Effects of Road and Bridge Infrastructure Development on the Local Economy in Tabalong Regency

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Abstract

Infrastructure development, particularly in the form of roads and bridges, plays a pivotal role in driving economic advancement and improving societal well-being in Tabalong Regency. This study aims to comprehensively evaluate the economic impacts of road and bridge infrastructure investments in Tabalong Regency. Utilizing secondary data sourced from the Tabalong Regency Statistics Office (BPS), the research employs a quantitative approach, primarily through regression analysis, to examine the relationship between infrastructure investments and economic indicators. The findings reveal significant positive correlations between infrastructure development and various economic metrics. Enhanced road and bridge networks are shown to facilitate smoother transportation of goods and people, reduce logistical costs, and improve market accessibility for businesses. This, in turn, stimulates economic activities, boosts productivity, and attracts investments into the region. Moreover, improved infrastructure supports the development of other sectors such as tourism, agriculture, and manufacturing, creating a multiplier effect on economic growth. Based on the research outcomes, it is recommended that Tabalong Regency continues to prioritize and invest in infrastructure projects, particularly those related to roads and bridges. Sustained investments in infrastructure not only support current economic activities but also lay the groundwork for future development opportunities.

Keywords: infrastructure development, economic impact, road infrastructure, bridge infrastructure, Tabalong Regency

Introduction

Infrastructure development policy is a crucial and strategic aspect in accelerating development in Tabalong Regency. The availability of adequate and sustainable infrastructure
forms the primary framework for providing essential roles and access needed by the public. The increasingly developed road and bridge infrastructure can serve as the foundation for local economic growth, facilitating connectivity and supporting smooth transportation and socio-economic activities between different regions. The physical development of road and bridge infrastructure in Tabalong Regency from 2002 to 2023 is as follows:

**Chart 1. Regency Road Length (Km)**

From the data graph above, the length of district roads has increased by 18.43 kilometers from 2002 to 2024, making the total road length 904.13 kilometers. In addition to roads, bridge infrastructure plays a vital role in connecting areas that are geographically separated by natural obstacles such as rivers, valleys, and ravines, which impede traffic flow, transportation, and community activities. The development of bridge infrastructure from 2002 to 2023 is as follows:

**Chart 2. The Number of Bridges in the District**

Data source: Public Works and Spatial Planning Agency (Dinas PUPR) of Tabalong Regency
The Tabalong Regency government supports the implementation of infrastructure development through various stages, including meticulous planning, which is essential for ensuring the successful execution of these projects. Adequate financing for infrastructure is crucial for effective development implementation.

Economic issues have significant impacts on individuals, communities, and regions, and even on entire countries. Stable and sustainable economic growth directly contributes to improving societal welfare. Economic growth leads to increased per capita income, lower unemployment rates, and more job opportunities. Tabalong Regency has experienced fluctuating economic growth in recent years, showing positive trends from 2002 to 2023. However, the economic growth declined in 2020 due to the COVID-19 pandemic, with a subsequent recovery and positive growth observed from 2021 to 2023.

Chart 3. Economic Growth (%) Tabalong Regency

Data source: BPS Tabalong Regency (Processed).

Research on the influence and impact of infrastructure development on the economy has been extensively conducted using various variables and indicators. Drawing from several previous studies focused on different infrastructure developments and research locations: Cut Nanda Kesuma and Suriani (2015) found that electricity and road variables significantly and positively affect economic growth across 26 provinces in Indonesia. Amran Husen and Aisyah S Baranyanan (2021) used multiple linear regression analysis and concluded that the road infrastructure variable has a significant partial effect on economic growth in North Maluku province.

Burhanuddin, Abdul Hadi Ilman, and Fitriah Permata Cita (2020) analyzed the impact of infrastructure on economic growth in Sumbawa Regency from 2001 to 2016, revealing negative effects of road and electricity infrastructure on economic growth. According to N.
Gregory Mankiw (2003), infrastructure refers to public capital, including roads, bridges, drainage systems, and others, representing government investments aimed at public benefit.

