

# Exploring the interaction between Kendari's economic growth and its hinterland



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## ABSTRACT

In order to attain high economic growth and equitable economic development, each region has to determine its regional economic growth centre. The existence of an economic growth center allows for the concentration of economic activity, which in turn has a ripple effect on the surrounding areas (Hinterland). This study was carried out to identify the primary centres of economic growth in Kendari and analyse their interactions and influence on the surrounding hinterland. This study employed both primary and secondary data, which were analysed using scalogram analysis, centrality index analysis, and gravity analysis. The findings indicate that among the eleven sub-districts in Kendari, three of them, namely Kadia, Kendari Barat, and Mandonga, serve as economic growth centres. Each economic growth centre is connected with a primary hinterland that exhibits the highest level of attraction or interaction value when compared to other districts. Among these centres, Kadia is the sub-district with the higher growth centre hierarchy and it has the highest interactions with Wua-wua. The interaction value between Kadia and Wua-wua is 139595130.7. Kendari Barat is the second growth centre in terms of its interactions with Mandonga, with an interaction value of 710383315.6. Mandonga is the third growth centre that has the highest level of interaction with Kendari Barat, with an interaction value of 710383315.6. The implication of the study is to formulate more targeted policies based on strong empirical evidence.

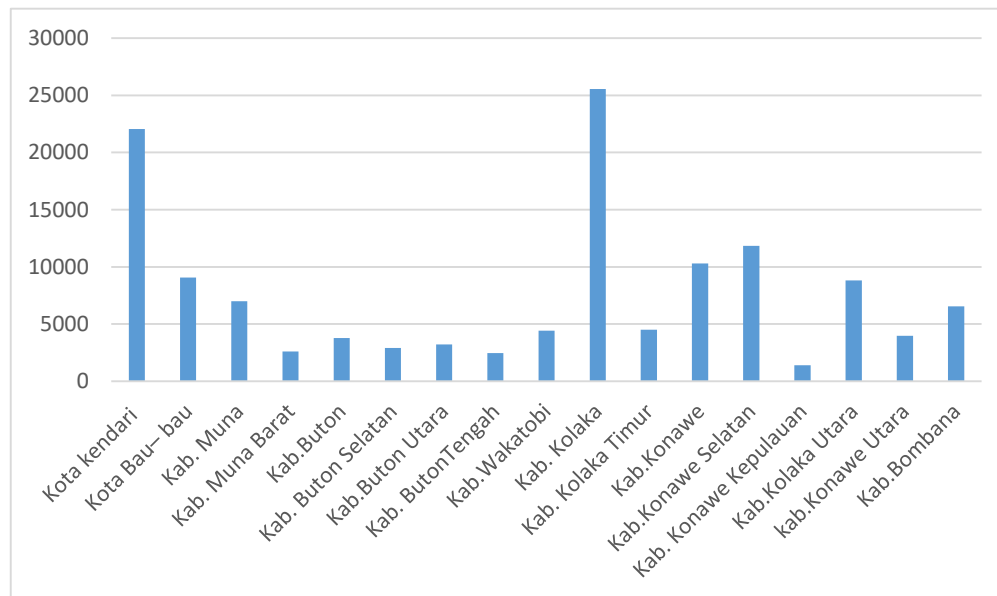
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## 1. Introduction

Economic growth serves as a key metric for evaluating a country's economic performance. Macroeconomics aims to achieve several goals, such as sustained economic growth, low unemployment rates, stable inflation, and monetary stability (Mankiw, 2010). Economic growth and development should be coordinated to ensure equal opportunity and an equitable distribution of development outcomes. To reach this goal, national development policies must align with the development trilogy's core approach of high economic growth, equitable development, and dynamic national stability. Shahzad & Yasmin (2016) states through quality of institution along with fiscal decentralization can promise to mitigate the negative consequences of fiscal decentralization for poverty and income inequality in Pakistan. While development strategies aimed at promoting economic growth may differ in focus, it is crucial to prioritize the spatial dimension (Adisasmita, 2014a). Sulawesi Tenggara is an Indonesian province that includes 17 regencies and cities. Kendari is the capital of Sulawesi Tenggara, comprising 11 sub-districts. Kendari, the capital of Sulawesi Tenggara, is ranked second in economic growth behind Kolaka, as shown in the Figure 1.

