



# Spatio-Temporal Analysis of Regional Economic Dynamics Using Geographic Information System in Central Kalimantan Province

Ratna Afriyanti, Choirul Amin<sup>(✉)</sup> , and Wahyu Tyas Pramono 

Faculty of Geography, Muhammadiyah Surakarta University, Surakarta 57162, Central Java, Indonesia  
ca122@ums.ac.id

**Abstract.** Central Kalimantan Province is a region with the lowest level of economic development when compared to other provinces on Kalimantan Island. The low level of economic growth is the basis for this research because several factors influence that. Spatio-Temporal Analysis of Regional Economic Dynamics Using a Geographic Information System (GIS) in Central Kalimantan Province is a method for analyzing regional economic development with the dimensions of location and time with the unit analysis used is each regency/city in Central Kalimantan Province. This study aims to analyze the Spatio-Temporal of regional economic development in Central Kalimantan Province, how the development of existing leading sectors, and the relationship or influence of the two. The method used is a quantitative method with Spatio-Temporal analysis using GIS. The data used is the Gross Regional Domestic Product (GRDP) of Central Kalimantan Province at constant market price by industrial origin in 2015–2021. The result of the study shows that economic development in Central Kalimantan Province between 2016–2021 was quite volatile and economic development in each regency/city experienced disparities. Fluctuating changes also occurred in the development of leading sectors. Overall, the growth rate and contribution of each sector were still less consistent. The leading sectors influence regional economic development, however, it is not viewed from the number of existing leading sectors, but from their contribution and consistency. In general, the leading sectors in each regency/city of Central Kalimantan Province have not been able to properly stimulate the regional economy.

**Keywords:** Regional Economic Dynamics · Leading Sector · Geographic Information System

## 1 Introduction

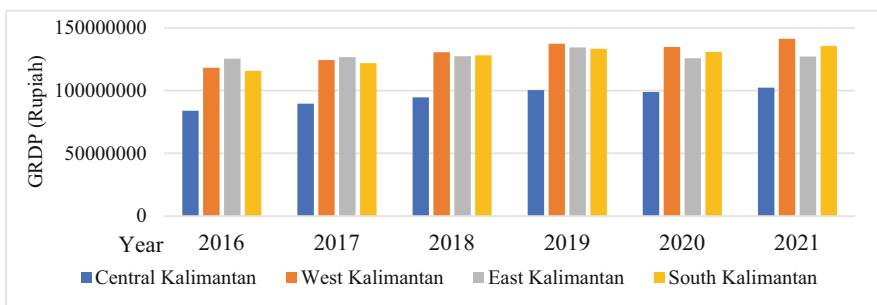
The economic condition of every region certainly experiences dynamics, both an increase and a decrease. The higher or positive value of the development of a region indicates that the economy in that region is running well. Talking about the economic growth of a region cannot be separated from Gross Regional Domestic Product (GRDP), as the economic

growth of a region can be measured using GRDP (Adisasmita, 2013). GRDP is the added value generated by all production activities in the regional economy (Adisasmita, 2011). The added value of all business units is used as a reference to determine the leading sectors and the value of the economic growth rate.

Central Kalimantan province is one of five provinces on the island of Kalimantan, which was established in 1957 along with three other provinces, such as East Kalimantan, South Kalimantan, and West Kalimantan. In terms of economic development, Central Kalimantan Province is a region with an economic situation that is quite underdeveloped or experiencing disparities compared to the other three provinces. In the evaluation of the Local Government Work/Development Plan 2015, it was stated that the problem that occurred was the development and economic disparities between regencies (Central Kalimantan Provincial Government, 2015). Based on research conducted by Sanjaya (2019), the highest regional inequality occurred in Kapuas regency and the lowest inequality in Palangka Raya City in 2016.

Figure 1 is a bar chart depicting GRDP at constant market price by industrial origin in 2015–2021 of provinces throughout Kalimantan from 2016 to 2021. The diagram illustrates that the GRDP of Central Kalimantan Province from 2016 to 2021 was always the lowest. The GRDP of Central Kalimantan Province rose from 2016 to 2019, however, it fell in 2020. Spatially, the economic structure of Kalimantan in the fourth quarter of 2021 was still dominated by East Kalimantan Province at 49.48 percent. Central Kalimantan Province was in fourth place with a contribution of 12.69 percent (Statistics Indonesia of Central Kalimantan, 2022a). The Ministry of National Development Planning data also shows that in 2021 the value of the economic growth rate of Central Kalimantan Province was still below the national average which was 3.4%, while the average national economic growth rate was 4.18%. The value of the growth rate was also still far from the target in the Government Work Plan (Ministry of National Development Planning, 2021).

The economic disparity that occurs is caused by the slow economic growth in every regency/city in Central Kalimantan Province. Therefore, it is necessary to conduct an analysis related to the dynamics of the regional economy in each regency/city of Central



**Fig. 1.** GRDP at constant market price by the industrial origin of Central Kalimantan Province, East Kalimantan, West Kalimantan, and South Kalimantan 2016–2021 (Statistics Indonesia of Central Kalimantan, 2022b; Statistics Indonesia of East Kalimantan, 2022; Statistics Indonesia of South Kalimantan, 2022; Statistics Indonesia of West Kalimantan, 2022)



**Table 1.** Classification of Typology Klassen

Growth rate Grdp per capita	Yi > y	Yi < y
Ri > r	(I) Developed and fast growing area	(III) Fast growing area
Ri < r	(II) Developed but depressed area	(IV) Relatively underdeveloped area

Remarks:

Ri = Growth rate of GRDP for Province/Regency/Sub-District i

Yi = Income per capita of Province/District/Sub-District i

R = GRDP Growth Rate

Y = Average Income per capita

carried out adds a dimension of space or spatial information (Ningsih, 2005). Temporal analysis is an analysis by reviewing time variations (Radiarta, 2015). The data used is the GRDP of Central Kalimantan Province at constant market price by industrial origin from 2015 to 2021. GRDP is a tool to measure economic activity in an area (Haryanto, 2019), and GRDP based on constant price was chosen since it can be used to show the economic growth rate of a region as a whole/each sector from year to year (Prasasti, 2006). The research methods carried out are as follows.

**2.1 Regional Economic Development Analysis Method**

**Klassen Typology.** Klassen typology is a method to determine an overview of the pattern or structure of economic growth in each region. The Klassen typology is used since there is a relationship related to economic growth with a single-dimensional development process and is measured by increasing production output and development (Ciptawaty, 2019). According to Imelia (2006), the Klassen Typology analysis divides economic growth classes into 4 classifications as shown in Table 1.

Economic Growth Rate (EGR) is the quotient between the GRDP of a certain year and the GRDP of the previous year. EGR is a benchmark for the success of a region’s development (Estrada, 2019). Formulas that can be used are:

$$EGR = \frac{(GRDP_x) - (GRDP_{x-1})}{GRDP_{x-1}} \times 100 \tag{1}$$

- EGR = Economic growth rate
- GRDP<sub>x</sub> = GRDP year x
- GRDP<sub>x-1</sub> = GRDP of the previous year.

**2.2 Leading Sector Development Analysis Method**

**Growth Ratio Model.** Growth Ratio Model analysis (GRM) is an analytical tool used to figure out a regency/city’s economic activities based on the growth criteria of the regional economic structure both internally and externally (Erika, 2013).

- a) The Growth Ratio of the Study Area (GRs) is a comparison between the GRDP revenue growth in the study area or the study of GRDP revenue of the reference area

(regency/city to province).

$$GRs = \frac{\Delta E_{ij}/E_{ij}}{\Delta E_{in}/E_{in}} \quad (2)$$

Remarks:

$\Delta E_{ij}$  = Changes in GRDP of sector i in region j

$E_{ij}$  = GRDP of the sector I in region j at the beginning of the research year

$\Delta E_{in}$  = Changes in GRDP of sector i by province

$E_{in}$  = GRDP of the sector i by the province at the beginning of the research year

If the value of GRs > 1, then it is given a positive sign (+) which means that the economy of the study area is experiencing growth or improvement. Vice versa, if the value of GRs < 1 then there is a decrease in economic growth.

- b) The Growth Ratio of the Reference Area (GRr) is a comparison of the income growth rate of activity I in the reference area with the total activity growth rate (GRDP) of the reference area.

$$GRr = \frac{\Delta E_{in}/E_{in}}{\Delta E_n/E_n} \quad (3)$$

Remarks:

$\Delta E_{in}$  = Changes in GRDP of sector i by province

$E_{in}$  = GRDP of sector I by province at the beginning of the research year

$\Delta E_n$  = Changes in GRDP province

$E_n$  = Total GRDP of province at the beginning of the research year

If the value of GRr > 1 then is given a positive sign (+), this indicates that the growth of a particular sector in the reference area (Province) is higher than the growth of the total GRDP of that region. And vice versa, if the value of GRr < 1 then it is given a negative sign (-). According to (Muta'ali, 2015), the results of the GRM analysis can be classified into 4 classes as can be seen in Table 2.