In general, infrastructure encompasses facilities for public use, such as roads, toll roads, bridges, dams, terminals, electricity networks, market buildings, and more. Public infrastructure means that all citizens can benefit from facilities provided by the government, contributing to societal welfare. Kodoatie (2005) states that infrastructure supports social and economic systems and connects with environmental systems. The availability of infrastructure significantly impacts social and economic systems within communities.

The development and maintenance of road and bridge infrastructure in Tabalong Regency play a strategic role in regional development policy, aiming to stimulate economic growth and improve community welfare. These infrastructures not only facilitate smooth movement of goods but also enhance socio-economic accessibility across various sectors, potentially boosting investments and overall economic activity within the region. Despite recognizing the importance of infrastructure development, the specific and comprehensive impacts of road and bridge infrastructure on Tabalong Regency's economy require further understanding. Therefore, the research focuses on examining the partial and simultaneous effects of road and bridge infrastructure development on the local economy. This inquiry aims to deepen insights into the direct economic implications of infrastructure investments in the region.

**Literature Review**

**Development Paradigm**

Development is defined as a deliberate effort or series of efforts aimed at growth and planned change conducted consciously by a nation, state, and government towards modernity in the nation-building process (Siagian, 2005). In the evolution of national development, the goal is to progress from underdevelopment to an advanced and modern state, where selected developmental variables lead to positive transformations. Hence, it requires initiative, activity, and critical thinking from every citizen to act effectively and enable resources for decision-making by the government in development.

Local governments possess broader authority to regulate and manage various governmental affairs for the interests and welfare of their respective communities. Regional development must align with the potential and aspirations of growing communities. Misalignment between regional development priorities and local potential can lead to suboptimal resource utilization, thereby hindering economic growth in the region.

According to Deddy T. Tikson in Digdowiseiso (2019), national development can also be interpreted as intentional economic, social, and cultural transformation through policies and strategies aimed at desired outcomes. Economic structural transformations, for example, are evident in rapid production growth in industrial and service sectors, increasing their contribution to national income. Conversely, the agricultural sector's contribution diminishes in proportion to industrialization and economic modernization. Social transformation involves
distributing prosperity through equal access to socio-economic resources such as education, healthcare, housing, clean water, recreational facilities, and participation in political decision-making processes. Cultural transformation is often associated with a resurgence of national spirit, shifting from high valuation to material possession, and from traditional institutions to modern and rational organizations. Hence, development encompasses all aspects of community life—economic, social, cultural, and political—at both macro (national) and micro (community) levels.

The significance of development lies in progress and improvement, as it represents a series of efforts towards growth and planned change for the better. The objective of development is to realize a just, prosperous, and spiritually and materially prosperous society. Effective implementation of development aligns with predefined goals, heavily supported by good management and organization. Planning, budgeting, implementation, monitoring, and evaluation are fundamental aspects of development management, with administration playing a pivotal role in achieving developmental goals (Esman, 1991).

Kartasasmita (1997) asserts that management studies have evolved considerably, yet their fundamental theories remain unchanged, including the activities carried out by management: planning, budgeting, implementation, and monitoring and evaluation. Planning involves consciously organized efforts to continuously select the best alternatives among several to achieve specific goals. Budgeting, closely linked to planning, outlines financing plans within predefined timeframes. Implementation involves effectively and efficiently realizing pre-planned development processes. Monitoring aims to assess progress against planned objectives, crucial for early detection of deviations requiring appropriate action. Evaluation, a critical management function, seeks to understand what occurred and why, applying various criteria to assess development outcomes.

The enactment of Law Number 23 of 2014 on Regional Government aims to expedite processes, ultimately influencing the achievement of effective and efficient development outcomes. Implementation of development should meet societal demands and needs for sustainable community living, while preserving ecosystem balance.

Infrastructure Development

According to N. Gregory Mankiw in economics, infrastructure is defined as public capital that includes bridges, public roads, drainage systems, and various other facilities. These investments are made by the government for the public good. Robert J. Kodoatie explains that infrastructure is a system that supports the economic and social systems, while also acting as an intermediary with the environment. It provides a basis for policy-making in various contexts.