Kendari experienced substantial economic growth but did not achieve the top position compared to other districts in Sulawesi Tenggara (Figure 1). It highlights the question of why Kendari, with its status as a government and potential economic center, did not achieve the highest level of economic growth in the region. Kendari possesses specific advantages in resource availability, infrastructure, investment, and government support, leading to potentially greater economic growth compared to other regions. The statement aligns with the idea that the city's expansion and economic environment have been influenced by geographical factors and infrastructure (Nagy, 2023). Adisasmita (2014b) emphasized the importance of establishing one or more economic center in an area to serve as growth centers in order to attain high income levels.



**Figure 1.** Gross Regional Domestic Product by District in Sulawesi Tenggara in 2022

To attain high levels of income and equitable economic growth and development in Kendari, the government can build growth hubs and city service centers in various locations within the city. According to studies conducted by Tervo (2010) growth centers and the hinterlands in Finland are seeing simultaneous expansion. This implies that the establishment of new economic hubs may encourage development in surrounding areas. An economic growth center can serve as an alternative to stimulate economic activity and facilitate regional development, hence leading to a rise in regional income. According to Syahputra et al (2020) argued one way to speed up economic progress is to concentrate economic growth in areas with significant potential, particularly in terms of facilities and infrastructure, as this can have a positive impact on the surrounding region. Saeed et al (2022) argued good hinterland connection is considered an important factor in port competitiveness.

Given the previously described factors, conducting a comprehensive study or research on Kendari growth center and its relationship with the surrounding areas is necessary. According to Adisasmita (2014b) the growth center serves as the main driver for development and is commonly known as the major driving force for development. We can compare the prime mover to a train locomotive that pulls the carriages connected to its rear. Consistent with Hirschman's concept, it can exhibit a trickle-down effect, also known as a trickling-down effect. This concept is analogous to the Myrdal concept (Anggraini et al., 2021) as it has the potential to generate a ripple impact on the surrounding region. Put simply, focusing on regional development as the main driver of economic growth can have a wide-ranging effect on promoting economic growth in the surrounding vicinity.

## 2. Method

The study was carried out in Kendari, Sulawesi Tenggara, by evaluating all 11 sub-districts in Kendari. This research is designed as a quantitative descriptive study. The author examines the growth center of Kendari and its expansion into the hinterland. This study included both primary and secondary data sources. The primary data collected is used to determine the distribution of service centers by analyzing the quantity and variety of socio-economic facilities in each sub-district. Primary data collection involves measuring the distance between sub-districts to assess the area's accessibility

to other regions and to analyze the city center's interaction with surrounding areas. Researchers utilize secondary data obtained from BPS Kota Kendari, namely demographic data per sub-district.

According to Muta'ali (2015) scalogram analysis was used to examine the distribution of social and economic service facilities, as well as the hierarchy of development centers and infrastructure. Latifah (2018) stated that scalogram analysis is useful for determining the quantity and type of facilities present. The study aims to determine the function and capacity of cities in delivering services to the community. A city is classified as a growth center when it has superior facilities in comparison to the surrounding region. Apriana & Rudiarto (2020) argue that in scalogram calculations, the assumption involves designating a region as a service center based on having the most complete facilities compared to other locations or holding the top position in the growth hierarchy. To identify service facilities, assign the number 1 for availability and 0 for unavailability in the area. Following identification, the next step entails summing all the numbers vertically and horizontally. According to Yahya et al (2021) the order or hierarchy in the growth hierarchy can be determined using the Struges approach, as follows:

$$k = 1 + 3.3 \log n \quad (1)$$

Where  $k$  is the number of hierarchy and  $n$  is the number of sub-districts. Following scalogram analysis, centrality index analysis is an additional method used to determine the hierarchy of regions and city service centers. This analysis is an additional examination of the scalogram results. The study entails assessing the service facilities by assigning them weights. This is commonly known as a weighted vitality index analysis. This study is commonly known as the Marshal Centrality Index analysis, named after its original developer, Marshal. According to Muta'ali (2015) this method is carried out with two weights, including a). Weighting of facility types as a combined centrality value. This is done with the assumption that the combined centrality value of all service facilities is considered the same, so that the value can be altered based on the largest number of facilities. In general, the combined centrality value uses the numbers 100 or 1000, and b). Weighting of the number of facility units (C) as the value of facility centrality using the following formula:

$$C = (x/X) \quad (2)$$

Where  $C$  is attribute weight of function  $x$ ,  $x$  is the joint centrality value = 100 (for example) and  $X$  is the total number of attributes in the system. The gravity model is a method used for analyzing spatial interaction patterns (Hao et al., 2024). This method used to assess the potential appeal of a specific site. Muta'ali (2015) suggests that the gravity model can evaluate the level of attraction between growth centers and the hinterland, as well as the strength of economic activity in one area towards others. This approach utilizes the variables of population size and distance between regions to examine relationships between growth hubs and hinterland regions. Below is the formula utilized in the gravity analysis conducted by Priyadi & Atmadji (2017) as follows:

$$T_{ij} = k \frac{P_i P_j}{d_{ij}^c} \quad (3)$$

Where  $T_{ij}$  is the interactions/number of trips from region  $i$  to region  $j$ ,  $k$  is the Constant number that can be determined as the average population trip,  $P_i$  is the Population of region  $i$ ,  $P_j$  is the Population of region  $j$ ,  $d_{ij}$  is the distance between  $i$  and  $j$  and  $c$  is the distance exponent.

### 3. Results and Discussion

Kendari is the capital of Sulawesi Tenggara, which has an area of 271.76 km. Kendari is the capital of Southeast Sulawesi Province, which has an area of 271.76 km. Kendari consists of 11 sub-districts, including Kadia, Mandonga, Kendari Barat, Poasia, Kambu, Wua-wua, Baruga, Puuwatu, Kendari, Abeli, and Nambo. Each sub-district in Kendari has a very diverse area. According to data released by BPS Kendari in 2018, the sub-district with the largest area was Baruga, with an area of 49.41 km<sup>2</sup>, or approximately 18.18 percent of the total area of Kendari. Meanwhile, Kadia is the sub-district that has the smallest area compared to the other 11 sub-districts, with an area of 6.48 km<sup>2</sup>, or around 2.38 percent of the total area of Kendari. The population of Kendari is 350.267 people, based on data released by BPS Kendari in 2021. From 2020 to 2021, Kendari's population growth rate will be 2

percent. In 2021, Kendari's population density will be 1.289 people per km<sup>2</sup>. The following is a table of Kendari's demographic conditions in 2021:

**Table 1.** Descriptive Statistics

District	Number of Population (Person)	Population Growth Rate (%)	Percentage of Population (%)	Population Density (per km <sup>2</sup> )
Mandongga	37.582	1.31	10.73	1.729
Baruga	34.241	3.84	9.78	693
Puuwatu	40.853	2.86	11.66	939
Kadia	36.956	1.25	10.55	5.703
Wua-wua	33.996	2.19	9.71	3.151
Poasia	41.769	3.66	11.92	973
Abeli	17.353	1.31	4.95	1.248
Kambu	24.898	0.95	7.11	1.127
Nambo	11.275	1.28	3.22	445
Kendari	28.814	1.11	8.23	1.990
Kendari Barat	42.530	0.94	12.14	2.014
Total	350.267	2.00	100.00	1.289

Source: BPS Kota Kendari

Table 1 shows that the sub-district with the largest population in Kendari is Poasia, with a population of 41.769 people, or 11.92 percent of the total population of Kendari. The population density is 973 people per km<sup>2</sup>. In 2021, Poasia's population growth rate will be 3.66 percent. Meanwhile, the district with the smallest population is Nambo, with a population of 11.275 people, or around 3.22 percent of Kendari's total population. The population density of Nambo is 445 people per km<sup>2</sup>, and the population growth rate is 1.28 percent. The population growth in Poasia is the most significant among other regions, likely due to the presence of excellent services and facilities that promote population growth in the area (Lin et al., 2024).