**Location Quotient (LQ).** Location Quotient (LQ) is an analysis method used to distinguish the economic sectors in GRDP (Sutanti and Oktariani, 2019). LQ is an analysis used to identify basic sectors or leading sectors in an area (Suryani, 2019). This analysis is used to determine the level of specialization of economic sectors in an area that utilizes basic sectors. LQ calculates the comparison between the share output of sector i in the

**Table 2.** Classification of GRM Analysis

Growth ratio of study area (grs)	Growth Ratio of Reference Area (grr)	
	Value +	Value -
Value +	GROW (Potential and Prospective)	GROW (Potential and Prospective)
Value -	UNDERDEVELOPED (Non Potential and Decreasing)	UNDERDEVELOPED (Non Potential and Decreasing)

regency and the share output of sector  $i$  in the province (Jumiyanti, 2018). The formula used is as follows:

$$LQ = \frac{\frac{Y_{ij}}{Y_j}}{\frac{Y_i}{Y}} \quad (4)$$

Remarks:

$Y_{ij}$  = GRDP of sector  $i$  in area  $j$

$Y_j$  = Total GRDP of region  $j$  in sector  $i$

$Y_i$  = GRDP Province in sector  $i$

$Y$  = The total of GRDP province in sector  $i$

The criteria in classifying the results of the LQ value is if the LQ value  $> 1$ , then the sector is a basic sector and is very prospective for development. And vice versa, if the LQ value  $< 1$  then the sector is not a basic sector.

**Analysis of Leading Sector with Geographic Information System Overlay Method.** The determination of leading sectors in this study used spatial analysis, particularly with the overlay method. Spatially, overlay analysis is a combination of several data elements that have spatial elements, or spatial operations that combine geographic layers to obtain new information (Larasati, 2017). In determining leading sectors, the analysis combines the results of the LQ value with the results of the GRM, especially the GRs (Yusuf, 1999). The steps carried out are as follows:

1. The calculation results using the GRM method, especially GRs and LQ, will be given a notation, if the value is  $> 1$  then it is denoted (+), and if the value is  $< 1$  then it is denoted (-). The LQ value shows the contribution, while the GRM value is the growth criteria.
2. The notation data listed in Ms. Excel will join the data with the spatial data of the regency/city administration of Central Kalimantan Province.
3. The GRM and LQ spatial data are then processed using the overlay method.
4. If the notation is both positive, then the sector is a leading sector, and then in the attribute table a description column is added and filled with 'Leading Sector'.

### 2.3 Analysis Method of the Relationship Between Leading Sector and Economic Development

In this study, the data is presented in the map. The map presented is a spatio-temporal map, which is a map that combines the dimensions of space and time. The spatio-temporal map will make it easier to analyze research results since the map can display spatial location data from each regency/city in Central Kalimantan Province and also its changes temporally from 2016 to 2021. Temporal changes from year to year are called multitemporal. In general, the map is an application to detect a change or difference that is in line with the function of time (Dhartaredjasa 2012). The maps presented in spatio-temporal are regional economic development maps, leading sector maps, and maps of the relationship between the leading sector and the regional economic development class.

The important thing in presenting a map is visualization. Visualization is a process of making symbol designs and researching data that will be displayed on a map (Lestari,

2016). The map of changes in the class of economic development which is ordinal data will be visualized with a different color for each class and shows a level. The leading sectors map will be presented with a symbology chart, in particular a bar chart where each color will indicate the leading sectors. Lastly, a map of the relationship between the leading sectors and economic development will be displayed with an overlay symbol between the leading sectors and the class of economic development.

### 3 Results and Discussion

#### 3.1 The Spatio-Temporal of Regional Economic Development in Central Kalimantan Province 2016–2021

Analysis of regional economic development in Central Kalimantan Province was conducted using the Klassen Typology method. Klassen typology is an analytical method to classify the level of economic growth in Central Kalimantan Province by comparing the value of growth rate and per capita income of each regency/city with the reference area Central Kalimantan province. Table 3 is the classification of regional economic growth in each regency/city of Central Kalimantan Province in 2016–2021. The table shows that every year the level of economic growth in the regencies/cities of Central Kalimantan Province changes.

The dynamics of economic development in each regency/city of Central Kalimantan Province was quite volatile. Figure 3 is a spatio-temporal map of the level of regional economic development in Central Kalimantan Province from 2016 to 2021. The map shows that the most frequent changes were changes that did not show a pattern or fluctuated. Regencies with highly volatile economic growth were Murung Raya, East Barito, North Barito, Pulang Pisau, Palangka Raya, Katingan, West Kotawaringin, and Sukamara regencies. However, there were also consistent changes between increases or decreases. The regencies that experienced a decline was East Kotawaringin regency, which was a regency with a developed and fast growing area class turning into a developed but depressed area in 2020 and 2021. The regency that always experienced an increase was Lamandau regency. The changes that occurred were very positive, the change from developed but depressed region to developed and fast growing area. Then the regency that was consistent in quadrant 3 or a fast growing area was Kapuas regency. Fast growing area means that the value of the growth rate is above the growth rate of the Central Kalimantan Province, but the value of GRDP per capita is lower. This area has considerable potential for development. In addition, there were also regencies that were consistently classified in underdeveloped areas, such as Seruyan and South Barito regencies. Seruyan and South Barito regencies need more attention from the government so that the economy can improve in the future.

From the results of research that has been done, it can be concluded that regional economic growth in Central Kalimantan Province still has gaps or inequalities, the same as in previous years. In Medium-Term Development Plan 2016–2021, regional economic disparities are a fairly important issue and must be resolved because the imbalances that occur will cause an imbalance in cumulative economic growth (Central Kalimantan Provincial Government, 2015). Remote areas are areas that are often unsupervised so that the wheels of economic growth are still less efficient. The Medium-Term Development

**Table 3.** Regional Economic Growth Class in Central Kalimantan Province 2016–2021

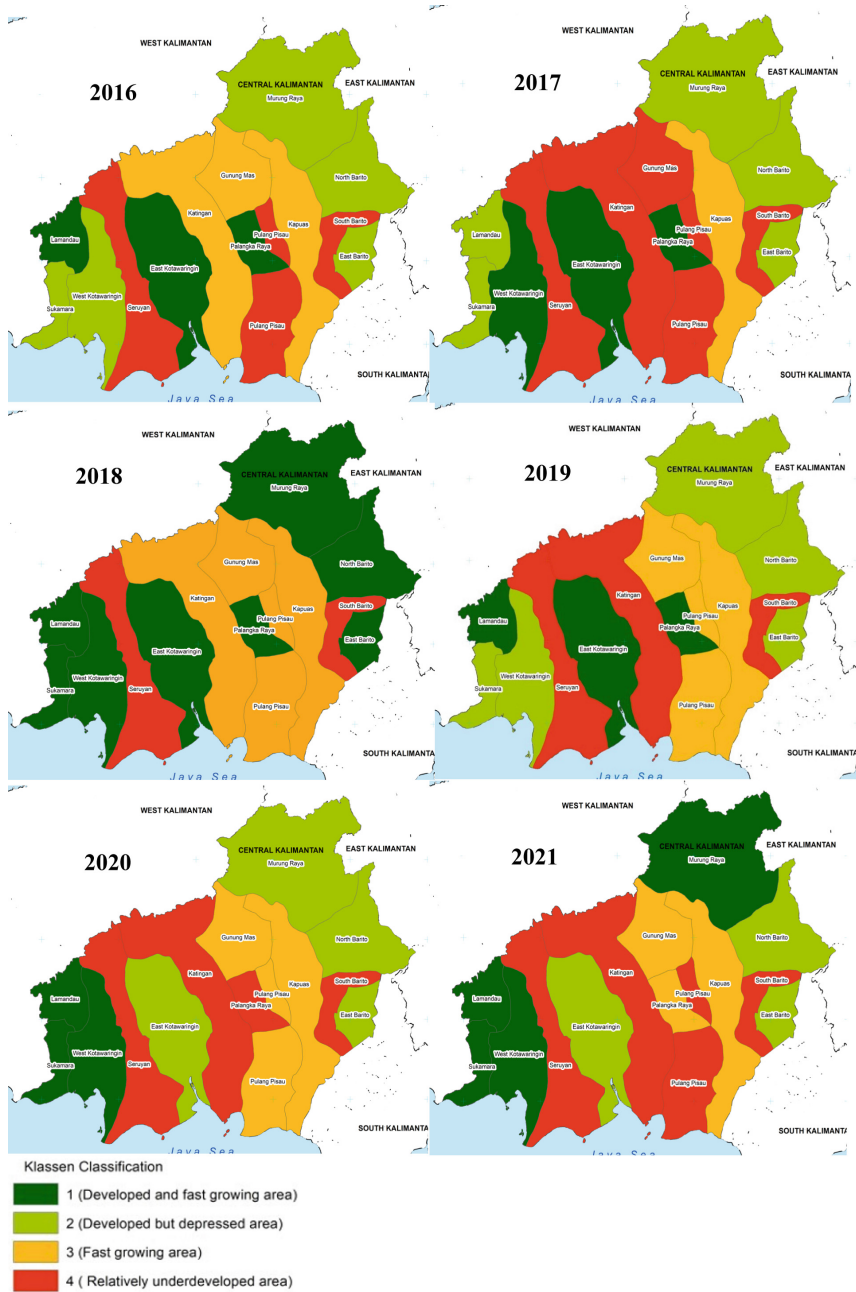
	2016	2017	2018	2019	2020	2021
Quadrant 1: Developed and fast growing area	East Kotawaringin, Lamandau, Palangka Raya	West Kotawaringin, East Kotawaringin, Palangka Raya	West Kotawaringin, East Kotawaringin, North Barito, Sukamara Lamandau East Barito, Murung Raya Palangka Raya	East Kotawaringin, Lamandau, Palangka Raya	West Kotawaringin, Sukamara, Lamandau,	West Kotawaringin, Sukamara, Lamandau, Murung Raya
Quadrant 2: Developed but depressed area	West Kotawaringin, North Barito, Sukamara, East Barito, Murung Raya	East Barito, Sukamara, Lamandau, East Barito, Murung Raya		West Kotawaringin, North Barito, Sukamara, East Barito, Murung Raya	East Kotawaringin, North Barito, East Barito, Murung Raya	East Kotawaringin, North Barito, East Barito
Quadrant 3: Fast growing area	Kapuas, Katingan, Gunung Mas	Kapuas	Kapuas, Katingan, Pulang Pisau, Gunung Mas	Kapuas, Pulang Pisau, Gunung Mas	Kapuas, South Barito, Pulang Pisau, Gunung Mas	Kapuas, Gunung Mas, Palangka Raya
Quadrant 4: Relatively underdeveloped area	South Barito, Seruyan, Pulang Pisau	South Barito, Seruyan, Katingan, Pulang Pisau, Gunung Mas	South Barito, Seruyan,	South Barito, Seruyan, Katingan	South Barito, Seruyan, Katingan, Palangka Raya	South Barito, Seruyan, Katingan, Pulang Pisau

Plan also mentions that the factors that are quite influential are the management of natural resources that are not optimal and the economy of communities is still not fully empowered. One of the strategies for the development of Central Kalimantan Province in 2016–2021 was the achievement of regional economic stability where the target indicator was the contribution of Central Kalimantan's GRDP to Kalimantan's GRDP of 20%. However, the results were still far from the target, in the fourth quarter of 2021, Central Kalimantan's GRDP contribution was recorded at only 12.69%.