According to the American Public Works Association (cited in Kodoatie, R., 2005), infrastructure comprises physical facilities developed or required by public bodies to provide water, electricity, waste disposal, transportation, and similar services. These facilities support social and economic objectives of the community. In general, infrastructure serves as a primary support for social and economic systems in community life. Good infrastructure functions as a mediator between the economic and social systems and the natural environment. Poor-quality
or dysfunctional infrastructure can significantly impact social and economic activities in communities.

Physical infrastructure such as county roads and bridges have specific specifications regulated by relevant ministries and technical agencies, including road width, foundation types, and surface layers tailored to their functions and uses. The same applies to county bridges, which have structures and constructions suitable for their needs. The development of road infrastructure provides significant benefits in economic, social, and cultural fields. Socially, road infrastructure serves as a communication tool among communities, connecting previously isolated regions and facilitating broader social interactions. Areas with well-developed road networks can reduce isolation and better facilitate social and economic life for communities. Overall, infrastructure encompasses all types of facilities needed by communities to support daily activities. Whether physical or non-physical, infrastructure is built by governments, private entities, or individuals to meet the basic social and economic needs of society.

**Infrastructure and Regional Economic Development**

Alongside central government policies on infrastructure development, the Tabalong Regency local government aims to direct its infrastructure projects towards fostering regional progress and development. Infrastructure development across all areas of Tabalong Regency, whether in urban or rural regions, aims to enhance both physical conditions and community welfare. Rapid physical infrastructure development signifies progress within a region or area. The infrastructure facilities encompass various physical structures designed to serve and benefit the community, particularly in enhancing the local economy. This is expected to yield positive impacts such as stimulating economic activities in the vicinity of the infrastructure projects.

The economic growth of regions is characterized by increased activities related to urban and rural road infrastructure development within district areas. These activities include fostering community interest in entrepreneurial endeavors such as commerce and trade. Furthermore, the construction of county road infrastructure, integrated with rural areas, aims to create job opportunities and facilitate ease of access for community activities and transportation of agricultural and plantation products.

The relationship and influence of infrastructure development on social and economic aspects are manifested through physical construction projects like buildings, roads, bridges, and others. These constructions serve the public widely, supporting both social and economic activities and bringing about changes in community life and welfare. Effective infrastructure development requires systematic planning and construction, with roads and bridges designed and built according to specific functions and dimensions.

In general, road and bridge infrastructure development serves as transportation systems that support and facilitate social and economic activities. Moreover, well-structured infrastructure projects have both short-term and long-term positive impacts. In the short term, construction activities generate employment opportunities within the private sector and among communities. In the long term, infrastructure development opens new access points and
opportunities to develop resources, thereby enhancing productivity in related sectors such as goods and services production.

According to W. Ronald Hudson (1997), the success and progress of communities depend on physical infrastructure for resource distribution and public services. The quality and efficiency of infrastructure affect living standards, health, social systems, and the sustainability of economic and business activities. Infrastructure, as defined by Grigg (cited in Kodoatie, 2005), is a physical system that provides irrigation, drainage, transportation, building structures, and other physical facilities necessary to meet various human needs, both economic and social. It is also defined as basic facilities or structures, equipment, installations built and needed to function as social and economic systems in communities.

According to Government Regulation of the Republic of Indonesia Number 34 of 2006 concerning road infrastructure and its implementation, public road management prioritizes building road networks in production centers and connecting these centers to marketing areas. This regulation aims to strengthen national unity, achieve balanced regional development, and ensure economic progress harmonized with prosperity goals. Effective road infrastructure aims to minimize travel costs, promote regional balance, and support economic growth in developed regions by addressing transportation deficiencies.

Tabalong Regency, with its diverse potential in natural resources, trade, agriculture, and plantations, is supported by robust road and bridge infrastructure. Local government policies emphasize the development of the agricultural and plantation sectors to boost regional economic growth. Infrastructure development in Tabalong Regency aims to achieve the welfare goals outlined in regional development plans. Quantitatively, regional prosperity indicators, including the Gross Regional Domestic Product (GRDP), measure economic conditions within a specific period, whether based on current or constant prices. GRDP at constant prices gauges real economic growth annually, unaffected by price fluctuations. Economic growth rate serves as a macroeconomic indicator reflecting the success of regional development efforts over time, guiding future development policies.

