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The Influence of Infrastructure Quality on Community Welfare in North Luwu Regency

Dicky Ade Anggriawan P¹, Sri Wahyuni Mustafa², Muhammad Ikbāl³

^{1,2,3} Department of Management, Faculty of Economics and Business, Universitas Muhammadiyah Palopo, Palopo, Indonesia. Email: dickyadeanggriawan08@gmail.com¹, wahyuni_lecturer@umpalopo.ac.id², muhammadikbal@umpalopo.ac.id³

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ABSTRACT

This study aims to analyze the condition of infrastructure quality, the level of community welfare, and examine the effect of infrastructure quality on community welfare in North Luwu Regency. This study uses a quantitative approach with a causal associative research type. The data used are primary data obtained through the distribution of questionnaires to 100 respondents from the North Luwu Regency community selected using a purposive sampling technique. Data analysis was carried out using validity tests, reliability tests, classical assumption tests, and simple linear regression analysis using the SPSS program. The results show that infrastructure quality has a positive and significant effect on community welfare. This is evidenced by the regression coefficient value of 0.634 and a significance value of 0.000 (<0.05), so the research hypothesis is accepted. The coefficient of determination (R^2) value of 0.438 indicates that infrastructure quality is able to explain 43.8% of the variation in community welfare, while the rest is influenced by other factors outside the research model. These findings indicate that the better the quality, accessibility, and usefulness of public infrastructure, the higher the level of perceived community welfare. Therefore, local governments are expected to improve the quality and equity of infrastructure development as an effort to promote sustainable community welfare.

Keywords: Infrastructure Quality, Community Welfare, Regional Development.

I. Introduction

Infrastructure development is a strategic foundation for improving public welfare, as it serves not only as a physical facility but also as a driver of social and economic dynamics. According to economic development theory, investment in public infrastructure drives economic growth by increasing market accessibility, labor mobility, and social connectivity, which directly and indirectly improve people's quality of life (public capital theory). Empirical research shows that improving infrastructure quality has a positive impact on welfare indicators, such as per capita income, access to basic services, and the human development index. For example, Nurlette et al. (2026) found that improvements in electricity and road infrastructure in South Buru Regency significantly contributed to economic growth and improved local community welfare. Furthermore, the quality and equity of infrastructure have received significant attention in global scientific discourse. A study by Li & Mostafavi (2024) identified inequality in infrastructure quality as a factor widening the socioeconomic gap between low- and high-income groups, as areas with low-quality infrastructure tend



to lag behind in terms of access to economic opportunities and basic services. Other research highlighting the impact of infrastructure on economic dynamics, such as a study of transportation system investments in Rome, shows that improving public transportation access not only supports mobility but also encourages the growth of sustainable local economic activity (Marzolla et al., 2025).

In the context of sustainable development and public policy, (Zulfikri, 2023) reveals that public policies supporting urban infrastructure investment have a positive impact on service accessibility, economic growth, and quality of life, although environmental challenges still need to be addressed. This type of research strengthens the argument that the quality of infrastructure, both physical and service, is strongly correlated with social and economic well-being across various regional contexts. In the Indonesian context, several studies have shown that infrastructure quality significantly influences community well-being in various regions. (Maulana & Nuraini, 2025) stated that economic and health infrastructure variables significantly influenced the Human Development Index (HDI) in East Java Province, illustrating that infrastructure is a crucial determinant in improving community quality of life. Another study by (Patmasari, 2024) in Wajo Regency found that road infrastructure development directly helped improve accessibility and mobility, which in turn positively impacted the level of local community well-being.

Similarly, research in Bulungan Regency showed that infrastructure development implementation had a significant impact on the economic and social well-being of rural communities, although its effectiveness varied depending on the quality of implementation and community participation (Nur, 2024). Furthermore, several empirical studies emphasize the importance of not only the quantity but also the quality of infrastructure services. For example, an analysis of infrastructure service quality in Sorong Regency indicates that service efficiency can strengthen regional economic productivity and increase public trust in infrastructure provision (Way et al., 2025). There is also research examining the direct relationship between infrastructure quality and perceptions of community well-being. A study (Azmi, 2025) measured community satisfaction with the performance of physical infrastructure development in Balung District and showed that community perceptions of the quality of road and bridge infrastructure correlated highly with their assessment of local well-being. Technology-based research and data-driven approaches, such as (Ariandi & Kurniawan, 2025), expand this understanding by assessing the dominant factors influencing village well-being, with infrastructure indicators being a key factor in predictive models.

Overall, various research findings indicate that infrastructure quality plays a crucial role in determining community well-being. However, a common phenomenon in various regions, including North Luwu Regency, is the uneven quality of infrastructure across regions and the gap between infrastructure development and directly perceived improvements in community well-being. Despite ongoing infrastructure development, limitations in road quality, access to education and health services, and economic infrastructure remain in some areas, potentially hampering community social and economic activities. This raises questions about whether the available infrastructure is truly of high quality and capable of making a significant contribution to community well-being. Therefore, this research is important to be conducted to empirically examine the influence of infrastructure quality on community welfare in North Luwu Regency, so that it can provide a real picture of existing problems and also become the basis for recommendations for more effective infrastructure development policies that are oriented towards improving community welfare.