### 3.2 The Spatio-Temporal of Leading Sector Development in Central Kalimantan Province from 2016 to 2021

The development of leading sectors was analyzed using three methods i.e. the GRM method, LQ, and spatial analysis with the overlay method between GRs and LQ. GRM is an analysis to find out potential sectors to be developed in an area. LQ is a method to find out how much a sector contributes to the regional economy, and the last is spatial analysis with the overlay method to determine whether the sector is a leading sector or not.





**Fig. 3.** Spatio-Temporal Map of the Level of Regional Economic Development in Central Kalimantan Province 2016–2021

Economic developments that occurred in each sector varied from the whole year the research was conducted. According to the GRM analysis, the existing sectors are classified into 2; growing and underdeveloped sectors. The changes that occurred from 2016 to 2021 shows a decrease or increase as shown in Table 4. This can be seen from the distribution of sectors that are classified as potential sectors each year. In 2016 and 2017, there were quite a number of potential sectors, even each regency had more than one potential sector. However, the number of potential sectors declined in 2018, then it rose in 2019, but in 2020 it experienced a dramatic drop. There was an increase in 2012, although the increase was not noticeable. The regencies with the most potential sectors were Gunung Mas District and Palangka Raya City with 12 potential sectors.

Besides the development of leading sectors, what needs to be known is the contribution of the existing sectors to the development in economic activities. The contribution of the sectors illustrates how big the role of the sectors in improving the regional economy. Table 5 is the result of calculating the amount of contribution from the existing business sectors using the LQ method. Contributions with a value of more than one mean that the sector is in the basic sector and is very prospective to be developed. The results of the analysis show that Palangka Raya City had the sectors with the most consistent contribution from 2016 to 2021. The sectors that were classified as basic sectors in Palangka Raya City were electricity and gas supply, water supply, construction, trade, transportation, accommodation provision, information, financial services, real estate, corporate services, government administration, education services, health services and other services. Besides Palangka Raya City, Katingan regency was also a regency that had a fairly consistent basic sector. In 2020 there was an additional sector, such as the manufacturing sector, but in 2021 this sector dropped. Similar to Palangka Raya City, the basic sector in Katingan regency was mostly services and construction sectors. In general, other regencies already have their respective potential sectors, but the contribution is unstable. There are still many sectors that experience a decline in the amount of contribution in certain years.

Potential sectors (GRs) from the results of the GRM analysis and the amount of contributions that are the results of the LQ analysis are then carried out with spatial analysis using the overlay method. According to Yusuf (1999), in analyzing there are four criteria in describing the economic sector. If the growth value or potential and contribution is positive (+) then the sector is a leading sector and has a dominant influence on economic development. If the growth value is positive (+) and the contribution is negative (−) then this sector has a more dominant growth than its contribution, so its contribution must be increased to become a leading sector. Then if the growth value is negative (−) and the contribution is (+) then the growth in the sector is low but the contribution value is large, meaning that the sector is experiencing a decline. Finally, if the growth value and contribution is negative (−), it means that the sector is not a leading sector and has no potential for development.

**Table 4.** Calculation Results of the Growth Ratio Model (GRM) of Central Kalimantan Province 2016–2021

Sectors	Central Kalimantan						South Barito						East Barito					
	GRr						GRs						GRs					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	0,6	0,7	1,2	1,1	-0,2	0,9	0,3	0,8	0,6	0,6	6,8	-1,2	0,6	1,4	0,6	0,6	12,8	1,0
II	1,2	1,3	-0,1	0,8	6,3	0,4	0,6	0,5	-12,9	1,0	1,6	3,3	0,5	0,5	-17,1	0,9	1,1	1,3
III	1,2	1,3	0,9	0,7	0,1	1,2	0,9	0,4	0,0	0,7	4,4	0,3	1,5	0,9	1,1	1,3	-31,0	0,4
IV	1,6	0,9	1,7	1,7	-14,6	1,1	2,1	1,2	1,0	0,7	0,5	1,9	1,1	1,7	0,9	0,9	0,4	-0,7
V	0,7	0,0	1,4	1,1	-4,4	2,1	1,0	3,3	0,8	1,8	0,8	1,1	1,3	4,9	0,9	1,0	-0,2	-0,7
VI	1,2	0,8	2,0	1,2	6,7	2,2	1,4	1,0	3,4	1,0	1,2	-1,5	1,4	0,8	2,3	1,0	0,6	1,0
VII	1,1	1,2	2,0	1,2	0,7	0,7	1,3	0,8	0,5	0,7	-1,7	0,5	1,4	1,1	0,8	0,6	-5,3	0,4
VIII	1,4	1,2	1,5	1,3	2,8	1,3	1,6	0,9	1,1	0,0	1,0	-0,8	1,7	1,0	1,0	1,2	-0,3	0,7
IX	1,2	0,8	1,2	1,2	3,3	0,8	1,9	1,7	0,7	0,8	0,3	0,8	1,4	1,5	1,2	0,8	1,0	0,5
X	1,0	1,0	1,5	0,8	-8,1	5,8	1,3	1,5	0,7	1,7	1,6	0,5	1,5	1,5	1,1	1,7	0,4	0,2
XI	1,1	1,3	0,4	1,0	-6,8	2,1	1,0	1,0	1,7	0,8	0,9	0,8	1,4	0,9	3,9	1,4	1,4	1,6
XII	0,8	0,6	1,5	0,7	-0,1	0,8	0,8	0,9	0,6	1,2	14,1	0,0	0,8	2,1	0,7	1,0	-11,9	1,8
XIII	1,0	0,8	1,4	1,1	9,9	0,5	1,1	1,0	0,7	1,0	0,5	-4,5	0,8	1,5	1,0	0,8	0,1	2,0
XIV	0,4	0,6	1,2	0,9	-5,4	-0,9	0,8	1,5	0,9	1,3	0,6	-2,1	1,1	1,6	1,1	1,3	1,2	-1,3
XV	1,0	0,5	1,5	0,9	-3,8	0,4	1,0	1,6	1,1	1,2	0,8	6,1	1,6	2,6	1,0	1,4	1,6	2,0
XVI	0,8	0,8	1,5	0,9	-6,8	4,2	1,0	1,1	0,7	1,7	2,3	2,9	1,3	1,4	1,0	1,5	0,8	0,9
XVII	1,1	0,6	1,5	1,1	6,0	0,7	0,8	1,0	0,6	0,8	0,8	-2,2	1,2	2,1	0,9	0,9	0,0	0,2

Sec-tors	Katingan						Gunung Mas						Kapuas					
	GRs						GRs						GRs					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	1,0	0,7	0,9	0,9	-9,9	0,8	0,8	1,3	0,9	1,0	15,4	2,0	-0,2	1,1	0,7	0,8	4,9	0,9
II	1,5	0,9	16,7	-2,1	2,8	-8,5	1,8	1,2	-9,0	1,6	-0,7	-4,1	3,4	2,0	-40,7	2,0	1,5	6,4
III	1,1	0,8	1,6	2,2	-1,9	0,8	1,1	0,5	1,8	1,2	-3,1	0,5	1,1	0,6	1,7	1,6	-81,3	1,0
IV	0,9	0,6	1,0	0,4	0,4	1,3	1,6	1,1	0,9	1,5	25	368	1,7	9,6	2,1	1,0	1,0	3,6
V	1,2	16,7	0,6	0,5	1,6	1,6	2,1	-21,4	0,8	1,0	1,5	1,4	1,2	6,2	0,5	0,2	1,7	0,3
VI	0,8	1,7	5,3	0,7	0,9	1,1	1,4	1,6	3,0	1,5	0,5	1,2	1,0	0,9	2,7	0,8	0,8	1,0
VII	1,1	1,0	0,8	0,9	0,8	0,5	1,2	1,0	0,9	0,9	-5,2	1,8	1,6	1,1	0,7	1,2	2,3	0,8
VIII	0,7	0,9	1,0	1,0	0,1	2,6	1,1	0,9	1,0	1,0	0,1	1,8	1,6	1,4	1,1	1,3	-0,8	1,4
IX	1,1	1,5	1,3	1,3	0,4	3,0	1,2	1,0	1,1	1,0	0,8	2,2	1,2	1,2	1,1	0,5	1,5	0,9
X	0,3	0,7	0,7	2,2	1,7	0,7	0,4	0,4	0,8	1,1	1,5	1,1	0,7	1,0	0,8	0,9	0,8	0,5
XI	0,2	0,5	1,2	1,3	1,4	1,3	0,4	0,4	2,5	0,6	0,6	1,0	0,5	0,7	2,2	1,0	0,8	1,0
XII	1,4	2,1	1,0	2,0	-18,3	-4,1	1,1	1,2	1,0	1,7	47,6	2,9	1,3	1,1	0,7	1,1	6,1	0,0
XIII	0,5	0,9	0,7	1,0	0,8	0,4	0,7	0,8	0,4	0,5	0,0	2,0	1,2	1,1	0,8	1,2	0,5	1,9
XIV	1,2	1,7	1,3	1,3	-0,3	-2,3	1,4	1,8	1,1	1,6	1,1	-4,6	1,1	0,0	0,8	1,9	-0,1	-4,8
XV	1,0	2,3	1,0	1,6	1,1	3,3	0,8	1,5	1,0	1,2	1,1	1,0	1,4	1,8	0,9	1,3	0,8	0,7
XVI	1,4	1,5	1,1	1,8	1,4	0,6	0,9	0,9	1,0	1,5	1,0	1,0	1,2	1,1	0,8	0,8	0,1	0,8
XVII	1,2	1,8	0,9	1,4	0,2	0,3	1,0	0,9	0,9	0,9	0,2	0,8	1,2	1,6	0,9	1,1	0,1	0,1