The economic sectors in Tabalong Regency, driven by production sectors, are pivotal in local government efforts to enhance economic growth as outlined in the regional development agenda. Therefore, infrastructure development supporting and facilitating economic activities in Tabalong Regency serves as a primary driver for regional economic development.

Social-Cultural Aspects of Infrastructure Development

Infrastructure development requires a meticulous process in both planning and execution. Generally, infrastructure development can be defined as a series of activities aimed at achieving desired infrastructure goals, encompassing various needs including social-cultural aspects. In relation to infrastructure development and its diverse objectives within a region, it must proceed in alignment with development goals and the desired outcomes through the development process. In essence, infrastructure development entails improvements aimed at enhancing the quality of life across all aspects of society.
In terms of social-cultural benefits, the construction of roads and bridges in Tabalong Regency aims to enhance connectivity and facilitate activities among communities, fostering direct communication, information exchange, and other social-cultural interactions. This is particularly crucial in rural areas of Tabalong Regency, where the terrain consists of highlands that are difficult to access and may be separated by wide rivers, leading to isolation and lagging development. Infrastructure development plays a vital role in supporting social-cultural activities within a region or area. The connectivity provided by road infrastructure within a region becomes a pivotal and mutually supportive element, expected to bolster community activities.

Research Method

Research methodology is a critical aspect that researchers must carefully consider. It involves procedures, tools, and the design of the study. According to Sugiyono (2022:8), quantitative research methodology is grounded in positivist philosophy and is used to investigate specific populations or samples. Data collection involves research instruments, and data analysis is quantitative/statistical, aimed at testing predefined hypotheses.

This study employs a quantitative research method with an associative problem formulation. According to Sugiyono (2022:37), an associative problem formulation seeks to explore relationships between two or more variables. These relationships can include causal relationships where an independent variable influences a dependent variable.

a. Object of Study
The object of this study focuses on obtaining answers to formulated problems. According to Sugiyono (2017:3), the object of research is an attribute, value, or entity that exhibits certain variations designated by the researcher for study and subsequent conclusions. In this study, the object is the impact of road and bridge infrastructure development on the regional economy.

b. Data Sources
Secondary data sources are utilized in this study. According to Sugiyono (2017), research data sources are categorized into primary and secondary data. Secondary data are obtained through reading, studying, and understanding from various sources such as literature, books, and documents. This study uses secondary data (time series) obtained from various sources including the Tabalong Regency Public Works and Spatial Planning Agency (Dinas PUPR) and the Central Statistics Agency (BPS) of Tabalong Regency.

c. Variables
Variables are attributes or characteristics that exhibit variations and are designated by the researcher for study and subsequent conclusions (Sugiyono, 2022). The independent variable is infrastructure data (time series) for county roads (X1) and bridge infrastructure (X2). The dependent variable is economic growth data (time series) in Tabalong Regency (Y).
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d. Analysis Stage
Data preparation involves tabulating research data, including Excel data for county road infrastructure time series (X1), bridge infrastructure time series data (X2), and economic growth time series data for Tabalong Regency (Y). The secondary data are then analyzed using multiple linear regression analysis. Multiple regression models involve more than one independent variable (Ghozali, 2018). Statistical Package for the Social Sciences (SPSS version 25) is used for this analysis, measuring the partial and simultaneous effects of independent variables on the dependent variable.

e. Data Testing
Data testing begins with classic assumption tests as an initial step before multiple linear regression analysis. These tests ensure regression coefficient unbiasedness. Classical assumption tests include normality, multicollinearity, and heteroskedasticity tests.

f. Hypotheses
Based on the research background, the following hypotheses are formulated:

H01: County road infrastructure (X1) does not have a partial effect on regional economic growth (Y). Ha1: County road infrastructure (X1) has a partial effect on regional economic growth (Y).

H02: Bridge infrastructure (X2) does not have a partial effect on regional economic growth (Y). Ha2: Bridge infrastructure (X2) has a partial effect on regional economic growth (Y).

