



Analyzing the development of service centers in pematang siantar city region

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Abstract

This study aims to analyze the determination of the development of service centers in the City of Pematang Siantar, compare the suitability of the spatial structure between the regional spatial planning with the results of the analysis and analyze the influence of the development of service centers on the regional development of the City of Pematang Siantar. The research method used is a quantitative descriptive method with the technique of Schalogram Analysis, Marshall Centrality Index, Spatial Analysis, Gravity Interaction and Structural Equation Model Partial Least Square (SEMPLS) method. The results of the study concluded that the Siantar Barat District with order I was designated as a City Service Center where the strongest regional interaction occurred with the Siantar Sitalasari District. The spatial structure stipulated in the 2012-2032 Regional Spatial Plan for the City of Pematang Siantar is no longer in accordance with current conditions and the development of service centers has a positive effect on Regional Development of the city of Pematang Siantar.

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Introduction

Regional development is one of the efforts in development to achieve the welfare of society by effectively, optimally, and sustainably utilizing various natural resources, human resources, institutional resources, technological resources, and physical infrastructure. The goal is to promote balanced regional growth and reduce disparities between regions (Adisasmita, 2008) ^[1], which is a universal phenomenon (Ernan Rustiadi et al., 2009) ^[3]. According to Sjafrizal (2012), economic inequality in regions is also caused by the concentration of activities in certain areas.

Service centers, also known as central places according to Christaller (1933), are cities that provide goods and services to the surrounding communities, forming a hierarchical structure based on distance and population thresholds. This hierarchy of services results in a city (with the highest service hierarchy) naturally having significant attractiveness and influence on smaller areas, as it has the ability to attract potential and resources from other areas and cities below it. Thus, service centers are agglomerations of various activities, facilities, and infrastructure that support regional growth and development.

Based on the data obtained from the Data Central Statistics/Badan Pusat Statistik (BPS) of Pematangsiantar City, the growth rate of Gross Regional Domestic Product (GRDP) in Pematangsiantar City from 2016 to 2019 experienced low growth, ranging from 4.4% to 4.8% annually. Since 2016, the city's economic growth has consistently been lower than the GRDP growth of North Sumatra Province, which ranges from 5.1% to 5.8% annually. The structure of the GRDP shows no significant changes in the contribution of each sector, with the majority still relying on Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles, followed by Manufacturing and Construction. In 2016, the largest contribution came from Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (24.40%), followed by Manufacturing (22.05%), and Construction (10.41%). With the increasing population residing in Pematangsiantar City, there is a need for improved facilities in the area as a driving factor for service provision and economic activities. Each residential area in Pematangsiantar City has different facilities in each

sub-district. The objectives of this research are (1) to analyze the determination of service center development in Pematangsiantar City, (2) to compare the Regional Spatial Plan (RTRW) with the results of the schalogram analysis of service centers in Pematangsiantar City, and (3) to analyze the impact of service center development on the overall development of Pematangsiantar City.

Literature

Johnston, as cited in Ernan Rustiadi (2009) ^[3], views regions as a technical term for spatial classification and recommends two types of regions: Formal Regions, which are places with similar characteristics, and Functional or Nodal Regions, which emphasize the interconnectedness between components or locations. Meanwhile, Murty, as cited in Ernan Rustiadi (2009) ^[3], defines a region as a geographic area, a territorial unit that can be a country, state, province, district (regency/city), or rural area with a unified geographic unit where its parts have functional interrelationships (Saefulhakim, 2002) ^[4].

In the process of regional development, it gives rise to growth centers (Francois Perroux, 1949), which refer to the concentration of industrial activities in specific areas that can stimulate national economic growth. This concept further develops into the notion of growth poles or "pole de croissance" in French. According to Perroux, as cited in Adisasmita (2005:31), based on the spatial development facts, growth does not occur randomly or simultaneously. It happens at certain points or development poles with varying intensities, spreading through diverse channels throughout the entire economy. This growth can be understood in two ways: functionally and geographically. Functionally, growth centers are locations of concentrated business or industrial clusters that, due to their dynamic relationships, can stimulate economic activities both internally and externally (spread effect). Geographically, growth centers are places with abundant facilities and conveniences that become attractive poles of attraction, causing various businesses to locate there, and people to enjoy the available facilities in the city, even if there may not be direct interactions among these businesses (Tarigan, 2004:162).