(continued)

**Table 4.** (continued)

Sec- tors	East Kotawaringin						Murung Raya						Palangka Raya					
	GRs						GRs						GRs					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	1,3	1,4	1,0	0,6	-14,3	1,4	0,5	0,8	0,0	0,1	6,7	0,5	0,7	0,5	0,2	0,9	19,3	2,4
II	1,5	1,4	-28,3	7,3	-2,6	-23,3	0,9	0,8	-24,4	1,3	-0,7	4,4	1,3	0,4	-26,9	1,3	0,5	4,1
III	1,4	1,3	1,5	1,2	31,2	0,7	1,8	0,6	0,7	1,4	-66,7	1,9	1,1	0,8	0,7	0,6	25,3	0,2
IV	2,1	1,0	1,1	1,2	0,6	2,1	2,4	6,0	1,4	2,9	0,7	4,1	2,0	1,1	1,0	1,7	0,0	0,5
V	0,9	3,2	0,4	1,3	2,2	0,4	0,2	9,9	0,2	0,1	0,2	0,2	0,7	3,2	0,8	0,7	-0,6	1,0
VI	0,8	0,8	2,5	0,6	2,8	0,5	1,5	1,5	3,2	1,0	-0,5	0,8	1,4	1,1	1,8	0,7	0,9	1,3
VII	1,3	1,1	0,8	1,3	7,4	1,9	0,2	0,8	0,3	0,3	-4,3	2,2	1,7	1,3	1,0	1,3	2,7	1,9
VIII	1,9	1,2	0,9	0,9	-1,0	0,8	0,6	1,1	1,0	1,3	-3,0	2,7	1,7	1,1	1,4	1,0	4,6	1,9
IX	1,1	0,9	0,7	0,6	0,7	1,1	1,0	1,1	1,2	1,0	-1,5	2,3	1,8	1,5	0,9	1,3	2,6	2,6
X	0,5	0,5	0,5	0,4	0,6	0,6	2,4	1,6	0,8	2,0	0,9	0,6	0,9	1,2	1,1	1,8	1,2	1,0
XI	0,5	0,8	1,3	1,2	0,6	0,7	0,7	-0,1	3,0	1,4	0,9	1,0	1,4	1,3	1,6	0,9	0,7	1,2
XII	0,8	1,1	0,7	1,0	5,4	2,1	0,8	1,1	0,5	1,4	41,7	2,3	1,5	1,1	1,1	2,2	-54,2	2,3
XIII	0,8	1,0	0,8	0,3	1,9	0,3	0,1	0,4	0,3	0,6	-0,3	2,9	1,3	1,2	1,1	1,5	1,1	1,8
XIV	0,0	-0,1	0,6	0,5	-0,1	-2,7	1,6	3,7	0,8	1,0	1,1	-3,3	0,0	1,0	0,9	1,5	-0,1	0,7
XV	0,8	1,2	0,9	0,6	1,6	1,5	0,4	1,3	0,6	1,1	1,4	6,5	1,3	1,7	1,1	1,6	1,6	2,9
XVI	0,6	0,9	0,9	0,0	0,1	0,9	1,5	1,8	0,6	1,2	0,7	0,8	1,2	1,1	1,0	1,7	0,7	0,8
XVII	0,9	1,5	0,9	0,8	1,0	3,3	1,0	1,5	0,7	1,0	-0,8	3,4	1,5	1,2	0,9	1,5	2,6	1,8

Sec- tors	Seruyan						Sukamara						Lamandau					
	GRs						GRs						GRs					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	0,7	0,9	0,6	0,8	-7,1	0,4	0,8	1,2	0,9	0,9	15,3	1,9	1,5	1,4	0,9	0,8	16,2	1,9
II	-1,2	-0,1	-7,5	0,8	0,1	-0,2	0,8	0,5	-11,7	0,9	0,4	1,2	-0,8	0,8	-27,2	1,7	0,7	0,7
III	1,0	1,0	1,3	1,2	49,3	0,6	1,0	0,9	1,2	1,3	-20,8	1,2	1,6	1,2	1,4	1,5	-64,7	2,1
IV	0,9	0,0	0,4	0,3	0,3	0,7	1,7	0,8	1,2	0,6	0,4	2,4	2,0	1,7	1,5	1,1	0,6	2,6
V	0,2	32,8	0,9	0,4	-0,9	0,8	0,6	21,6	1,5	1,1	-0,4	-0,1	1,3	31,8	1,0	1,2	1,4	0,0
VI	0,9	-0,1	0,1	0,2	0,6	0,7	0,8	1,0	2,5	0,8	0,5	1,0	1,7	0,9	2,8	0,8	1,1	1,0
VII	0,8	0,6	0,7	0,6	0,4	1,2	1,1	0,9	0,7	0,8	-2,5	2,0	1,5	0,9	0,8	1,3	-9,1	1,0
VIII	1,3	1,0	1,0	0,7	-1,2	0,3	1,1	0,9	0,8	0,9	-0,9	0,5	1,1	0,7	1,0	1,4	-1,5	0,8
IX	0,8	0,9	0,7	0,5	0,1	0,4	1,0	1,1	1,0	0,8	0,5	1,9	0,7	1,2	1,0	1,1	1,2	1,1
X	0,7	0,6	0,5	0,7	0,5	0,2	1,2	0,8	0,7	1,2	0,5	0,5	1,2	1,1	0,9	1,3	0,7	0,8
XI	1,0	0,6	1,2	1,1	0,7	0,3	1,2	0,5	1,9	0,7	0,5	0,6	0,8	0,7	1,3	0,5	0,8	1,4
XII	0,8	1,2	0,5	1,1	20,5	0,9	1,3	1,7	0,8	1,0	9,4	1,1	0,8	1,0	0,8	1,6	32,3	0,7
XIII	0,6	0,5	0,5	0,6	0,4	0,1	0,6	0,8	0,6	0,7	0,2	1,5	1,5	1,9	1,0	1,2	0,1	1,4
XIV	0,8	0,5	0,9	1,2	-0,1	0,0	1,1	1,6	1,0	1,3	0,1	0,3	1,1	1,2	0,9	1,3	1,4	1,9
XV	0,7	0,2	0,6	1,1	1,1	0,5	1,1	1,5	0,8	1,1	1,0	0,5	1,5	0,9	1,0	1,2	1,5	-1,5
XVI	1,0	1,3	0,6	0,7	0,3	0,5	1,3	1,3	0,6	1,0	0,3	0,7	1,5	1,5	1,0	1,5	1,0	0,6
XVI	0,4	0,8	0,3	0,3	0,2	0,0	0,5	1,0	0,7	0,8	-0,2	1,0	1,3	1,5	1,1	1,3	-0,7	0,0

(continued)

Figure 4 is a spatio-temporal map of the development of leading sectors in Central Kalimantan Province in 2016–2021. The map illustrates that each regency/city in Central Kalimantan Province already had its own leading sectors, although its development every year was still inconsistent. Increases and decreases occurred randomly over the period given. Among all regencies/cities, only Palangka Raya City had a fairly good consistency in the development of leading sectors, although in certain years some of these sectors decreased. In contrast to Palangka Raya City, Seruyan regency had the worst condition in its leading sectors. The only leading sector owned was the manufacturing industry

