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**ANALYSIS OF THE EFFECT OF ROAD CONNECTIVITY,  
TRANSPORTATION ACCESSIBILITY, AND ACTIVITY OPTIMIZATION  
ON PUBLIC SERVICES IN SUPPORTING REGIONAL ECONOMIC  
DEVELOPMENT IN LUBUK BAJA DISTRICT, BATAM CITY**

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**Abstract**

Batam City, as part of the Batam–Bintan–Karimun (BBK) Free Trade Area, enjoys a strategic position along the international shipping route of the Strait of Malacca and plays a vital role in regional industrial and logistics activities. However, central trade and service areas such as Lubuk Baja District face serious challenges in terms of road connectivity, transportation accessibility, and the quality of public infrastructure. This study aims to analyze the influence of these three aspects on public services to support regional planning in the Lubuk Baja District. The method used is descriptive-quantitative, analyzing existing conditions and public perceptions. The results indicate that transportation connectivity and accessibility significantly influence the efficiency of mobility and economic activity. Integration of spatial planning policies and infrastructure management is necessary to achieve effective public services and sustainable regional development in Batam City.

**Keywords:** Batam, Road Connectivity, Transportation Accessibility, Public Services, Regional Planning



## INTRODUCTION

Batam City is one of the most dynamic cities in Indonesia and holds a strategic position in the context of national and regional development. Administratively, Batam is the largest city in the Riau Islands Province and is an integral part of the Batam-Bintan-Karimun (BBK) Free Trade and Free Port Area. With an area of 426,563.28 hectares, consisting of 108,265 hectares of land and 318,298.28 hectares of water, Batam encompasses more than 400 islands, including the outermost islands in Indonesia's border areas. Based on data from the Batam City Population and Civil Registration Office (2023), the population reached 1,240,792 people with a density of around 1,200 people per km<sup>2</sup>, indicating a high urbanization character and pressure on the carrying capacity of the region.

Geographically, Batam has a strategic location as it lies along the Strait of Malacca, one of the world's busiest maritime routes connecting East Asia with Europe, the Middle East, and Africa. Its proximity to Singapore and Malaysia places Batam in a strategic position as a hub for industry, trade, and logistics in Southeast Asia. Regionally, Batam is part of the Indonesia–Malaysia–Singapore Growth Triangle (IMS-GT), a trilateral cooperation aimed at strengthening economic integration between countries to drive regional growth through trade, investment, and infrastructure connectivity.

Batam's proximity to global economic hubs like Singapore provides significant competitive advantages. Batam serves as a gateway for Indonesia's international trade, as well as a strategic location for manufacturing, shipbuilding, logistics, and technology industries. With the development of port, airport, and industrial park infrastructure, Batam has successfully attracted large-scale foreign investment. However, this rapid economic growth also presents various challenges, particularly related to spatial planning, population density, and the provision of adequate public infrastructure. The transformation of Batam's regional governance has experienced significant momentum through the enactment of Government Regulation (PP) Number 62 of 2019 concerning the Second Amendment to PP Number 46 of 2007 concerning the Batam Free Trade Zone and Free Port.

This regulation stipulates that the Mayor of Batam serves as ex officio Chairman of the Batam Business Entity (BP Batam), a position later reinforced by Presidential Decree No. 8 of 2020. This measure aims to harmonize policies between the Batam City Government and BP Batam, which previously operated separately. This policy places authority over licensing, land management,



investment, and infrastructure development under a single line of coordination, which is expected to accelerate economic growth and create more integrated and efficient regional governance. In the context of urban development, Lubuk Baja District plays a crucial role in Batam City's spatial structure. This area, located on the main island, is designated as a city-scale trade and services zone in the Batam City Detailed Spatial Plan (RDTR) for 2021–2041.

According to the RDTR document, the city-scale service zone in Lubuk Baja District covers 184.82 hectares out of a total land area of 1,309.68 hectares. Functionally, Lubuk Baja is a center of economic activity encompassing the Nagoya, Jodoh, and surrounding areas, known as a center for trade, services, hospitality, and modern business in Batam. The increase in economic activity in Lubuk Baja District has had a positive impact on urban growth, but has also created new problems in infrastructure, spatial planning, and urban social issues. Based on data from the Batam City Central Statistics Agency (BPS), the population of Lubuk Baja District reached 78,591 people with a population density of 3,135 people/km<sup>2</sup>, making it one of the most densely populated areas in Batam. This density puts pressure on the availability of land, housing, and basic infrastructure such as clean water, sanitation, drainage, and waste management. Existing conditions indicate that the quality of infrastructure in Lubuk Baja District is still inadequate.

