

The Impact of the Bahteramas Bridge Construction on the Socioeconomic Conditions of the Community in Abeli District

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ABSTRACT

The construction of the bridge connecting Abeli District and Nambo District in Kendari City has had significant impacts on the socio-economic conditions of the local community, including employment opportunities, income levels, social cohesion, and public safety. This research aims to quantitatively assess the effects of the bridge infrastructure development on these socio-economic factors in Abeli District. Data were collected through structured interviews with 156 respondents residing within a 500-meter radius of the bridge, selected via [specify sampling method, e.g., purposive or random sampling]. The collected data were analyzed using simple linear regression and descriptive statistical methods to evaluate relationships between infrastructure development and socio-economic variables. The results indicate a statistically significant positive relationship between bridge infrastructure and community social activities, with a regression coefficient of 0.421 ($p < 0.05$). This suggests that the bridge has facilitated stronger social ties by connecting previously separated communities across Kendari Bay, improving access, and reducing travel distances to educational facilities. Additionally, the economic analysis reveals a positive impact on community income, particularly among traders, with a regression coefficient of 0.473 ($p < 0.05$). This effect is attributed to increased consumption by bridge construction workers and enhanced accessibility, alongside a notable reduction in transportation expenses, including fuel costs and crossing fees.

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Introduction

Transportation infrastructure development is a fundamental strategy for enhancing economic growth and community welfare worldwide by improving accessibility, reducing costs, and facilitating the movement of people and goods. Countries across different regions have allocated substantial investments to develop transportation networks, recognizing their

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critical role as drivers of economic activity and social connectivity (Sukwika, 2018). Numerous empirical studies have established a positive correlation between infrastructure availability and increased productivity and economic efficiency within regions. Well-developed transportation systems reduce logistical expenses, accelerate the mobility of production factors, and foster more effective spatial integration, including enhanced urban-rural linkages and regional market accessibility.

In developing countries such as Indonesia, transportation infrastructure development is a national policy priority aimed at addressing persistent regional disparity. Specific policy frameworks, including the National Medium-Term Development Plan (RPJMN), emphasize infrastructure as a means of bridging economic gaps between Western and Eastern Indonesia (Palilu, 2019). These infrastructure gaps remain a critical challenge, with quantitative disparities in access to roads, ports, and other facilities significantly influencing equitable economic growth across the regions. Solis-Oba et al. (2023) highlighted that transportation infrastructure development in coastal and island regions presents distinct dynamics compared to mainland areas, notably in how economic structures and local livelihood patterns transform in response. These differences include challenges related to geographical isolation, reliance on marine-based economies, and unique social structures that must be considered in infrastructure planning.

Within Southeast Sulawesi, the provincial government prioritizes transportation infrastructure to stimulate regional economic growth and strengthen connectivity among the regencies and cities. Several key projects supported by targeted budget allocations have contributed to the emergence of new economic centers and diversification of production activities (NSS et al., 2015). Kendari City, as the provincial capital, functions as the principal transportation hub linking diverse areas within Southeast Sulawesi, necessitating a robust infrastructure to sustain its administrative and economic roles. A significant component of these efforts is the Bahteramas Bridge, which has connected the Kendari and Abeli districts since 2015. This bridge represents a strategic investment by the Kendari City Government, designed to enhance inter-regional connectivity and promote socioeconomic development in coastal zones (Dja'wa et al., 2021). The bridge is vital for improving traffic flow, facilitating access to economic centers, and integrating peripheral districts that were previously isolated by Kendari Bay. Prior to its construction, limited access between Kendari and Abeli hindered the latter's integration into broader economic activities, thereby constraining local development.

Geographically, the Abeli District is a coastal area with considerable but underutilized economic potential, characterized by untapped resources and limited infrastructure. This underutilization is evidenced by low investment levels and limited diversification of local livelihood. The district's experience with the earlier construction of the "Yellow Bridge" (2009–2013), which connected the Abeli and Nambo districts, offers a valuable comparative framework for analyzing the cumulative socio-economic impacts of bridge infrastructure in similar contexts. Mastuti et al. (2021) emphasized that the impacts of transportation infrastructure development are multidimensional, affecting demographic dynamics, livelihood patterns, land values, and settlement structures. This study builds upon such conceptualizations by examining how bridge infrastructure influences these interconnected socioeconomic parameters within the community of Abeli District.