Jakimowicz & Rzekowski (2021) conducted a study to identify the actual economic growth centers and growth routes. In this study, growth centers were determined using scalogram analysis, as opposed to cluster analysis used in previous studies. Scalogram analysis is used to determine the center of economic growth in Kendari by identifying the service facilities that exist in each sub-district, including social, economic, and even political or government facilities. The types of facilities identified are grouped into 10 types, namely: (a) health; (b) worship; (c) education; (d) transportation; (e) trade; (f) banks and financial institutions; (g) services; (h) security; (i) tourism; and (i) sports. The total service facilities identified based on 10 facility groups amount to 90 service facilities. The following are the details of the service facilities identified in this research:

- a. Hospitals, integrated service posts (posyandu), health centers, maternity clinics, pharmacies, and health laboratories are all examples of health.
- b. Worship includes mosques, churches, temples, and monasteries.
- c. Education includes baby care/day care, kindergarten/PAUD, elementary school, junior high school, senior high school, vocational school, university, high school, training centre, Islamic boarding school, and course institutes.
- d. Transportation includes minibuses, taxis, motorbike taxis, ports, airports, and terminals.
- e. Trade includes traditional markets, modern markets, super markets, mini markets, malls, restaurants, large-scale building materials shops, car dealers, motorcycle dealers, electronics shops, gas stations, coffee shops, elite housing, and stationery shops.
- f. Banks and financial institutions include banks, insurance, pawnshops, financing, social security administrators for health, employee social security systems, and cooperatives.
- g. Services include a multi-purpose building, beauty salon, car rental, tailor, photo studio, notary-PPAT, public appraisal service office (KJPP), lawyer's office, tax office, developer,

legal aid agency (LBH), vehicle repair shop, star hotel, catering, wedding organizer, electronic service, delivery service, decoration service, and a place for reflection.

- h. The police station and military district are two examples of security.
- i. Recreation includes libraries, green open spaces, swimming pools, nature tourism, religious tourism, monuments and playgrounds, karaoke places, and wifi areas.
- j. Sports include a football field, futsal court, badminton court, volleyball court, and basketball court.

**Table 2.** Range and Hierarchy of Regional Growth Centers in Kendari

Range	Hierarchy	Information
57-68	Hierarchy / Orde I	Main Regional Growth Center (Primary)
45-56	Hierarchy / Orde II	Second Regional Growth Center (Secondary)
33-44	Hierarchy / Orde III	Supporting Region
20-32	Hierarchy / Orde IV	Supporting Region

Source: data processed

After determining the types of service facilities used in this research, the next stage is to carry out a scalogram analysis by identifying the distribution of service facilities in each sub-district. Next, provide a hierarchical ranking based on the type and number of service facilities from the highest to the lowest. The city orde/hierarchy is determined based on the struges method. The results obtained were that the number of orde/hierarchy used in this research was 4 city orde with a range of 12 as in [Table 2](#).

**Table 3.** Result of The Hierarchy of Kendari Economic Growth Center Based Scalogram Analysis

Ranking	Sub-district	Number of Population	Number of Facilities	Orde/Hierarchy
1	Kadia	37.582	68	I
2	Kendari Barat	40.853	65	I
3	Mandongga	34.241	64	I
4	Poasia	36.956	59	I
5	Kambu	33.996	58	I
6	Wua-wua	41.769	55	II
7	Baruga	17.353	52	II
8	Puuwatu	24.898	52	II
9	Kendari	11.275	40	III
10	Abeli	28.814	35	III
11	Nambo	42.530	20	IV

Source: data processed

[Table 3](#) shows the hierarchy of Kendari growth centres is divided into four orde or classes based on the results of the calculations using the formula previously explained. Orde I consists of 5 sub-districts, including Kadia, Kendari Barat, Mandonga, Poasia, and Kambu. Meanwhile, Orde II consists of 3 sub-districts, including Wua-Wua, Baruga, and Puuwatu. Orde III consists of two sub-districts, including Kendari and Abeli. Then the last orde IV consists of one sub-district, namely Nambo. By identifying the centre of economic growth, it is expected that concentrating economic activity in this area will stimulate GDP growth, hence influencing the surrounding region ([Li et al., 2019](#)). Nambo district has the highest population, consisting of 42.530 people. Contrary to popular belief, the sub-district that holds the highest position in the growth centre hierarchy is not Nambo but rather Kadia. This is due to Kadia having the greatest number of service facilities, with a total of 68 available. Additionally, Kadia has a population of 37.582. This suggests that population growth should be directly correlated with the presence and adequacy of service facilities in the region. However, this was not found in the current study.