Road connectivity is a major issue. Although central areas like Nagoya and Jodoh have relatively good road networks, many narrow and difficult-to-access roads remain in outlying residential areas. This imbalance in connectivity hinders public mobility and exacerbates regional disparities. Furthermore, poor road quality, coupled with low-frequency infrastructure maintenance, causes congestion and reduces the efficiency of the distribution of goods and services. Another serious problem is limited public transportation accessibility. The mass transportation network in Lubuk Baja is unable to reach all areas evenly, forcing residents to rely more on private vehicles. This dependency has knock-on effects such as congestion, pollution, and rising transportation costs. This situation is further exacerbated by the lack of supporting road facilities such as bus stops, traffic signs, and functioning road markings. As a result, the safety and comfort of road users are reduced, and the efficiency of public mobility is disrupted.

In addition to transportation factors, flooding is a perennial issue that remains unresolved. Drainage systems in several key areas, including business and residential areas, are not functioning optimally. Every rainy season, flooding hampers economic activity, particularly around hotels, shopping centers, and office areas. Flooding not only reduces the area's attractiveness as a business and



tourist destination but also worsens the socio-economic conditions of the community. Limited basic infrastructure also impacts the optimization of community economic activities. Many small and medium-sized businesses in the trade and service sectors experience obstacles due to difficult access and prolonged traffic jams.

This condition causes a decrease in productivity, increased operational costs, and decreased regional competitiveness. The accumulation of these problems has resulted in the stagnation of Lubuk Baja's economic growth, with some parts of the area experiencing a decline in economic activity and the closure of several commercial facilities. These problems indicate that Lubuk Baja District faces serious challenges in managing the balance between economic growth and the provision of public infrastructure. To achieve effective regional planning and sustainable development, a comprehensive evaluation is needed of aspects of connectivity, accessibility, and optimization of community activities that directly influence the quality of public services and citizen welfare. Based on these conditions, this study aims to analyze the influence of road network connectivity, transportation accessibility, and optimization of community activities on public services in supporting regional planning in Lubuk Baja District, Batam City. This study is expected to provide empirical and conceptual contributions to the development of urban policies that are more responsive to community needs. Furthermore, the results of this study are expected to provide a basis for the Batam City Government in formulating strategies to improve the quality of infrastructure and public services, especially in strategic trade and service areas such as Lubuk Baja. With integrated management of spatial planning, investment, and infrastructure policies, Batam has great potential to strengthen its role as a maritime metropolis and a sustainable global economic center in the future.

## LITERATURE REVIEW

Regional planning theory is an approach used to organize and manage land and resource use in a region with the goal of achieving sustainable, efficient, and balanced development. This theory encompasses various aspects such as land use planning, resource management, economic development, and social welfare. The following is an explanation of regional planning theory, complete with expert opinions and a bibliography.

According to Prof. Arsyad, regional planning must be based on community participation to ensure that local needs and aspirations are



accommodated. He emphasized the importance of inclusive planning based on local data to enhance the success of plan implementation.

Regional Planning Theory is the study of how regions should be planned and managed to support sustainable development. This theory encompasses various approaches and models to ensure the efficient and equitable use of resources and the achievement of regional development goals. Some key aspects of regional planning theory include: 1. Land Use: Determining optimal land use for various purposes such as housing, industry, agriculture, and open space. 2. Economic Development: Planning strategies to increase economic activity in a region, including the development of infrastructure, industry, and services. 3. Social Welfare: Ensuring that regional planning supports social welfare by providing access to health services, education, and public facilities. 4. Environmental Management: Integrating sustainability principles to protect and restore the environment, including natural resource management and mitigating the impacts of climate change.

## RESEARCH METHOD

This study employed a mixed methods (sequential explanatory) design, with a quantitative approach primarily to test the inter-variable influences and a limited qualitative approach for contextual explanation and triangulation. The study location was Lubuk Baja District, Batam City, a core trade and service area. The study population comprised the entire population of Lubuk Baja District, totaling 78,591 people. The sample was determined using the Slovin formula with a 10% error rate, resulting in 100 respondents. The sampling technique used was simple random sampling with proportional distribution across five urban villages: Tanjung Uma (29), Baloi Indah (29), Batu Selicin (21), Lubuk Baja Kota (15), and Kampung Pelita (6). The sampling procedure was carried out by inviting respondents to the meeting hall of each urban village for one week. Inclusion criteria included a minimum age of 18 years, residency for at least one year, and willingness to provide informed consent.

The independent variables consisted of: (1) Road Connectivity (X1), which includes road capacity, quality, and maintenance; (2) Transportation Accessibility (X2) which includes multimodal availability, ease of access, and safety; (3) Activity Optimization (X3) which assesses the ease and benefits of access to public, social, and economic facilities. The dependent variable (Y) is Public Services which is measured based on the adequacy and quality of public, social, and economic facilities. All indicators use a Likert scale of 1–5.