Methodology

Research Location

This study was conducted in the Abeli District of Kendari City, Southeast Sulawesi Province. Geographically, the Abeli District is located between 3°58'42" – 4°3'48" South Latitude and 122°34'07" – 122°36'20" East Longitude. The district covers an area of 15.41

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km² and has a population of 16,234 as of 2024 (Kendari City Central Bureau of Statistics, 2024). Administratively, it is divided into seven sub-districts: Benua Nirae, Pudai, Lapulu, Abeli, Anggalomelai, Poasia, and Talia. The research site was selected because of its proximity to the Bahteramas Bridge, which is central to the study.

Research Data

This study used both primary and secondary data. Primary data were collected through interviews with local residents, supplemented with high-resolution imagery and geographic coordinate points to assist with spatial analysis. Secondary data included population statistics, infrastructure records, and information on infrastructure development activities sourced from local government agencies and official reports (Adinugroho et al., 2016).

Population and Sampling

The study population comprised residents of the Abeli District in 2024. A purposive sampling technique was employed to select respondents residing within a 500-meter radius of the Bahteramas Bridge, aiming to capture those most directly affected by the infrastructure development. While purposive sampling enables targeted data collection, potential sampling bias must be acknowledged.

Research Variables

Variables are defined as the characteristics of the research objects that enable the analysis of causal relationships (Rohman et al., 2023). The independent variable in this study is Bridge Infrastructure (X), operationalized through proximity and access measures related to the Bahteramas Bridge. The dependent variables included:

1. Social aspects (Y): education level, social conflict, and occupation type.
2. Economic aspects (Y): income and expenditure patterns of the household.

The measurement methods for these variables combined self-reported survey data and secondary sources, where applicable.

Data Analysis Techniques

1. Simple Linear Regression Analysis

Simple linear regression was used to model the relationship between one independent variable (Bridge Infrastructure) and each dependent variable separately. This statistical technique assesses the strength and direction of the linear relationships (Husdi & Dalai, 2023). The regression model applied follows the equation (Kartika and Kaihatu, 2010 in Imran, 2018).

$$y = a + bx$$

where:

a = constant

b = regression coefficient

y = dependent variable

x = independent variable

To obtain the values of the constant (a) and the regression coefficient (b), the following formulas are applied (Husdi & Lasena, 2020):

- a. Constant (a) calculation:

$$a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

- b. Regression coefficient (b) calculation:

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$

2. Descriptive Analysis

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Descriptive statistics were employed to summarize and characterize the data collected, providing insights into the distribution, central tendency, and variability of the variables (Nasution, 2017). This preliminary analysis aids in understanding the sample characteristics and supports the interpretation of the regression results. Unlike inferential statistics, descriptive analysis does not test hypotheses or establish causal relationships but provides essential context for the study's findings.

Result and Discussion

Result

1. Social Conditions of the Community
 - a. Education Level

Table 1. Educational Level of the Community

No	Education	Number (individuals)	Percentage (%)
1	Elementary to Junior High School (SD – SMP)	5	3
2	Elementary to Senior High School (SD – SMA)	97	63
3	Elementary to Bachelor's Degree (SD – S1)	54	35
4	Elementary to Master's Degree (SD – S2)	-	-
Total		156	100

Source: Data Analysis Results, 2024

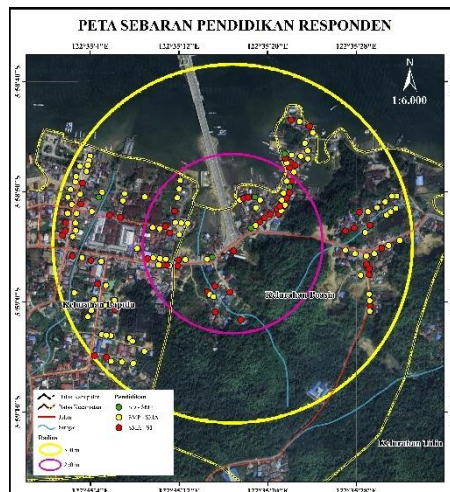


Figure 1. Map of Respondents' Educational Distribution in Abeli Subdistrict

Table 1 indicates that the majority of the community in the Abeli Subdistrict has completed Senior High School (SMA), with 97 individuals (63%), followed by those holding a Bachelor's degree (S1), totaling 54 individuals (35%). Only a small fraction (3%) have education levels ranging from elementary to junior high. Figure 1 illustrates the spatial distribution of educational attainment across subdistricts. This educational profile suggests a relatively high level of formal education, which could influence socioeconomic dynamics and responsiveness to infrastructure development.