Service centers are the focal points of growth that occur in specific places due to the driving force of development. This force stimulates the growth and development of other activities. These activities tend to cluster and form a unity that eventually becomes a center of services. Therefore, service centers are aggregations of various activities and infrastructures that support the growth and development of a region (Pane, 2013). Service centers are useful places where residents engage in activities to obtain goods and services to meet their needs. The required service facilities are concentrated in these locations (Parera, 2004 as cited in Muliana, 2018) ^[18], and the development of each type of service center depends heavily on the population served and served by the center (Koestoer, 1995 as cited in Muliana, 2018) ^[18].

Teuku (2006) in his thesis "Determining the Government and Service Centers in East Aceh Regency Based on Regional Development" concluded that there is a relationship between the development of service centers and regional development in East Aceh Regency. Furthermore, Purhatmanto (2007) ^[17]

in his thesis titled "Direction of Service Centers as an Effort to Control Spatial Utilization in Waleri City Ring Road" concluded that the direction of service centers as an effort to control spatial utilization in Waleri City's Ring Road is placed in Tratemulyo and Pucuksari villages, based on the suitability of the land for cultivation areas and the suitability of the land in those villages for development as residential areas, restaurants, and warehousing areas, with an available land area of 135.00 hectares. Additionally, Erwin Harahap (2009) ^[15] in his thesis titled "Perbaungan Sub-District as a Growth Center in Serdang Bedagai Regency" concluded that Perbaungan Sub-District in Serdang Bedagai Regency experiences annual growth, and the provision of infrastructure in Perbaungan Sub-District needs to be continuously improved, including educational and healthcare facilities, until 2014.

Yarman Gulo (2015) ^[19] in his research titled "Identification of Growth Centers and Supporting Regions in the Development of Nias Regency" concluded that the main growth center in Nias Regency is Gido Sub-District, the second growth center is Idanogawo Sub-District, and the third growth center is Botomuzoi Sub-District. Similarly, Puji Haryati (2016) ^[16] in her research titled "Hierarchy of Service Centers in West Ungaran and East Ungaran Sub-Districts, Semarang Regency" concluded that in West Ungaran and East Ungaran Sub-Districts, Bandarjo Village is designated as the service center for residents' activities.

Research Method

The research was conducted in Pematang Siantar City, located between 2°53'20" - 3°01'00" North Latitude and 99°01'00" - 99°06'35" East Longitude, with a total area of 79.971 km². The city consists of 8 districts and 53 sub-districts, and it shares administrative boundaries with Simalungun Regency. The population or total number of units or individuals to be selected as samples is 60.

The data used in the research consist of primary data obtained from interviews, observations, and documentation. Secondary data were obtained from relevant institutions to complement the information obtained from the primary data. The analysis used in processing the data includes interaction analysis or gravity analysis. Skalogram analysis and Centrality Index are used to determine economic growth centers based on the availability of public facilities and to determine the hierarchy of regions. ArcGIS analysis is used to create a growth center map in Pematang Siantar City by combining spatial data used in the previous analysis. Structural Equation Modeling (SEM) analysis is used to test the hypothesis regarding the relationship between the development of service centers and the development of Pematang Siantar City. Hypothesis testing is done using the Partial Least Squares (PLS) approach, which is a component-based structural equation modeling (SEM) model.

Result and Discussion

The analysis results indicate that Siantar Timur District and Siantar Barat District have the potential to serve as urban service centers due to their more comprehensive range of facilities compared to other districts. By employing skalogram analysis, the hierarchy of districts can be determined based on the completeness of their facilities.