H03: County road (X1) and bridge (X2) infrastructure do not have a simultaneous effect on regional economic growth (Y). Ha3: County road (X1) and bridge (X2) infrastructure have a simultaneous effect on regional economic growth (Y).

These hypotheses will guide the analysis to determine the impact of infrastructure development on the economic growth of Tabalong Regency.

Result and Discussion
Based on the partial hypothesis testing results, the influence of road infrastructure development on the regional economy in Tabalong Regency is significantly negative. Meanwhile, bridge infrastructure shows no significant influence, with a positive directional effect. Moving forward to the simultaneous hypothesis testing results, the combined impact of road and bridge infrastructure development on the regional economy in Tabalong Regency is both significant and positive.

This discussion will elaborate on the tested hypotheses regarding the impact of road and bridge infrastructure development on the regional economy in Tabalong Regency, considering various aspects, perspectives, theories, and previous research that support this study. Regarding the hypothesis testing results, based on the statistical tests conducted, road infrastructure development significantly affects the regional economy in Tabalong Regency in
a negative direction. According to the regression formula, the coefficient (B) represents the direction of the linear regression, indicating the average change in variable (Y) for every one-unit change in variable (X). This change is positive (+) if the coefficient (B) is positive and negative (-) if it is negative. In this case, the linear regression coefficient (B) signifies the value of variable (X), which can be positive or negative, influencing variable (Y). A positive value of variable X increases variable Y, whereas a negative value decreases it.

From the Coefficients table:

- Constant value (113.413)
- Variable (X1) Sig. value (0.009), Constant value (X1) (-0.131)
- Variable (X2) Sig. value (0.124), Constant value (X2) (0.017)

From this data, the regression equation can be derived as follows:

\[
Y = \beta_0 + \beta X_1 + \beta X_2
\]

or

\[
Y = 113.413 - 0.131 + 0.017
\]

Description:

- \( \beta_0 = 113.413 \) (Constant)
- Y = Economic growth
- \( \beta X_1 = \) Road Infrastructure
- \( \beta X_2 = \) Bridge Infrastructure

The constant unstandardized coefficient (B) value of 113.413 indicates that in this regression model, if the variable (X) length of county roads increases by 1 km through new construction or expansion, and if the constant value remains zero, road infrastructure development influences the regional economy of Tabalong Regency by 113.413.

The effect of variable (X1), road infrastructure, on the regional economy in Tabalong Regency, obtained a significance value of 0.009 with a significance level of 0.05 (5%), meaning a 95% confidence level that road infrastructure significantly affects the regional economy in Tabalong Regency.

The constant value of road infrastructure (X1) in the coefficient (B) is -0.131, indicating the direction of influence, meaning that road infrastructure development in Tabalong Regency negatively impacts the regional economy. This implies that there will be a decrease/change in variable (Y) when variable (X1) increases or decreases.

In other words, concerning the impact of road infrastructure on the regional economy in Tabalong Regency, a decrease of 1 km in road length would result in a decrease of -0.131% in the regional economy. This is partly due to the condition of county road infrastructure in Tabalong Regency, where road damage remains relatively high, necessitating repairs throughout the county.
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The findings of this research on the partial impact of road infrastructure on the economy align with studies conducted by Amran Husen, Aisyah S Baranyanan (2021), using multiple linear regression analysis. The results indicate that road infrastructure significantly influences economic growth in North Maluku province.

Additionally, the negative directional impact found aligns with research by Burhanuddin; Abdul Hadi Ilman; Fitriah Permata Cita (2020), using secondary data from the 2001-2016 time series, which found that road infrastructure had a negative impact on economic growth in Sumbawa Regency.

The partial impact of bridge infrastructure development on the regional economy in Tabalong Regency, with a significance value of 0.124, indicates that bridge infrastructure has no significant impact. In this case, the regression model shows that the constant value of bridge infrastructure in the coefficient (B) is 0.017, meaning that bridge infrastructure development in Tabalong Regency has a positive directional influence on the regional economy.