- b. Social Conflict

Conflict becomes problematic when it causes the loss of social relationships, damages physical infrastructure, and disrupts social values. Table 2 presents the data on social conflict incidents in the study area.

Table 2. Social Conflict Incident Data

Variable	Number	Percentage (%)
Has social conflict ever occurred in your environment?		
Never	83	57
Ever occurred	73	43

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Total	156	100
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Source: Data Analysis Results, 2024

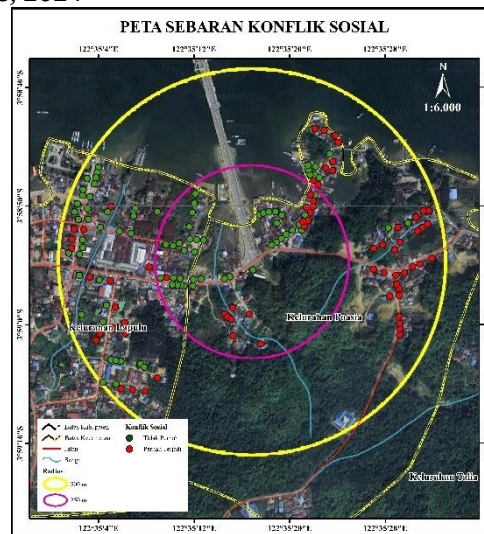


Figure 2. Map of Social Conflict Distribution in Abeli Subdistrict

According to Table 2, of the 156 respondents, 83 (57%) reported no social conflict in their environment, whereas 73 (43%) acknowledged the occurrence of conflicts. The spatial patterns of social conflict are shown in Figure 2. Notably, many conflicts are linked to land acquisition disputes between residents and the government, occasionally escalating into physical confrontations. Furthermore, tensions arising from illegal levies by local thugs near the bridge area have contributed to social discord, affecting community cohesion and perceptions of the infrastructure project.

c. Livelihoods/Occupation

Table 3. Types of Occupations of the Population

Occupation	Number	Percentage (%)
Traders	38	24
Entrepreneurs	33	21
Civil Servants	22	14
Fishermen	31	20
Security Personnel	6	4
Unemployed	26	17
Total	156	100

Source: Data Analysis Results, 2024

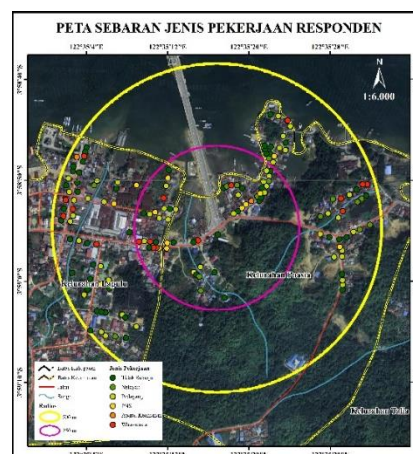


Figure 3. Map of Respondents' Occupation Distribution in Abeli Subdistrict

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As shown in Table 3, the predominant occupations among residents are traders (24%) and entrepreneurs (21%), followed by fishermen (20%) and civil servants (14%). Security personnel constituted a smaller segment (4%), while 17% of respondents were unemployed. Figure 3 shows the spatial distribution of these occupations. The dominance of trade-related livelihoods highlights the economic vibrancy of the bridge area, suggesting that improved accessibility may support local commerce and fishing activities.