### Analysis of the Effect of Road Connectivity ...



### **Data Collection Procedures**

Data were collected through questionnaire surveys, in-depth interviews, focus group discussions (FGDs), field observations, and secondary documentation. The survey was conducted both in-person and online. The FGDs involved community leaders and business actors to understand experiences of accessing public services. Observations were made of road conditions, drainage, and the completeness of public facilities.

Validity was tested using item-total correlation with a minimum threshold of  $r = 0.30$ , while reliability was assessed using Cronbach's alpha coefficient with a minimum threshold of 0.60. Normality was tested using histograms and the coefficient of variance. The instrument was pre-tested to ensure reliability and readability.

### **Data analysis**

Data analysis was performed using SPSS or R software. Descriptive analysis was used to describe the characteristics of respondents, while multiple linear regression was used to test the effect of road connectivity (X1), transportation accessibility (X2), and activity optimization (X3) on community services (Y). The F test was used to see the simultaneous effect, the t test for partial effect, and the coefficient of determination ( $R^2$ ) to assess the strength of the model. This study adhered to the principles of research ethics with voluntary participation, anonymity, and informed consent. Data were collected and stored securely and used only for academic purposes.

## **RESULTS AND DISCUSSION**

Based on statistical analysis, road connectivity was found to have a positive and significant impact on public services. This indicates that good and well-connected road infrastructure is crucial for improving public accessibility to public services. The better the road connectivity, the easier it is for people to access public facilities such as health, education, and government services, ultimately contributing to an improved quality of life.

Based on statistical analysis, transportation accessibility was found to have a positive and significant impact on the quality of public services. This indicates that good transportation access allows people to more easily access various public services, including education, health, and administrative services. The better the transportation accessibility, the faster and more efficient it is for people to obtain



the services they need, ultimately improving the quality of life and well-being of the community.

Table 1. Test results

Variabel Independen	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	-3.273	1.896	-	-1.727	0.087
X1 (Konektivitas Jalan)	0.350	0.082	0.280	4.258	0.000
X2 (Aksesibilitas Transportasi)	0.400	0.190	0.327	2.104	0.038
X3 (Optimalisasi Aktivitas)	0.366	0.169	0.347	2.173	0.032

Statistical analysis shows that activity optimization has a significant impact on the quality of public services. This indicates that efforts to optimize activities, whether in terms of public service distribution, space utilization, or operational effectiveness, have a direct impact on improving the quality and efficiency of services received by the public. The better the activity optimization, the higher the public's satisfaction with the public services provided.

Based on the statistical analysis, it was found that road connectivity, transportation accessibility, and activity optimization simultaneously have a significant influence on the quality of public services. This indicates that when these three variables are optimized together, the impact on public services is greater than the influence of each variable individually. The integration of road infrastructure, transportation accessibility, and activity optimization allows for increased efficiency, accessibility, and quality of public services, ultimately improving public welfare.

This section presents the data and information found by the researcher and serves as a basis for conclusions and even the development of new theories. Generally, the data is presented in three stages: a description of the findings, data, and information collected, and supporting data in the form of tables, graphs, and figures as needed to clarify and streamline the explanation.

Synthesis Of Topic



Based on statistical analysis, road connectivity has a positive and significant impact on public services. This indicates that good and well-connected road infrastructure is crucial for improving public accessibility to public services. The better the road connectivity, the easier it is for the public to access public facilities such as health, education, and government services, ultimately contributing to an improved quality of life.

Based on statistical analysis, transportation accessibility has a positive and significant impact on the quality of public services. This indicates that good transportation access allows the public to more easily access various public services, including education, health, and administrative services. The better the transportation accessibility, the faster and more efficient the public can obtain the services they need, ultimately improving the quality of life and public welfare.

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## CONCLUSION

**Road Connectivity:** Road connectivity variables significantly influence public services. Adequate and high-quality road and drainage infrastructure (Road Capacity Adequacy, Road Infrastructure Quality, Road Section Infrastructure Adequacy, Road Maintenance, Road Drainage Quality, and Road Drainage Maintenance) play a crucial role in improving mobility, distribution of goods and services, and inter-regional accessibility.

**Transportation Accessibility:** Transportation accessibility variables also influence public services. Availability of multi-modal and inter-modal public transportation, Ease of Public Transportation Services, Public Transportation



Travel Distance, Public Transportation Travel Time, Ease of Public Transportation Services, and Public Transportation Safety can improve the quality of public services.

Activity Optimization: Optimizing activities, Ease of Access to Public Facilities, Ease of Access to Social Facilities, Ease of Access to Economic Facilities, Benefits of Public Facilities, Benefits of Economic Facilities, and Benefits of Social Facilities, have a positive impact on public services. These efforts support more efficient and sustainable regional economic development.

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