According to [Saradhi \(2024\)](#) government policies are essential for fostering economic growth, and one such policy involves ensuring the availability of high-quality infrastructure and amenities in urban areas to attract both local and international investors. This aligns with the research conducted by [Anggraini & Syahrir \(2024\)](#) which argues that infrastructure plays a crucial role in stimulating the

economic development of a region. Sustainable economic growth is the other goal, in addition to promoting the region's development. According to [Vladyka et al \(2023\)](#) a region must take into consideration five key components to achieve its objectives, namely the economic, geographical, social, digital, and environmental aspects. Centrality index analysis is a method that builds upon scalogram analysis to determine the hierarchical structure of service centres, also known as growth centres, within a certain region. Once the distribution of service facilities in each sub-district has been determined, the next step is to assign weights to the kind of facility and the number of facility units. In this study, the facility types are assigned a weight of 100.

**Table 4.** Result of The Hierarchy of Kendari Economic Growth Centers Based on Centrality Index Analysis

Ranking	Sub-district	Number of Population	Weighted Centrality Index	Orde/Hierarchy
1	Kadia	37.582	1217.7	I
2	Kendari Barat	40.853	1195.6	I
3	Mandongga	34.241	1054.6	I
4	Wua-wua	41.769	930.2	II
5	Kambu	33.996	853.8	II
6	Poasia	36.956	805.5	II
7	Puuwatu	24.898	706.8	II
8	Baruga	17.353	671.9	III
9	Kendari	11.275	474.2	III
10	Abeli	28.814	407	IV
11	Nambo	42.530	182.7	IV

Source: data processed

However, the results of the scalogram analysis show some differences between Table 3 and 4. In the centrality index analysis ([Table 4](#)), orde I only consists of 3 sub-districts, including Kadia, Kendari Barat, and Mandonga. Meanwhile, Orde II consists of 4 sub-districts, including Wua-wua, Kambu, Poasia, and Puuwatu. Orde III consists of two sub-districts, including Baruga and Kendari. Then the last orde IV consists of two sub-districts, including Abeli and Nambo. In this analysis, the sub-district with the highest weighted centrality index is Kadia, consistent with the results of the previous scalogram analysis. However, the difference resulting from centrality index analysis and scalogram analysis is in the number of sub-districts in each city orde. A growth center in a city is expected to serve as an engine for the economic development of an area. Several studies have examined the growth centre of a city and identified urbanisation as the main driver for the city's economic growth. However, [Shaban et al \(2022\)](#) analyze the correlation between urbanisation and economic growth in India suggests that the urban centres in India lack an important driver for driving economic development.

After conducting scalogram analysis and centrality index analysis, it was determined that three sub-districts, namely Kadia, Kendari Barat, and Mandonga, were classified as orde I growth centres in Kendari. Next, we will examine the interaction between the growth centre of Kendari and its hinterland using gravity analysis. [Rivera-Gonzalez et al \(2023\)](#) employed this approach in their study to determine the centre of the economy and estimate the average distance of product delivery at various locations along the supply chain. The gravity analysis in this study is conducted by quantifying the distance between two regions, taking into account the population of each location. According to [Yusliana & Devi \(2020\)](#) state that a higher gravity value indicates a stronger interaction between two places, whereas a lower gravity value suggests a weaker interaction. [Table 6](#) shows each growth centre is associated with a primary hinterland area that exhibits the highest level of attraction or engagement compared to other sub-districts. Kadia is the top-ranked city service centre in the hierarchy of growth centres, with the highest interaction value of 139595130.7 with Wua-wua. Kendari Barat is the second growth centre with the highest interaction value of 710383315.6 with Mandonga. Additionally, Mandonga, the third growth centre, has the highest interaction value of 710383315.6 with Kendari Barat. Nambo has the lowest level of engagement with the three growth centres. The interaction value between Kadia and Nambo is 1568289.7, between Kendari Barat and Nambo is 2926792.9, and between Mandonga and Nambo District is 1810145.9.