2. Economic Conditions of the Community

a. Income

Table 4. Community Income Levels

Occupation	Number	Percentage (%)
Rp. 0	20	13
< Rp. 1.000.000	0	-
Rp. 1.000.000 – Rp. 2.000.000	64	41
Rp. 2.000.001 – Rp. 3.000.000	41	26
Rp. 3.000.001 – Rp. 4.500.000	29	19
>Rp. 4.500.001	2	1
Total	156	100

Source: Data Analysis Results, 2024

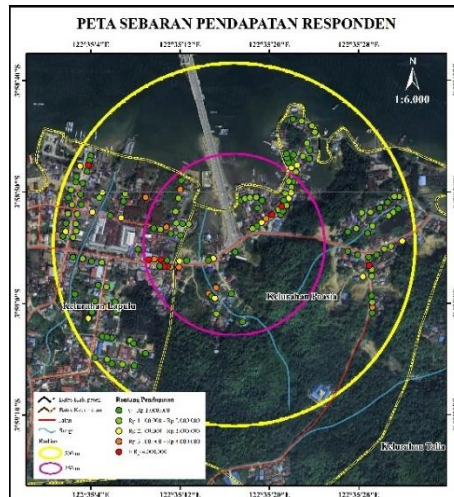


Figure 4. Map of Respondents' Income Distribution in Abeli Subdistrict

Table 4 details the income distribution, revealing that the largest group (41%) earns between Rp. 1,000,000 and Rp. 2,000,000 monthly, followed by 26% earning Rp. 2,000,001 to Rp. 3,000,000, and 19% earned between Rp. 3,000,001 and Rp. 4,500,000. A small minority (1%) earned above Rp. 4,500,001, while 13% reported no income. Figure 4 spatially maps these income levels, contextualizing economic disparities within the subdistrict. Comparisons with regional income averages would help situate these findings within a broader economic context.

b. Expenditure

Table 5. Community Expenditure Levels

Occupation	Number	Percentage (%)
Rp. 0	0	0
< Rp. 1.000.000	98	63
Rp. 1.000.000 – Rp. 2.000.000	15	10
Rp. 2.000.001 – Rp. 3.000.000	2	1.3
Rp. 3.000.001 – Rp. 4.500.000	1	0.7
>Rp. 4.500.001	5	3.2
Total	156	100

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Source: Data Analysis Results, 2024

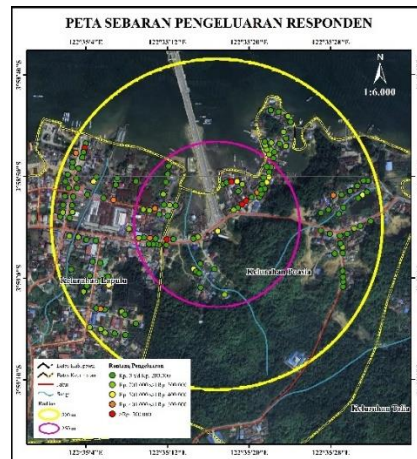


Figure 5. Map of Respondents' Expenditure Distribution in Abeli Subdistrict

Table 5 shows that 63% of respondents have monthly expenditures below Rp. 1,000,000, with smaller proportions spending higher amounts. However, inconsistencies between the table categories and textual descriptions should be clarified to ensure accuracy. Figure 5 visualizes the expenditure patterns, offering insights into community consumption behaviors and financial constraints.

3. Simple Linear Regression Analysis

Table 6 presents the regression analysis with bridge infrastructure as the independent variable and social conditions as the dependent variable. The regression coefficient (b) of 0.421 was statistically significant ($p < 0.001$), indicating a positive influence of the bridge on social conditions, such as community interactions and access to facilities. The standardized coefficient (Beta) of 0.503 suggests a moderate effect.

Table 6. Simple Linear Regression Test (Social Condition)

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	18,045	1,764		10,231	0,000
Bridge Infrastructure	0,421	0,058	0,503	7,225	0,000

a. Dependent Variable: Social

Source: Data Analysis Results, 2024

The regression coefficient (b) of 0.421, with a significance level of 0.000 (less than 0.005), indicates a positive and significant influence of bridge infrastructure development on the social conditions of the community.

Next, considering the independent variable (X) as bridge infrastructure and the dependent variable (Y) as the economic condition of the community in Abeli Subdistrict, the results are presented in Table 7.