In other words, concerning the impact of bridge infrastructure on the regional economy in Tabalong Regency, an increase in bridges would lead to an increase of 0.017% in the regional economy. Bridges are closely linked to roads and transportation networks; their interconnection plays a crucial role in supporting and enhancing connectivity within a region. Given Tabalong Regency's varied topography—mountains, valleys, rivers, and swamps—road infrastructure can become disconnected, hindering community activities and economic distribution efficiency. Therefore, bridges are essential to maintain connectivity within Tabalong Regency's road network, ensuring smooth mobility for both social and economic activities.

Simultaneously, the combined impact of road and bridge infrastructure development has a significant and positive effect on the regional economy in Tabalong Regency, with a significance value of 0.020. Roads and bridges are integral parts of the transportation system, providing connectivity and a network for vehicular and human activities, both socially and economically.

Physical infrastructure development, both roads and bridges, undertaken by the local government of Tabalong Regency, is crucial for regional advancement. The Tabalong Regency government, through Long-Term Regional Development Plans (RPJPD), Medium-Term Regional Development Plans (RPJMD), and annual strategic development programs, directs policy for community advancement in Tabalong Regency. Policies on road and bridge infrastructure development are prioritized programs crucial for accelerating economic development in Tabalong Regency.

This aligns with theories and opinions, such as Grigg (as cited in Kodoatie 2005), who defines infrastructure as a physical system providing irrigation, drainage, transportation, buildings, and other facilities necessary for meeting human basic needs—both economic and social. Moreover, infrastructure as a system supports the social and economic systems of society, as defined by N. Gregory Mankiw, and as an essential public capital, it consists of bridges, public roads, drainage systems, among others, invested by the government.
Infrastructure, according to Robert J. Kodoatie, supports the economic and social system as an intermediary within the environmental system. This system serves as a foundation for policy-making. According to the American Public Works Association (Stone, 1974, as cited in Kodoatie, R., 2005), infrastructure comprises physical facilities developed or required by public agencies for governmental functions in providing water, electricity, waste disposal, transportation, and similar services to facilitate social and economic goals.

Thus, these perspectives collectively underscore that road and bridge infrastructure development plays a pivotal role as a mediator between economic and social systems in human life, profoundly impacting the environment. Infrastructure significantly affects all community activities in daily life. Therefore, the roads and bridges constructed by the Tabalong Regency government are crucial to meeting basic social and economic needs within Tabalong Regency.

The availability of adequate and sustainable infrastructure is fundamental in providing essential roles and access required by the community. Developing roads and bridges further establishes a foundation for local economic development, serving as connecting and supporting links in facilitating transportation efficiency, social activities, and economic operations between Tabalong Regency and other regions, thereby benefiting local and regional economic growth by reducing logistics costs, travel time, and expediting goods delivery at lower costs.

**Conclusion**

Partially, road infrastructure development significantly influences the regional economy in Tabalong Regency. This indicates that road infrastructure is crucial in supporting community activities within the economic framework of a region. The presence of road infrastructure facilitates the smooth flow and distribution of goods produced by the local community within Tabalong Regency and from external areas, thereby driving economic activity and fostering economic growth in the region.

Partially, bridge infrastructure development does not significantly impact the regional economy in Tabalong Regency but provides a positive directional influence. Bridges play a critical role in supporting connectivity and ensuring smooth traffic flow in regions characterized by diverse topographies such as mountains, valleys, and rivers. Connectivity of road segments can be disrupted due to geographical conditions; thus, the availability of bridge infrastructure ensures positive directional connectivity, maintaining uninterrupted economic and social activities.

Simultaneously, the development of road and bridge infrastructure significantly impacts the regional economy. Roads and bridges are integral parts of the transportation system, providing connectivity, networks, and services that facilitate social and economic activities. Physical infrastructure development, including roads and bridges, undertaken by the local government of Tabalong Regency, plays a crucial role in regional advancement. The Tabalong Regency government, through Long-Term Regional Development Plans (RPJPD), Medium-Term Regional Development Plans (RPJMD), and annual strategic development programs, directs policies aimed at community advancement. Policies on road and bridge infrastructure development are prioritized as crucial aspects for accelerating economic development in Tabalong Regency.
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