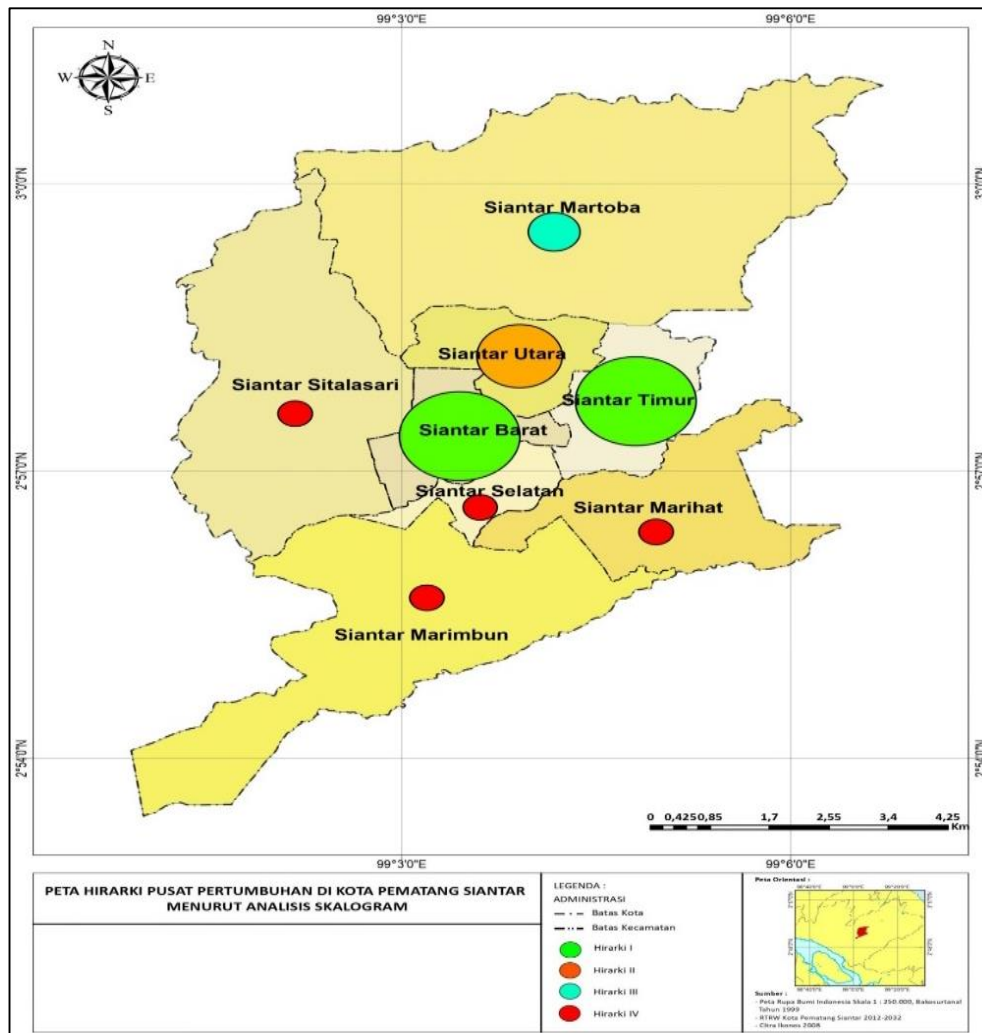


Fig 1

Based on the existing conditions, there are 27 types of facilities in the Pematang Siantar City area that have been selected, such as educational and healthcare facilities. The district with the highest number of facility units is Siantar Barat District with a total of 1,579 units, followed by Siantar Utara District with a total of 857 units. On the other hand, the district with the lowest number of facility units is Siantar Marimbun District, which only has 364 units.

The analysis results of the Marshall Centrality Index depict Siantar Barat District as a potential service center due to its highest number of facilities among other districts, amounting to 1,579 units. The fact that Siantar Barat District has a more comprehensive range of facilities compared to other districts indicates its better ability to provide services to the community, which in turn can support regional activities. In other words, Siantar Barat District has the potential to become a growth center in Pematang Siantar City.

The development of service centers in Pematang Siantar City will stimulate economic growth, which will also be followed by the surrounding districts. Growth centers can cause a spread effect, where the activities and development from the growth center district spread to the surrounding districts. Consequently, the surrounding districts can also grow and develop. This aligns with the findings of Zovani Rimalemna (2021) in their research, which concludes that the development of Kabanjahe District as a growth center in Karo Regency has a positive influence on the surrounding districts,

reducing the gap between districts in Karo Regency.