Table 7. Simple Linear Regression Test (Social Condition)

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	14,405	2,415		5,966	0,000
Bridge Infrastructure	0,473	0,080	0,432	5,937	0,000

a. Dependent Variable: Economic

Source: Data Analysis Results, 2024

The regression coefficient (b) of 0.473 with a significance level of 0.000 (less than 0.005) indicates a positive and significant influence of bridge infrastructure development on the community's economic improvement.

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To determine the magnitude of the effect of bridge infrastructure on social and economic conditions using simple linear regression, Table 8 presents the results of the coefficient of determination test for infrastructure variables against social variables.

Table 8. Coefficient of Determination Test (R^2) of Infrastructure on Social Condition

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.503a	0,253	0,248	3,110

Predictors: (Constant), Bridge Infrastructure

Dependent Variable: Social

Source: Data Analysis Results, 2024

The correlation coefficient (R) is 0.503, with a coefficient of determination (R^2) of 0.253, indicating that 25.3% of the variation in social condition (Y) is explained by the bridge infrastructure (X). This suggests that the social condition of the community can be influenced by 25.3% through the development of bridge infrastructure, while the remaining 74.7% is influenced by other variables not covered in this study.

Table 9. Coefficient of Determination Test (R^2) of Infrastructure on Economic Condition

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.432a	0,186	0,181	4.258

Predictors: (Constant), Bridge Infrastructure

Dependent Variable: Economic

Source: Data Analysis Results, 2024

The correlation coefficient (R) is 0.432, with a coefficient of determination (R^2) of 0.186, indicating that 18.6% of the variation in economic condition (Y) is explained by the bridge infrastructure (X). This means that the economic condition of the community is influenced by 18.6% due to bridge infrastructure development, while 81.4% is affected by variables outside this research.

The F-test results are presented below to test whether bridge infrastructure variables significantly influence social and economic variables simultaneously.

Table 10. Simultaneous Test (F) Results of Infrastructure on Social Condition

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	505,042	1	505,042	52,201	.000 ^b
Residual	1489,951	154	9,675		
Total	1994,994	155			

a. Dependent Variable : Social

b. Predictors (Constant), Bridge Infrastructure

Source: Data Analysis Results, 2024

Table 11. Simultaneous Test (F) Results of Infrastructure on Economic Condition

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	639,076	1	639,076	35,244	.000 ^b
Residual	2792,482	154	18,133		
Total	3431,558	155			

a. Dependent Variable : Economic

b. Predictors (Constant), Bridge Infrastructure

Source: Data Analysis Results, 2024

Discussion

1. Social Conditions of the Community

The Bahteramas Bridge has significantly transformed community interactions by enhancing connectivity between regions. Previously, residents separated by Kendari Bay faced considerable physical and social barriers that limited their communication and interaction. With the bridge in place, mobility has become easier, enabling the expansion of social networks and fostering stronger community ties in the area (Tasch, 2021; Jensen et al., 2023)). Qualitative feedback from residents indicated that increased social gatherings and cooperative activities were facilitated by improved access.

However, enhanced connectivity has introduced new social challenges. The influx of external values and customs has altered the traditional social fabric, occasionally leading to community tensions. Notably, conflicts related to land acquisition disputes between residents and government authorities have surfaced, often resulting in protests and strained relationships between the two parties. Additionally, illegal levies imposed by local groups around the bridge area have generated friction and undermined social cohesion and public trust.

In the educational sector, the bridge has had a positive impact by reducing distance barriers to schools, which have historically hindered student attendance. Local school data reveal a decrease in dropout rates since the bridge's completion, which is attributed to reduced travel times and costs. Surveys suggest that students and parents feel more encouraged to pursue formal education because of these improved conditions. Petre et al (2024) revealed in his research findings that there is a significant correlation between travel time to school, family financial situation, and attitudes toward education, which affects dropout rates in various satellite cities. Addressing the challenge of school dropouts promises social improvement and empowers policymakers to enact more inclusive policies that benefit all members of society.

