIR of Rp 1,587,922 /m² and an NJOP range of Rp 1,490,000 to Rp 1,655,000 which is located in Pakal Sub-District, Pakal District. KMP Zone 4 is at a radius of 3 kilometers from the center point of the Gelora Bung Tomo Stadium (GBT) object.

![Figure 5. Buffer Analysis at GBT Stadium](image)

The highest change in land value occurred in the PRP11 zone of 3070.132%. In this zone there is a change of land allotment from vacant land to residential area and in a radius of 3 kilometers from the center point of the GBT Stadium object. This zone is located in Pakal Sub-District, Pakal District. The lowest land value change was obtained in the KMP4 zone of 53.868% which is a settlement area and located at a radius of 3 kilometers from the center point of Gelora Bung Tomo Stadium (GBT). The KMP4 zone is located in Pakal Sub-District, Pakal District.
b) Surabaya Outer West Ring Road (JLLB)
From the analysis using a buffer with a radius of 3 kilometers from the object point of the JLLB West Outer Ring Road, the highest land value in the PRB 6 zone with an NIR of Rp 9,671,269/m² and an NJOP range of Rp 9,250,000 to Rp 10,040,000 located in Sememi Sub-District, Benowo District. Zone PRB6 is a residential zone and is located at a radius of 1 kilometer from the JLLB road. The lowest land value was obtained in the KMP4 zone with an NIR of Rp 1,587,922/m² and an NJOP range of Rp 1,490,000 to Rp 1,655,000 which is a settlement zone and located within a 2 kilometer radius of the JLLB Road. KMP Zone 4 is located in Pakal Sub-District, Pakal District.

The highest land value change was obtained in the RKB1 zone of 5637.724% which is a new Central Business District (CBD) area and located within a radius of 1 kilometer from the object of the Outer West Ring Road (JLLB) located in Sememi Sub-District, Benowo District. In this zone there is a change of land usage from vacant land to a CBD zone. The lowest land value change occurred in the KMP4 zone of 53.868% which is a settlement zone and located at a radius of 2 kilometers from the object of the JLLB Road. The KMP4 zone is located in Pakal Sub-District, Pakal District.

![Figure 6. Buffer Analysis at Surabaya Outer West Ring Road (JLLB)](image)

4. Conclusion
From the research that has been done, it can be concluded that:

The highest change in NJOP value of 445% occurred in the 2018-2019 period, in the residential area located in the Sub-District of Babat Jerawat, Pakal District. The lowest change in NJOP value of 8.11% occurred in the 2017-2018 period, in the warehousing area located in Tambak Osowilangun Sub-District, Benowo District. The zone with the highest value is in the RKB1 zone with an NIR of Rp. 26,623,038/m² and an NJOP range of Rp. 25,300,000 to Rp. 26,690,000, while the zone with the lowest value is in the KMP4 zone with an NIR of Rp. 1,587,922/m² and the NJOP range of Rp. 1,490,000 to Rp 1,655,000. In the Bivariate Map of Prices and Land Value Changes in Pakal and Benowo Districts the highest land value change was in the RKB1 zone of 5537.724%, while the lowest land value change was in the KMP4 zone of 50.5%.
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