On the other hand, Siantar Barat District remains in the first rank because it has a higher frequency of facilities compared to Siantar Timur District. However, this indicates that other districts have the potential to reach a higher rank through modifying the availability and increasing the number of trading, educational, religious, and healthcare facilities.

The analysis of interaction or gravity in this research is used to assess the strength of the relationship between two districts. The interrelationship between regions can be identified as economic interactions between growth centers and their surrounding hinterlands. In this case, the interaction value reflects the closeness of the relationship between the growth center and the surrounding area. Stronger interactions indicate closer relationships. These interactions can be manifested in the movement of goods and population between the districts, both in terms of economic and social services.

The strongest inter-district interaction occurs between Siantar Barat District and Siantar Sitalasari District, indicating a close relationship. This is influenced by the relatively short distance between the two districts, approximately 2.3 km, and their population ranges from 34,323 to 37,896 individuals. On the other hand, Siantar Marimbun District has the smallest interaction strength, 42.37, due to factors such as a small population and a greater distance of 4.3 km, resulting in a weaker interaction between the district centers.

These analysis results also illustrate that Siantar Sitalasari District has the potential to develop further. The number and completeness of facilities in an area serve as indicators of its development. Therefore, in future planning, Siantar Sitalasari District can undergo modifications and improvements by adding more facilities and providing the necessary facilities to elevate its rank and become a primary service center (Order I).

The government of Pematang Siantar City can shift the direction of development towards Siantar Sitalasari District to build facilities that are currently lacking, such as public and private banks, hospitals, post offices, and places of worship. The development of these facilities will increase the number of facility types in Siantar Sitalasari District to match Siantar Barat District (which has 24 types of facilities). The government can increase the number of trading facilities by, for example, constructing a new market or trading area in Siantar Sitalasari District to create potential and attraction.

The improvement of service facilities will accompany the interactions towards Siantar Sitalasari District. As the completeness or the higher value of centrality index of the facilities increases, the district will have a greater function compared to other areas and become more attractive for the people from other districts to engage in activities or relocate there.

These findings align with the discussion by Ibrahim Husni (2018) titled "The Role of Service Centers in Ternate City

towards the Hinterland Areas," which concluded that the development of service centers in Ternate City not only affects the movement system within Ternate City itself but also influences the movement from its hinterland areas, including Tidore Kepulauan City, Sofifi City, and West Halmahera Regency.

In the Spatial Plan (RTRW) of Pematang Siantar City for the period 2012-2032, Siantar Barat District was designated as the City Service Center, Siantar Timur, Siantar Marimbun, Siantar Sitalasari, and Siantar Martoba Districts were designated as Sub City Service Centers, and Siantar Selatan, Siantar Utara, and Siantar Marihat Districts were designated as Neighborhood Service Centers (PPL).

Based on the analysis of the Centrality Index, it was found that one district is classified as rank/order I (highest) and can be designated as the City Development Center (PPK), which is Siantar Barat District. Siantar Timur District is designated as the Sub City Service Center (SPPK) with rank/order II. Siantar Utara, Siantar Martoba, Siantar Selatan, Siantar Sitalasari, Siantar Marimbun, and Siantar Marihat Districts are designated as Neighborhood Service Centers (PPL) with rank/order III and IV.

Therefore, the designation of Siantar Barat District as the City Service Center (PPK), along with the designation of Siantar Timur District as the Sub City Service Center (SPPK) with rank/order II in the Spatial Plan of Pematang Siantar City, remains appropriate.

Table 1: Comparison of City Service Centers according to the Spatial Plan (RTRW) and the Existing Conditions in 2023

Planned City Service Center System within RT/RW	District	Hierarchy Order	Existing Condition Analysis in 2023	District	Hierarchy Order
City Service Center (PPK)	Siantar Barat	I	City Service Center (PPK)	Siantar Barat	I
Sub City Service Centers (SPPK)	Siantar Timur Siantar Marimbun Siantar Sitalasari Siantar Martoba	II	Sub City Service Center (SPPK)	Siantar Timur	II
Neighborhood Service Centers (PPL)	Siantar Selatan, Siantar Utara Siantar Marihat	III & IV	Neighborhood Service Center (PPL)	Siantar Utara Siantar Martoba Siantar Sitalasari Siantar Selatan Siantar Marimbun Siantar Marihat	III, IV

Source: Pematang Siantar City RT/RW 2012-2032

The research findings indicate that the regional spatial planning established by the Local Government of Pematang Siantar in 2012 has not developed in the expected direction. The comparative results show that the expected development of Siantar Marimbun, Siantar Sitalasari, and Siantar Martoba as Sub City Service Centers (SPPK) has instead declined in their hierarchy order, becoming Neighborhood Service Centers (PPL).