**Table 4.** (continued)

Sectors	North Barito					West Kotawaringin					Pulang Pisau							
	RPs					RPs					RPs							
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	0,5	0,7	0,4	0,1	6,0	1,0	0,9	1,6	1,0	0,5	10,4	0,9	0,5	1,0	0,7	0,7	24,7	1,2
II	0,9	0,7	-18,4	1,0	0,8	1,1	0,9	-0,2	-13,1	1,4	0,0	-3,2	1,1	0,8	-24,6	1,5	-1,0	2,9
III	0,9	0,8	1,3	1,7	-25,7	0,4	0,8	1,0	1,4	1,2	-31,3	1,7	1,4	1,0	1,8	2,2	-77,8	2,0
IV	2,3	2,2	1,5	1,6	1,0	4,2	0,7	0,4	0,8	0,9	0,6	1,0	2,7	3,4	1,7	2,0	-0,6	-1,8
V	0,9	16,1	0,6	0,9	1,0	0,3	0,8	12,6	0,8	1,3	-0,5	1,2	0,9	22,0	0,7	0,9	-0,4	0,3
VI	0,7	1,0	2,8	0,6	0,8	1,3	0,9	1,2	3,0	1,0	1,3	1,4	1,2	0,7	1,9	0,6	0,9	0,7
VII	0,9	0,9	0,8	0,9	-3,0	0,4	1,1	0,7	0,6	0,9	-3,2	2,4	1,2	0,9	0,7	1,2	-4,1	1,0
VIII	1,0	0,9	1,1	1,2	-0,9	1,5	0,9	0,6	0,9	1,1	2,2	1,5	0,7	0,1	0,2	0,6	-0,2	0,5
IX	1,2	1,6	1,2	1,0	-0,7	0,5	1,4	1,0	0,8	0,9	1,2	0,9	1,4	1,6	1,3	1,4	1,1	0,4
X	1,0	0,9	0,7	1,1	1,3	0,3	1,1	0,7	0,4	1,6	0,6	0,4	1,5	1,4	1,0	1,6	0,8	0,5
XI	0,9	0,6	1,6	0,6	1,0	0,5	1,1	0,5	1,0	1,1	1,0	1,0	0,7	0,6	2,4	1,0	0,8	0,8
XII	0,9	1,6	0,8	1,2	13,0	0,2	1,0	0,5	0,7	1,5	20,9	0,9	1,4	1,9	1,0	1,9	27,8	1,0
XIII	1,0	1,2	1,0	0,8	1,0	1,1	0,7	0,5	0,6	0,9	0,8	1,5	1,1	1,3	0,9	1,0	0,4	0,8
XIV	0,4	1,0	0,9	1,2	1,2	-1,4	0,8	1,8	0,0	1,5	1,1	-3,3	1,0	1,8	1,1	1,5	0,4	0,4
XV	1,0	1,9	1,0	1,4	1,6	1,6	0,8	0,9	0,8	1,4	1,5	1,6	1,5	2,3	0,9	1,3	1,2	-4,2
XVI	1,1	1,3	1,0	1,7	1,1	0,8	0,7	0,7	0,7	1,4	2,7	1,3	1,2	1,3	0,9	1,4	0,6	0,6
XVII	1,1	1,7	1,0	1,0	0,6	1,0	1,1	1,6	1,0	1,1	3,9	-0,9	1,4	2,1	0,9	1,1	0,8	0,3

Remarks  Value +  Value -

- I : Agriculture, Forestry and Fisheries
- II : Mining and excavation
- III : Processing industry
- IV : Electricity and Gas Supply
- V : Water Supply, Waste Management, Waste and Recycling
- VI : Construction
- VII : Wholesale and Retail Trade ; Car and Motorcycle Repair
- VIII : Transportation and Warehousing
- IX : Provision of Accommodation and Food and Drink
- X : Information and Communication
- XI : Financial Services and Insurance
- XII : Real Estate
- XIII : Corporate Services
- XIV : Government Administration, Defense and Mandatory Social Security
- XV : Education Services
- XVI : Health Services and Social Activities
- XVII : Other services

**Table 5.** Calculation Results of Location Quotient (LQ) Method of Central Kalimantan Province 2016–2021

Sec-tors	South Barito						East Barito						North Barito					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	0,9	0,9	0,8	0,8	0,9	1,0	0,9	0,9	0,9	0,9	0,9	0,9	0,5	0,5	0,5	0,4	0,5	0,5
II	1,5	1,5	1,6	1,6	1,5	0,5	2,7	2,6	2,7	2,7	2,7	2,8	3,1	3,1	3,2	3,3	3,3	3,4
III	0,4	0,4	0,4	0,4	0,4	1,5	0,4	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5
IV	0,6	0,6	0,6	0,6	0,6	0,7	0,3	0,3	0,3	0,3	0,2	0,2	0,4	0,5	0,5	0,5	0,5	0,5
V	1,6	1,6	1,6	1,7	1,7	1,4	0,6	0,6	0,6	0,6	0,6	0,5	1,6	1,7	1,6	1,6	1,6	1,6
VI	0,7	0,7	0,7	0,7	0,7	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,5	0,5	0,5	0,5	0,5	0,6
VII	0,7	0,7	0,6	0,6	0,7	1,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
VIII	1,8	1,8	1,8	1,7	1,7	1,6	0,7	0,7	0,7	0,7	0,7	0,7	0,8	0,8	0,8	0,8	0,9	0,9
IX	1,1	1,1	1,1	1,1	1,2	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,8	0,8	0,8	0,9	0,8
X	1,2	1,2	1,2	1,3	1,3	0,6	1,1	1,1	1,1	1,1	1,1	1,0	1,0	1,0	1,0	1,0	1,0	0,9
XI	1,3	1,3	1,4	1,4	1,4	1,1	0,4	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5
XII	1,0	1,1	1,0	1,0	1,1	0,7	1,0	1,0	1,0	1,0	1,0	1,0	0,7	0,7	0,7	0,7	0,7	0,7
XIII	0,4	0,4	0,4	0,4	0,5	0,7	1,9	2,0	2,0	1,9	2,3	2,3	0,3	0,3	0,3	0,3	0,3	0,3
XIV	1,0	1,0	1,0	1,1	1,1	0,3	0,6	0,6	0,6	0,6	0,6	0,6	0,8	0,8	0,8	0,8	0,8	0,9
XV	1,4	1,5	1,5	1,5	1,5	0,6	1,0	1,0	1,0	1,0	1,1	1,1	0,9	1,0	1,0	1,0	1,0	1,0
XVI	1,5	1,5	1,5	1,5	1,7	0,5	0,8	0,9	0,8	0,9	0,9	0,9	1,1	1,1	1,1	1,1	1,1	1,1
XVII	2,0	2,0	1,9	1,9	2,0	0,7	0,5	0,5	0,5	0,5	0,6	0,6	1,3	1,3	1,3	1,3	1,4	1,4

Sec-tors	Gunung Mas						Kapuas						West Kotawaringin					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	1,6	1,6	1,6	1,6	1,6	1,6	1,2	1,2	1,2	1,1	1,2	1,1	1,3	1,3	1,3	1,3	1,3	1,2
II	0,7	0,7	0,7	0,7	0,8	0,7	1,0	1,0	1,1	1,2	1,1	1,2	0,1	0,1	0,1	0,1	0,1	0,1
III	0,6	0,6	0,6	0,6	0,6	0,6	0,7	0,7	0,7	0,7	0,8	0,8	1,6	1,6	1,7	1,7	1,7	1,7
IV	0,2	0,2	0,2	0,2	1,0	3,1	0,7	1,0	1,0	0,9	0,9	0,9	0,7	0,7	0,6	0,6	0,6	0,6
V	0,6	0,6	0,6	0,6	0,6	0,6	0,8	0,8	0,7	0,7	0,7	0,7	1,1	1,1	1,1	1,1	1,0	1,0
VI	1,3	1,3	1,4	1,4	1,4	1,4	1,0	0,9	1,0	0,9	1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0
VII	0,8	0,8	0,8	0,8	0,8	0,8	1,3	1,3	1,2	1,3	1,2	1,2	1,1	1,1	1,0	1,0	1,1	1,1
VIII	0,3	0,3	0,3	0,3	0,3	0,3	0,5	0,5	0,5	0,5	0,6	0,6	1,3	1,3	1,3	1,3	1,2	1,2
IX	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9	0,9	0,9	0,8	0,8	0,8	0,8	0,7	0,7
X	1,3	1,2	1,2	1,2	1,2	1,2	0,9	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,9	0,9	0,8	0,8
XI	0,2	0,2	0,2	0,2	0,2	0,2	1,2	1,2	1,2	1,2	1,2	1,1	1,6	1,5	1,5	1,5	1,5	1,4
XII	1,3	1,4	1,3	1,4	1,4	1,4	1,4	1,4	1,4	1,3	1,3	1,3	0,9	0,9	0,9	0,9	0,9	0,9
XIII	1,3	1,3	1,2	1,2	1,3	1,3	0,8	0,8	0,7	0,7	0,8	0,8	1,2	1,2	1,2	1,2	1,2	1,1
XIV	1,1	1,1	1,1	1,1	1,1	1,2	0,6	0,6	0,6	0,6	0,6	0,7	0,5	0,5	0,5	0,5	0,5	0,6
XV	1,7	1,7	1,7	1,7	1,6	1,6	1,1	1,2	1,1	1,1	1,1	1,1	0,6	0,6	0,6	0,6	0,6	0,6
XVI	1,8	1,8	1,8	1,8	1,7	1,7	1,1	1,1	1,1	1,0	1,0	0,9	0,6	0,6	0,6	0,6	0,7	0,7
XVII	0,3	0,3	0,3	0,3	0,3	0,3	0,8	0,8	0,8	0,8	0,8	0,8	0,9	1,0	0,9	1,0	0,7	0,6

(continued)

Table 5. (continued)