Despite these social changes, the community's occupational structure remains relatively stable, with fishing, trading, and entrepreneurial activities continuing to dominate. This reflects the longstanding economic character of Kendari Bay as a fisheries and trade center. Nonetheless, there has been a measurable increase in individuals engaged in trade and entrepreneurship, indicating the community's adaptive response to the emerging economic opportunities brought about by the bridge (Ma et al., 2021; Zhang & Ji, 2024). This is in line with research Blankespoor et al (2022) that the bridge has led to an economic revival in the Jamuna hinterland with increased agricultural productivity and population density, despite a decline in the share of manufacturing employment. The impact is spatially heterogeneous, with a substantial decline in manufacturing in the central subregion, while the remote areas reap the greatest benefits.

2. Economic Conditions of the Community

The construction of the Bahteramas Bridge has materially increased community income levels through direct and indirect channels. The presence of bridge construction workers boosted local consumption, benefiting traders and service providers nearby. Post-construction, the bridge has facilitated smoother logistics and expanded market reach for traders and small-to medium-sized enterprises, thereby increasing trade volume and economic activity. Moreover, the bridge has attracted visitors and tourists, particularly during the evening, spurring the growth of new businesses and informal economic ventures.

Survey data indicate that individuals earning between Rp. 1,000,000 and Rp. 2,000,000 are predominantly fishermen, traders, and entrepreneurs, while those in higher income brackets (Rp. 1,500,000 to Rp. 3,000,000) are mainly civil servants and security personnel.

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This distribution reflects both the traditional economic base and the stable government employment sectors.

Regarding expenditures, while some community members, particularly those relocated due to the bridge project, faced significant moving costs, such as transporting belongings and securing new housing, the overall transportation expenses for the community decreased. Residents now save substantially on fuel and ferry fees, with research indicating monthly expenditure reductions ranging from Rp. 100,000 to Rp. 350,000. These savings alleviate financial burdens and enhance disposable income for other needs.

3. Impact of Bahteramas Bridge Development on the Socioeconomic Conditions of the Community

Statistical analysis confirmed that bridge infrastructure development has a positive and significant effect on the socioeconomic conditions of Abeli Subdistrict residents. The significance level ($p < 0.001$) robustly supports this relationship, while a correlation coefficient (R) of 0.650 and an R^2 value of 0.422 indicate that 42.2% of the variation in socioeconomic conditions is explained by bridge infrastructure, with the remainder attributable to other social, economic and environmental factors.

Key social impacts include improved educational access owing to shorter, more accessible routes to schools, resulting in increased educational attainment. Infrastructure also fosters enhanced social relationships, as community members collaborate to manage emerging challenges and opportunities. Economically, the bridge facilitates easier intercity access and reduces transportation costs, thereby streamlining daily commutes and stimulating new business ventures (Cai et al., 2024; Kim et al., 2018; Yavuz et al., 2017). Alhassan and Anciaes (2025) revealed that better transportation infrastructure can increase economic activity by providing better access to jobs and markets. This can lead to higher household incomes and overall economic growth. Katrenko et al. (2020) also added that improving public transportation can also support local businesses by increasing pedestrian traffic and customer access.

Conclusion

The construction of the Bahteramas Bridge has had a significant positive impact on the socioeconomic conditions of the Abeli Subdistrict community. Statistical analysis revealed regression coefficients of 0.421 for the social dimension and 0.473 for the economic dimension, both statistically significant ($p < 0.001$), indicating meaningful relationships. Practically, these coefficients suggest that bridge infrastructure substantially improves social connectivity and economic well-being among residents. Socially, the bridge enhances connectivity among communities previously separated by Kendari Bay and facilitates easier access to educational institutions in the area. However, it has also generated social challenges, including conflicts related to land acquisition and the emergence of illegal levies around the bridge area. Addressing these tensions through community engagement and equitable policy measures is essential to ensure sustainable development.

Economically, the bridge contributes to increased community income, particularly among traders and entrepreneurs, driven by heightened consumption by construction workers and the creation of new business opportunities. While income gains appear promising, further research is needed to assess their sustainability and broader impact on poverty alleviation and economic diversification. Additionally, transportation expenditures decreased by approximately Rp. 100,000 to Rp. 350,000 per month, providing tangible financial relief to the residents. However, this reduction may vary across different community segments depending on income levels and occupational status, suggesting the need for targeted support to maximize benefits equitably.

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