The study also reveals several factors influencing the development of the areas, as indicated by the Structural Equation Modeling (SEM) analysis:

$$PW = 0,262FB + 0,213FE + 0,151FS + 0,153FK + 0,143FL + 0139FLKG$$

Where:

- PW: Regional Development
- FB: Biogeophysical Factors
- FE: Economic Factors
- FS: Social Factors
- FK: Institutional Factors
- FL: Location Factors
- FLKG: Environmental Factors

Based on the obtained model, it can be observed that there are no differences in the coefficients' signs of the six exogenous latent variables, namely Biogeophysical, Economic, Social, Institutional, Location, and Environmental Factors, on the Regional Development variable, where all variables have a positive sign. The model indicates a proportional relationship between the exogenous variables and the endogenous variable. This can be interpreted as follows: if the Development of Service Centers through the enhancement of Biogeophysical, Economic, Social, Institutional, Location, and Environmental Factors increases, Regional Development can occur, with the most influential factor being the Biogeophysical factor.

According to Budiharsono (2005) [2], Biogeophysical Factors are one of the most important pillars/aspects in regional development planning. This aspect encompasses the content of biological resources, non-biological resources, services, and facilities available in the area. Ernani Rustiadi (2011) also states that resources (especially natural resources) are unevenly distributed in terms of quality and quantity, so the main pillar of regional planning and development is always based on this consideration. Given their uneven distribution, the first step in technocratic regional development is to

identify the existing resources through resource evaluation activities, including natural resources, human resources, artificial resources, and social resources. This evaluation is the primary pillar in regional planning and development.

The second most important factor in regional development according to the analysis is the Economic Factor. The Economic Factor, as defined by Budiharsono, encompasses economic activities that occur around the region. Considering the limitations, scarcity, and unevenness of resources, every existing resource potential must be utilized efficiently and effectively. In regional planning and development, the economic aspect plays a crucial role in allocating resources more effectively and efficiently in both short-term and long-term perspectives.

The Social Factor also has a positive influence on regional development according to the analysis results. This is consistent with the research conducted by Yustinus Bima Pramudita (2017) ^[20] titled "Study on the Effectiveness of Environmental Facilities Utilization in Development Zone III Service Centers, Semarang Regency." The study concludes that four social facility resources are categorized as effective in the development of Service Centers in Development Zone III, Semarang Regency.

The Institutional Factor also has a positive influence on regional development because institutions regulate the efficient, equitable, and sustainable allocation and utilization of resources. Additionally, Location and Environmental Factors will also affect regional development, and therefore, spatial aspects must be considered in regional development planning.

Conclusion and Recommendations

The development of service centers in Pematang Siantar City can be carried out by designating Siantar Barat District as a City Service Center (PPK) at order I, Siantar Timur District as a Sub City Service Center (SPPK) at order II, and Siantar Utara District (order III) along with Siantar Martoba, Siantar Sitalasari, Siantar Selatan, Siantar Marimbun, and Siantar Marihat Districts (order IV) as Environmental Service Centers (PPL). The strongest inter-regional interaction occurs between Siantar Barat District (PPK) and Siantar Sitalasari District (PPL). The spatial structure defined in the Pematang Siantar City Spatial Planning (RTRW) 2012-2032 is no longer suitable for the current conditions, and the development of service centers has a positive impact on the overall development of Pematang Siantar City.

It is recommended that the Pematang Siantar City Government revise the Pematang Siantar City Spatial Planning (RTRW) 2012-2032 due to the changes in the current spatial structure. The city government is expected to continue the sustainable development of the necessary service centers, ensuring that the positive impact of these service centers on regional development can be realized. The participation of the Pematang Siantar City community in maintaining the established service centers is also crucial, as community participation significantly influences regional development.

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