Sec- tors	Murung Raya						Palangka Raya						Sukamara					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	0,6	0,6	0,5	0,5	0,5	0,4	0,1	0,1	0,1	0,1	0,1	0,1	1,6	1,6	1,6	1,5	1,5	1,6
II	3,5	3,4	3,7	3,7	4,1	4,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
III	0,2	0,2	0,2	0,2	0,2	0,2	0,7	0,7	0,6	0,6	0,6	0,6	1,5	1,5	1,5	1,6	1,5	1,5
IV	0,2	0,3	0,3	0,3	0,2	0,2	4,6	4,6	4,5	4,7	4,0	4,0	0,4	0,4	0,4	0,4	0,4	0,4
V	0,5	0,5	0,5	0,4	0,4	0,4	2,1	2,1	2,1	2,0	1,8	1,8	0,2	0,2	0,2	0,2	0,1	0,1
VI	0,7	0,7	0,7	0,7	0,8	0,8	1,2	1,2	1,2	1,2	1,2	1,2	1,1	1,1	1,1	1,1	1,1	1,1
VII	0,4	0,4	0,4	0,4	0,4	0,4	1,6	1,7	1,6	1,6	1,6	1,6	1,1	1,1	1,0	1,0	1,0	1,0
VIII	0,5	0,5	0,5	0,5	0,6	0,6	1,4	1,4	1,4	1,4	1,2	1,3	0,4	0,4	0,4	0,4	0,4	0,4
IX	0,3	0,4	0,4	0,4	0,4	0,4	2,8	2,8	2,8	2,8	2,6	2,7	0,6	0,6	0,6	0,6	0,6	0,6
X	1,1	1,2	1,1	1,2	1,1	1,0	1,6	1,7	1,7	1,7	1,7	1,7	1,2	1,2	1,1	1,1	1,0	1,0
XI	0,2	0,2	0,2	0,2	0,2	0,2	2,4	2,4	2,4	2,4	2,3	2,3	0,6	0,6	0,6	0,6	0,5	0,5
XII	0,7	0,7	0,6	0,6	0,6	0,6	1,6	1,6	1,6	1,6	1,5	1,6	0,7	0,7	0,7	0,7	0,7	0,7
XIII	0,2	0,2	0,1	0,1	0,2	0,2	2,0	2,0	2,0	2,0	2,1	2,1	1,1	1,1	1,1	1,1	1,2	1,2
XIV	0,6	0,6	0,6	0,6	0,6	0,6	3,6	3,6	3,5	3,6	3,4	3,3	1,1	1,1	1,1	1,1	1,0	1,0
XV	0,9	0,9	0,9	0,9	0,8	0,9	1,3	1,3	1,3	1,3	1,3	1,4	1,0	1,0	1,0	1,0	0,9	0,9
XVI	1,1	1,2	1,1	1,1	1,0	1,0	1,3	1,3	1,3	1,3	1,3	1,3	1,0	1,0	1,0	1,0	0,9	0,9
XVII	1,7	1,7	1,7	1,7	1,8	1,9	1,3	1,3	1,3	1,3	1,1	1,2	0,7	0,7	0,7	0,7	0,7	0,7

Sec- tors	Katingan						East Kotawaringin						Lamandau					
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	1,4	1,3	1,3	1,3	1,3	1,3	1,1	1,1	1,1	1,0	1,0	1,0	1,4	1,5	1,4	1,4	1,4	1,4
II	0,6	0,6	0,5	0,4	0,3	0,3	0,3	0,3	0,4	0,4	0,6	0,5	0,9	0,9	1,0	1,0	1,0	1,0
III	0,9	0,9	0,9	1,0	1,0	1,0	1,5	1,5	1,5	1,5	1,5	1,5	0,9	0,9	0,9	0,9	0,9	0,9
IV	0,4	0,4	0,4	0,4	0,4	0,4	0,7	0,7	0,7	0,7	0,7	0,7	0,2	0,2	0,2	0,2	0,2	0,2
V	0,5	0,6	0,5	0,5	0,5	0,6	1,4	1,4	1,3	1,3	1,4	1,4	0,3	0,3	0,3	0,3	0,3	0,3
VI	1,3	1,3	1,4	1,4	1,4	1,5	1,1	1,1	1,1	1,0	0,8	0,8	1,4	1,4	1,4	1,4	1,3	1,3
VII	0,6	0,6	0,6	0,6	0,6	0,6	1,5	1,5	1,5	1,5	1,4	1,5	0,8	0,8	0,7	0,7	0,8	0,8
VIII	1,1	1,1	1,0	1,1	1,1	1,2	1,6	1,6	1,5	1,5	1,6	1,6	0,4	0,4	0,4	0,4	0,4	0,4
IX	1,1	1,2	1,2	1,2	1,3	1,3	0,7	0,7	0,7	0,6	0,7	0,7	0,4	0,4	0,4	0,4	0,4	0,4
X	0,8	0,8	0,8	0,8	0,9	0,9	0,7	0,7	0,6	0,6	0,6	0,6	1,1	1,1	1,1	1,1	1,0	1,0
XI	0,4	0,4	0,4	0,4	0,4	0,4	1,1	1,1	1,1	1,1	1,1	1,1	0,4	0,4	0,4	0,4	0,3	0,3
XII	1,3	1,4	1,3	1,4	1,4	1,2	0,7	0,7	0,7	0,7	0,7	0,7	0,6	0,6	0,6	0,6	0,6	0,6
XIII	0,4	0,4	0,4	0,4	0,4	0,4	0,9	0,9	0,9	0,8	0,7	0,7	1,4	1,4	1,4	1,4	1,5	1,5
XIV	1,1	1,1	1,1	1,1	1,0	1,1	0,3	0,3	0,3	0,3	0,3	0,3	0,9	0,9	0,9	0,9	0,9	0,8
XV	1,2	1,3	1,3	1,3	1,3	1,4	0,6	0,6	0,6	0,6	0,6	0,6	1,3	1,3	1,3	1,3	1,3	1,2
XVI	1,4	1,4	1,4	1,5	1,5	1,5	0,6	0,5	0,5	0,5	0,5	0,5	1,1	1,1	1,1	1,1	1,1	1,0
XVI																		
I	2,2	2,3	2,2	2,3	2,5	2,5	0,6	0,6	0,6	0,6	0,6	0,7	0,6	0,6	0,6	0,6	0,7	0,7

(continued)

**Table 5.** (continued)

Sec-tors	Pulang Pisau					Seruyan						
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021
I	1,7	1,8	1,7	1,7	1,7	1,7	1,8	1,8	1,8	1,8	1,7	1,7
II	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
III	0,5	0,5	0,6	0,6	0,6	0,6	2,0	2,0	2,1	2,1	2,0	2,0
IV	0,8	1,0	1,0	1,0	0,8	0,7	0,2	0,2	0,2	0,2	0,2	0,2
V	0,8	0,9	0,8	0,8	0,7	0,7	0,2	0,2	0,2	0,2	0,2	0,2
VI	1,9	1,8	1,9	1,8	1,8	1,7	1,1	1,0	1,0	1,0	1,0	1,0
VII	0,9	0,9	0,9	0,9	0,9	0,9	0,5	0,5	0,5	0,5	0,5	0,5
VIII	0,7	0,6	0,6	0,6	0,6	0,6	0,3	0,3	0,3	0,3	0,4	0,3
IX	1,8	1,9	1,9	2,0	1,9	1,9	0,7	0,7	0,7	0,6	0,7	0,7
X	1,4	1,4	1,4	1,4	1,3	1,2	0,7	0,7	0,6	0,6	0,6	0,6
XI	0,2	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3
XII	1,0	1,0	1,0	1,0	1,0	1,0	0,8	0,8	0,8	0,8	0,9	0,9
XIII	2,0	2,1	2,0	2,0	2,1	2,1	0,3	0,3	0,3	0,3	0,3	0,3
XIV	0,9	0,9	0,9	0,9	0,8	0,9	0,7	0,7	0,7	0,7	0,6	0,7
XV	1,6	1,7	1,6	1,7	1,6	1,5	0,7	0,7	0,7	0,7	0,7	0,7
XVI	1,7	1,7	1,7	1,7	1,6	1,5	0,7	0,8	0,7	0,7	0,7	0,7
XVII	0,9	0,9	0,9	0,9	0,9	0,9	0,8	0,8	0,8	0,8	0,8	0,8

Remarks  Value +  Value -

- I : Agriculture, Forestry and Fisheries
- II : Mining and excavation
- III : Processing industry
- IV : Electricity and Gas Supply
- V : Water Supply, Waste Management, Waste and Recycling
- VI : Construction
- VII : Wholesale and Retail Trade ; Car and Motorcycle Repair
- VIII : Transportation and Warehousing
- IX : Provision of Accommodation and Food and Drink
- X : Information and Communication
- XI : Financial Services and Insurance
- XII : Real Estate
- XIII : Corporate Services
- XIV : Government Administration, Defense and Mandatory Social Security
- XV : Education Services
- XVI : Health Services and Social Activities
- XVII : Other services



sector, and even then it experienced a decline in 2016, 2017, and 2021. The agricultural sector in Seruyan regency had always experienced a decrease in the 2016–2021 period. Apart from these two sectors, overall there is no sector that can be developed, because the results of the analysis show that the average value of growth and its contribution is negative.