**Table 5.** The Distance from the Center of Economic Growth in Kendari to Its Back Area (Hinterland)

Sub-district	Number of Population	Distance Between Districts (km)		
		Kadia	Kendari Barat	Mandongga
Mandongga	37582	4	1.5	0
Baruga	34241	5.9	10.6	10.2
Puuwatu	40853	6.9	7.7	6.2
Kadia	36956	0	5.9	4
Wua-wua	33996	3	7.5	6.1
Poasia	41769	4.3	6.9	6.5
Abeli	17353	10.1	7.6	9.3
Kambu	24898	4.7	8.4	8
Nambo	11275	16.3	12.8	15.3
Kendari	28814	12.8	8.1	9.7
Kendari Barat	42530	5.9	0	1.5

Source: data processed

Although the distance is not the only indicator (Table 5) of potential interaction between regions, but interactions between one region and another (Table 6) are greatly influenced by the distance between these regions. According to Rivera-Gonzalez et al (2023) proximate areas are more likely to engage with one another compared to distant areas. Kadia has high interaction with Wua-wua because the distance between the two areas is only around 3 kilometers. Kendari Barat has high interaction with Mandongga and vice versa because the distance between the two areas is around 1.5 km. Meanwhile, Nambo which is the district with the lowest interaction value, because Nambo has the furthest distance around >12 km from the growth center. It can be concluded that if the distance between the growth center and the hinterland is closer, then the interaction value will be higher. This shows if the distance between two locations is closer, the more people interest to travel to another location, but conversely, if the distance between two locations is greater, the less people interest to travel to another location. According to Henry et al (1997) hinterland regions near the economic core receive more benefits than those located further away.

**Table 6.** The Interaction Values of Kendari Economic Growth Center with Its Back Area (Hinterland)

Sub-district	Number of Population	The Interaction Values of Economic Growth Center		
		Kadia	Kendari Barat	Mandongga
Mandongga	37582	86805024.5	710383315.6	0
Baruga	34241	36351921.7	12960748.8	12368754.9
Puuwatu	40853	31711057.9	29304740.9	39941140.6
Kadia	36956	0	45151929.9	86805024.5
Wua-wua	33996	139595130.7	25703997.9	34335868.6
Poasia	41769	83483783.9	37312236.3	37154143.4
Abeli	17353	6286613.7	12777408.1	7540298.8
Kambu	24898	41653711.5	15007255.4	14620572.4
Nambo	11275	1568289.7	2926792.9	1810145.9
Kendari	28814	6499329.7	18677936.6	11509063.1
Kendari Barat	42530	45151929.9	0	710383315.6

Source: data processed

Cao et al (2022) has already examined similar topics with an agglomeration model in Tiongkok. Urban agglomeration development has attracted significant support from the Tiongkok government as a new approach to regional development. Within Tiongkok's national development pattern, the urban

agglomeration has emerged as the most dynamic growth centre. This analysis is supported by a research completed by Zhang & Liu (2022) on urban agglomerations in China.

#### 4. Conclusion

Identifying the centre of economic growth within a region is crucial for encouraging its economic development. After doing scalogram analysis and centrality index analysis, it can be concluded that there are three sub-districts, namely Kadia, Kendari Barat, and Mandonga, that serve as the economic growth centres in Kendari. This conclusion is based on the examination of 11 sub-districts in Kendari. Each growth centre is associated with a primary hinterland area that exhibits the greatest level of attraction or engagement as compared to other sub-districts. The relationship between the centre of economic development in Kendari and its surrounding rural areas can be described as follows: Kadia holds the top position in the hierarchy of city service centres, known as a growth centre, due to its highest level of engagement with Wua-wua, with an interaction value of 139595130.7. Kendari Barat, the second growth centre, exhibits the most significant level of interaction with Mandonga, with an interaction value of 710383315.6. Additionally, Mandonga, the third growth centre, exhibits the highest level of interaction with Kendari Barat, with an interaction value of 710383315.6. This research is expected to provide contributions both theoretically and practically. Theoretically, this research can enrich the literature on the concept of the interaction between economic growth centres and their hinterlands. Practically, the results of this study can serve as a reference and recommendation for policymakers to formulate more targeted policies based on strong empirical evidence.

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