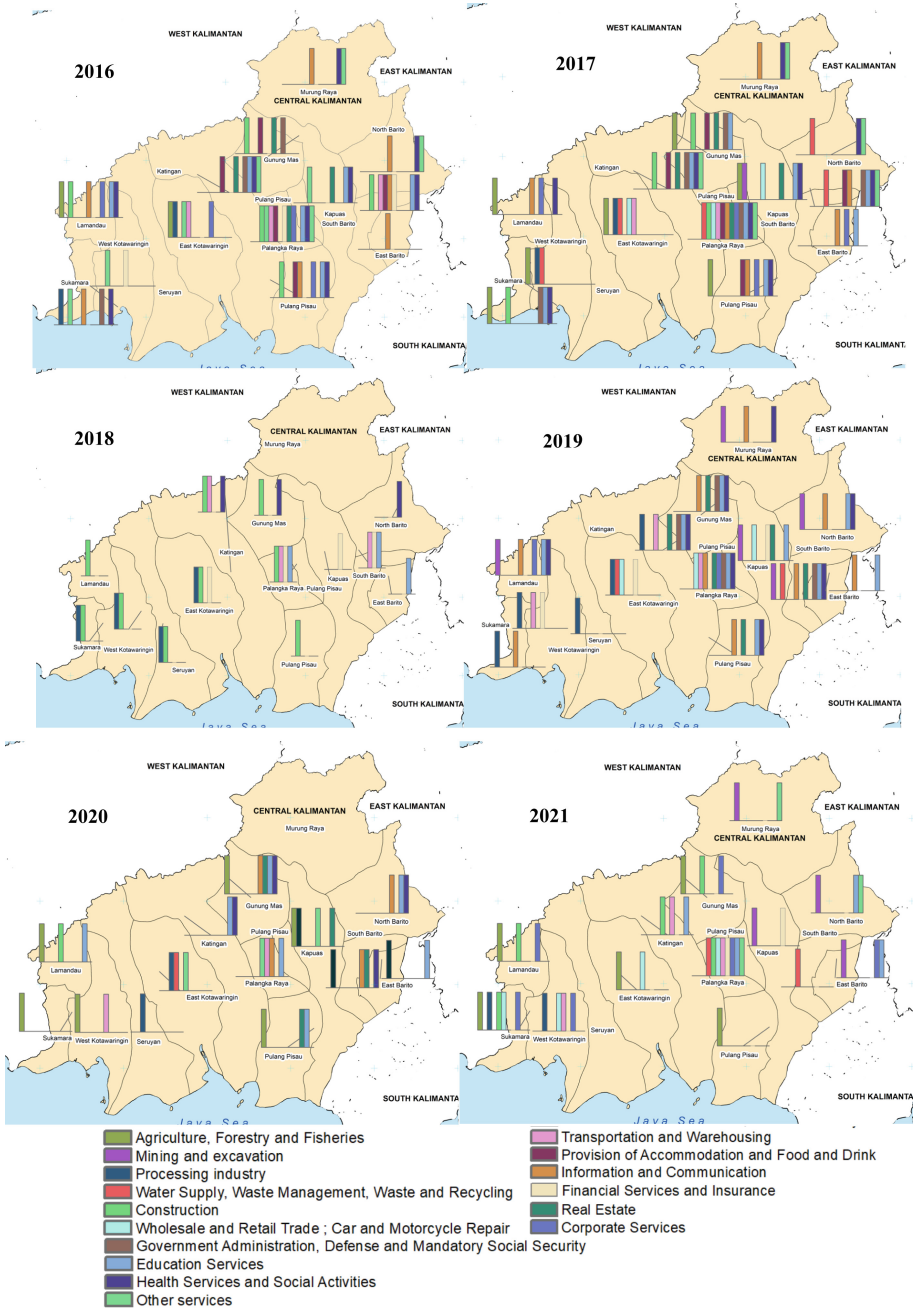
The Medium-Term Development Plan of Central Kalimantan Province in 2016–2021 states that agriculture, forestry and fishery sectors, manufacturing industry sector, and mining and excavation sector were the leading sectors in Central Kalimantan Province. This is in accordance with the results of the analysis that has been conducted. The results of the analysis show that the sector was classified as a leading sector in several regencies according to their respective potential sectors. Regencies with potential for agriculture, forestry and fisheries sectors were Lamandau, Sukamara, Pulang Pisau, East Kotawaringin, West Kotawaringin and Gunung Mas regencies. Regencies with potential for manufacturing industries were East Kotawaringin and West Kotawaringin. Meanwhile, regencies with potential for the mining and excavation sector were East Barito, South Barito, and Kapuas. However, these three sectors experienced a fall in 2016–2021. When the three are compared, the sector that experienced the greatest decline in growth rate was the mining sector. The mining sector is indeed a sector that relies on non-renewable natural resources and in the future will inevitably experience a decline, along with the depletion of natural resources. Meanwhile, the manufacturing sector is quite dependent on the plantation sub-sector, because the existing manufacturing industry sector is generally the palm oil processing industry. So if the agricultural sector experiences a decline, the manufacturing sector will experience the same thing.

Central Kalimantan province must have alternatives in developing its economy. The results of the analysis show that the construction sector and the wholesale and retail trade sector; car and motorcycle repair is a sector with great potential to be developed. This can be seen from the value of the growth rate which is more dominant than its contribution, which means that the sector can be encouraged to contribute and become a leading sector. Regencies with potential in the construction and wholesale and retail trade sectors; car and motorcycle repair are Kapuas Regency, East Kotawaringin, and Palangka Raya City.

### **3.3 The Relationship Between Leading Sectors and Regional Economic Development in Central Kalimantan Province**

The relationship between leading sectors and regional development was analyzed using the overlay of two map, there are the results of the Klassen Typology analysis with results of leading sector analysis. By linking these two things, it can be concluded how the influence between the two variables is, whether the leading sector is able to support economic development or vice versa.

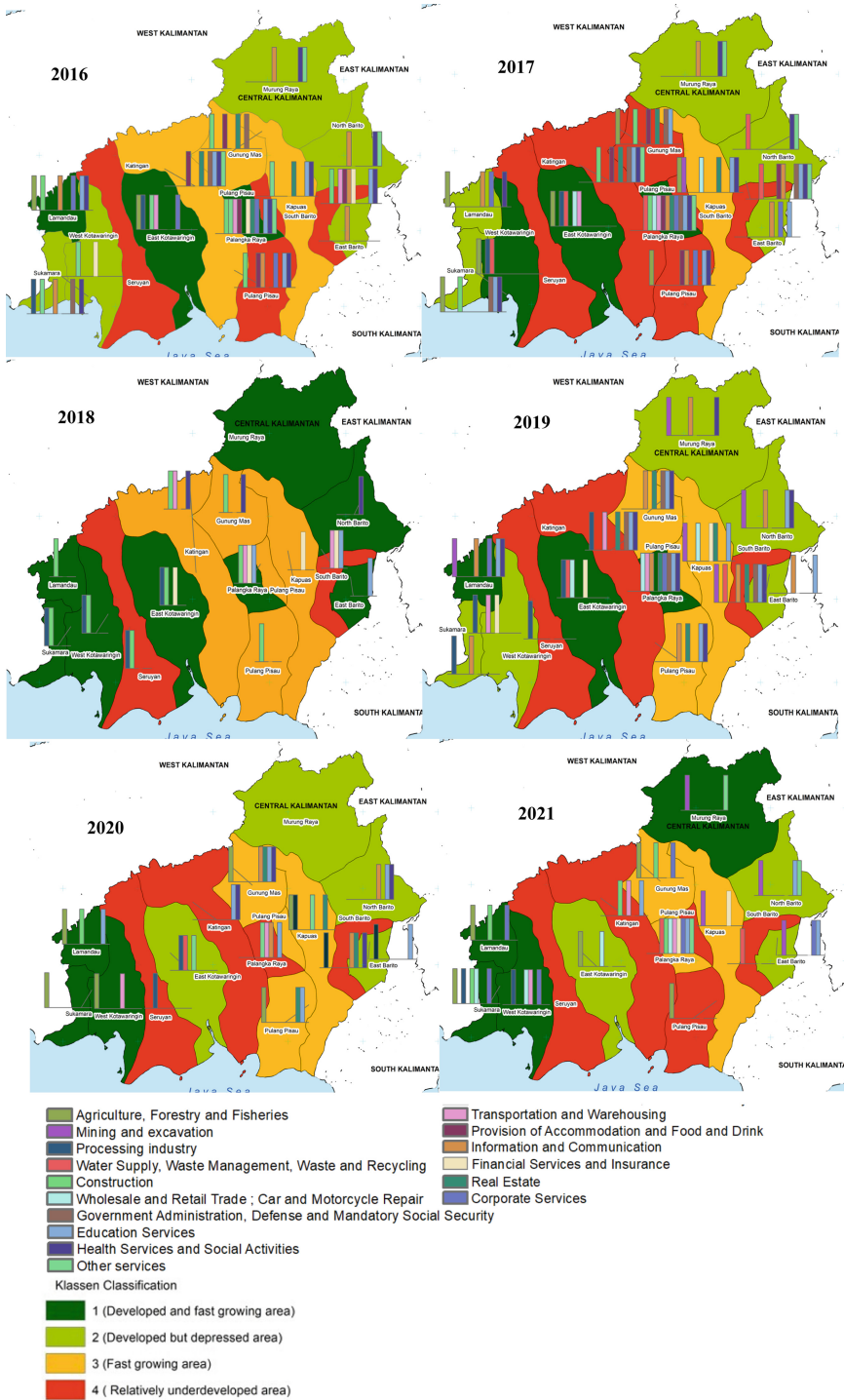
The results illustrate that the leading sectors and economic development did not show a harmonious relationship. For example, each year Katingan Regency had a large number of leading sectors, but its economic development class was often classified as an underdeveloped region. In 2016 and 2018 Katingan Regency was classified as a fast growing regional area, but when viewed from the number of leading sectors, the two years were very different. This situation did not only occur in Katingan Regency, but



**Fig. 4.** Spatio-Temporal Map of Leading Sector Development in Central Kalimantan Province 2016–2021

almost all regencies in Central Kalimantan Province except Palangka Raya City. The city of Palangka Raya had a fairly consistent development of the leading sectors, although in 2020 it experienced a slight decline. This condition was in line with the economic development, where in 2020 economic development also declined, including in underdeveloped regions. This happened because the leading sectors in Palangka Raya were most affected by the COVID-19 pandemic, such as trade, services and other sectors. In addition to the differences that occurred every year, there were also differences in conditions between regencies, for instance, the number of leading sectors differed from the development of the economy from one region to another. For example, the condition of Katingan Regency was very different from East Kotawaringin and West Kotawaringin. The two regencies had fewer leading sectors than Katingan Regency, however, the regencies were classified in the developed region and Katingan Regency was classified in the underdeveloped region. The following are the results of the visualization in the form of a map which can be seen in Fig. 5.

From the conditions mentioned above, it can be concluded that the leading sectors have an influence on the level of regional economic development. However, this is not influenced by the large number of existing leading sectors, but from the large contribution and consistency of these leading sectors. Overall, the leading sectors in Central Kalimantan Province have not been able to stimulate the regional economic development properly as there is still a lack of consistency and contribution from the existing leading sectors. For now, only Palangka Raya City is able to harmonize the leading sectors with its economic development. This is because the leading sectors in Palangka Raya City are suitable with the potential of the region. Palangka Raya City is the capital of Central Kalimantan Province which certainly has adequate facilities and infrastructure. Urban areas with economic, educational, and health centers have greater potential in trade and services. In the Medium-Term Development Plan of Central Kalimantan Province in 2016–2021, it is stated that in addition to the non-optimal utilization of regional potential, the causes of low regional economic capacity were the lack of investment and the lack of equitable distribution of human resources quality, and the unequal distribution of infrastructure development and accessibility.



**Fig. 5.** Spatio-Temporal Map of the Level of Regional Economic Development and Leading Sectors in Central Kalimantan Province

## 4 Conclusions

Regional economic development in each regency/city of Central Kalimantan Province from 2016 to 2021 was quite volatile with different patterns of change. Regional economic development in Central Kalimantan Province still had gaps or inequalities. Fluctuating changes also occurred in the development of leading sectors in each regency/city of Central Kalimantan Province. Regencies/cities in Central Kalimantan Province had not been consistent in developing existing leading sectors. Overall, only Palangka Raya City was quite stable in the development of its leading sector. The agricultural, manufacturing and mining sectors were the leading sectors, but in their development these sectors still experienced a decline. Alternative sectors that have the potential to be developed are the construction sector and wholesale and retail trade; car and motorcycle repair. Leading sectors have an influence on regional economic development. However, this is not seen from the large number of leading sectors that exist, but from the contribution and consistency of their development. In general, the leading sectors in Central Kalimantan Province have not been able to properly stimulate regional economic development, except Palangka Raya City.

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## References

- Adisasmita, R. (2011). *Pembiayaan Pembangunan Daerah*. Yogyakarta: Graha Ilmu.
- Adisasmita, R. (2013). *Teori-Teori Pembangunan Ekonomi, Pertumbuhan Ekonomi dan Pertumbuhan Wilayah*. Yogyakarta: Graha Ilmu.
- Amin, C. M., M. (2017). *Pengantar Perencanaan Wilayah: Perspektif Geografi*. Surakarta: Muhammadiyah University Press.
- Central Kalimantan Provincial Government. (2015). *Rencana Pembangunan Jangka Menengah Daerah (RPJMD) Tahun 2016–2021*. Palangka Raya: Central Kalimantan Provincial Government.
- Ciptawaty, U. (2019). Pola Pertumbuhan Ekonomi Daerah Otonomi Baru (DOB) berdasarkan Tipologi Klassen di Provinsi Lampung (Lampung Timur, Way Kanan dan Kota Metro). *Jurnal Ekonomi Pembangunan*, 8, 229-241.
- Dhartaredjasa, I. Analisis Citra Satelit Multitemporal untuk Kajian Perubahan Penggunaan Lahan di Kota Surabaya, Kabupaten Gresik dan Sidoarjo Tahun 1994–2012. *Jurnal Bumi Indonesia*, 2, 164–173.
- Erika, R. U., Sri. (2013). Analisis Sektor-Sektor Ekonomi Dalam Rangka Pengembangan Kebijakan Pembangunan Ekonomi Kota Kediri. *JESP*, 5, 65-78.
- Estrada, A. A. E. W., I Wayan. (2019). Pengaruh Laju Pertumbuhan Ekonomi, Indeks Pembangunan Manusia dan Tingkat Pengangguran Terhadap Tingkat Kemiskinan. *Jurnal Ekonomi Pembangunan Universitas Udayana*, 8, 1637–1665.
- Haryanto, S. A., Muhammad Nur; Djuraidah, Anik. (2019). Analysis of the Geographically and Temporally Weighted Regression (GTWR) of the GRDP the Construction Sector in Java Island. *Forum Geografi*, 33, 129-138.

- Imelia, E. (2006). *Modul Ekonomi Regional*. Jambi: Fakultas Ekonomi Universitas Jambi.
- Islami, M. I. R., Amran; Jaya, A. Kresna; Bakri, Bambang. (2021). Spatio-Temporal Model of Rainfall Data Using Kalman Filter and Expectation-Maximization Algorithm. *Jurnal Matematika, Statistik & Komputasi*, 17, 304–313. <https://doi.org/10.20956/jmsk.v17i2.11918>
- Jumadi, J., Fikriyah, V., Hadibasyir, H., Priyono, K., Musiyam, M., Mardiah, A., Rohman, A., Hasyim, H., Ibrahim, M. (2022). A Year of Spatio-Temporal Clusters of COVID-19 in Indonesia. *Quaestiones Geographicae*, 41, 139–151. <https://doi.org/10.2478/quageo-2022-0013>
- Jumiyanti, K. R. (2018). Analisis Location Quotient dalam Penentuan Sektor Basis dan Non Basis di Kabupaten Gorontalo. *Gorontalo Development Review*, 1, 2615-1375.
- Larasati, N. M. S., Sawitri; Sukmono, Abdi. (2017). Analisis Penggunaan dan Pemnfaatan Tanah (P2T) Menggunakan Sistem Informasi Geografis Kecamatan Manyumanik Tahun 2016. *Jurnal Geodesi Undip*, 6, 89-97.
- Lestari, S. R., Noorhadi. (2016). Desain Visualisasi Data Wilayah dalam Bentuk Peta Multiskala di Wilayah Kabupaten Magelang. *Jurnal Bumi Indonesia*, 5, 1–10.
- Ministry of National Development Planning (Producer). (2021). SIMREG (Sistem Informasi dan Manajemen Data Dasar Regional). Retrieved from <https://simreg.bappenas.go.id/home/pemantauan/lpe>
- Mulyadi, M. (2017). Penelitian Kuantitatif dan Kualitatif Serta Pemikiran Dasar Menggabungkannya. *Jurnal Studi Komunikasi dan Media*, 15, 127-138. <https://doi.org/10.17933/jskm.2011.150106>
- Muta'ali, L. (2015). *Teknik Analisis Regional untuk Perencanaan Wilayah, Tata Ruang dan Lingkungan*. Yogyakarta: Badan Penerbit Fakultas Geografi UGM.
- Ningsih, D. H. U. S., R; Sunardi. (2005). Pemanfaatan Analisis Spasial untuk Pengolahan Data Spasial Sistem Informasi Geografis. *Jurnal Teknologi Informasi DINAMIK*, 10, 108–116.
- Prasasti, D. (2006). Perkembangan Produk Domestik Regional Bruto Per Kapita 30 Provinsi di Indonesia Periode 1993-2003: Pendekatan Disparitas Regional dan Konvergensi. *Jurnal Ekonomi dan Bisnis Indonesia*, 21, 344–360.
- Radiarta, N. E. (2015). Analisis Spasial dan Temporal Kondisi Kualitas Perairan Melalui Pendekatan Statistik Multivariat di Teluk Gerupuk Provinsi Nusa Tenggara Barat. *Jurnal Riset Akuakultur*, 10, 435-447.
- Sanjaya, L. R. S., Endriatmo; Pravitasari, Andrea Emma. (2019). *Ketimpangan Pembangunan Wilayah di Provinsi Kalimantan Tengah (Kajian Pada Kabupaten Kotawaringin Timur dan Pemekarannya)*. Semarang: TATA LOKA.
- Statistics Indonesia of Central Kalimantan (Producer). (2022a). Berita Resmi Statistik. Retrieved from <https://kalteng.bps.go.id/pressrelease/2022a/02/07/1308/ekonomi-kalimantan-tengah-tahun-2021-tumbuh-3-40-persen.html>
- Statistics Indonesia of Central Kalimantan. (2022b). *Kalimantan Tengah Dalam Angka Tahun 2022b*. Palangka Raya: Statistics Indonesia of Central Kalimantan.
- Statistics Indonesia of East Kalimantan. (2022). *Kalimantan Timur Dalam Angka Tahun 2022*. Samarinda: Statistics Indonesia of East Kalimantan,.
- Statistics Indonesia of South Kalimantan. (2022). *Kalimantan Selatan Dalam Angka Tahun 2022*. Banjarmasin: Statistics Indonesia of South Kalimantan.
- Statistics Indonesia of West Kalimantan. (2022). *Kalimantan Barat Dalam Angka Tahun 2022*. Pontianak: Statistics Indonesia of West Kalimantan.
- Suryani, A. S. (2019). Analisis Location Quotient dan Shift Share Pascabencana Alam di Provinsi Jawa Tengah. *Jurnal Kajian*, 25, 55–72. <https://doi.org/10.22212/kajian.v24i1.1859>
- Sutanti and Oktariani, D. (2019). Analysis Of Leading Sectors In South Tangerang For Determining Regional Development Priorities. *Muhammadiyah Internasional Journal of Economic and Business*, 2, 44–58.

Yusuf, M. (1999). Model Rasio Pertumbuhan sebagai Salah Satu Analisis Alternatif dalam Perencanaan Wilayah dan Kota. *Ekonomi dan Keuangan Indonesia, XLVII*, 105–233.

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