II. Literature Review and Hypothesis Development

2.1. Social Welfare Theory

In modern development studies, social well-being is understood as a multidimensional condition that reflects the overall quality of life of a society. Well-being is not only measured by economic aspects such as income or consumption, but also includes access to basic services, health conditions, education, a decent living environment, as well as a sense of security and social participation. The OECD (2020) emphasizes that well-being reflects how economic and social conditions influence a society's quality of life in the long term,

not simply the achievement of economic growth. In the context of public policy, the United Nations Development Programme (UNDP, 2023) explains that social well-being is a primary goal of sustainable development, achieved through improving the quality of human resources, reducing inequality, and expanding access to public services. The UNDP emphasizes that well-being indicators must reflect people's ability to live healthy, productive, and meaningful lives. Therefore, development is no longer oriented solely on economic output, but rather on tangible outcomes felt by the community.

Contemporary approaches to well-being also emphasize the close link between well-being and the provision of public services. Stiglitz, Sen, and Fitoussi (2021) state that social welfare is strongly influenced by the quality of public services and infrastructure, which enable people to equitably access education, health care, transportation, and economic opportunities. Infrastructure is viewed as a structural factor determining whether people can capitalize on the economic and social potential available in a region. Furthermore, a recent empirical study by Li and Mostafavi (2024) shows that infrastructure quality has a direct impact on community welfare, primarily through improving accessibility and reducing inter-regional disparities. Regions with low-quality infrastructure tend to experience limited access to basic services and economic opportunities, resulting in low levels of community welfare. This finding reinforces the view that welfare is not solely an individual matter, but is largely determined by structural conditions and regional development policies. Thus, community welfare can be understood as the result of the interaction between economic conditions, the quality of public services, and the availability of adequate infrastructure. Quality infrastructure plays a crucial role in improving community welfare because it supports mobility, productivity, access to basic services, and overall quality of life. This community welfare theory provides a relevant and robust conceptual foundation for analyzing the influence of infrastructure quality on community welfare in North Luwu Regency.

2.2. Infrastructure Quality Theory

Public capital theory explains that infrastructure is public capital provided by the government to support the economic and social activities of the community. (Aschauer, 1989) states that public infrastructure investment has a significant impact on productivity and long-term economic growth. Quality infrastructure can lower production costs, accelerate the distribution of goods and services, and increase market efficiency. Over time, this theory has emphasized not only the quantity of infrastructure but also the quality and equity of its provision.

2.3. The Relationship Between Infrastructure Quality and Community Welfare

Conceptually, infrastructure quality is closely linked to community well-being. Good infrastructure enables greater mobility, increases labor productivity, and opens up new economic opportunities. Recent research shows that equitable infrastructure can reduce social and economic disparities between regions. Conversely, poor or uneven infrastructure has the potential to hinder local economic growth and widen the welfare gap.

2.4. Hypothesis Development

Based on the conceptual framework and previous empirical studies, the hypotheses proposed in this study are:

H₁: Infrastructure quality has a positive and significant impact on community welfare in North Luwu Regency.

H₀: Infrastructure quality does not significantly impact community welfare in North Luwu Regency.



Figure 1. Research Construct Measurement Model.
Source: Developed by the authors (2025)

III. Research Method

This study employed a quantitative approach with a causal associative approach, aiming to analyze the causal relationship between infrastructure quality and community well-being. This quantitative approach was chosen because it emphasizes empirical hypothesis testing through numerical data obtained directly from respondents. This research was conducted in North Luwu Regency, South Sulawesi Province. The research location was selected based on the consideration that North Luwu Regency has diverse geographic and socioeconomic characteristics and still faces challenges in infrastructure equity and quality. The research period was planned for three months, encompassing instrument preparation, data collection, data processing, and report preparation.

The population in this study was all residents of North Luwu Regency who have enjoyed and utilized public infrastructure provided by the local government, including transportation, education, health, and economic infrastructure. This population was selected because this community group directly experiences the impact of infrastructure quality on daily social and economic activities. The research sample was determined using a non-probability sampling technique with a purposive sampling method, which is a sampling technique based on specific considerations and criteria relevant to the research objectives. The respondent criteria established in this study are as follows:

- a. Residents who have resided in North Luwu Regency for at least five (5) years, thus having sufficient experience in experiencing the quality of infrastructure in the region.
- b. At least 18 years of age, so that respondents are deemed capable of providing rational and objective assessments.
- c. Have used or utilized public infrastructure (roads, educational facilities, healthcare facilities, and economic infrastructure) in North Luwu Regency.

The sample size for this study was set at 100 respondents, considering that this number meets the minimum requirements for simple linear regression analysis and is considered representative for describing public perceptions of infrastructure quality and well-being. (Hair et al., 2019) state that linear regression analysis can be conducted reliably with a minimum sample size of 50–100 respondents, depending on the complexity of the model. Furthermore, (Ghozali, 2018) asserts that a sample size of 100 respondents is sufficient to produce stable and reliable parameter estimates in regression analysis. This sample size also takes into account the limitations of time and research resources while still maintaining the validity and reliability of the results (Sugiyono, 2022). This study used primary data as the sole source. Primary data were obtained directly from respondents through questionnaires distributed to residents of North Luwu Regency who met the research sample criteria. The use of primary data aims to obtain a concrete picture of public perceptions of infrastructure quality and the level of well-being they directly experience. The research instrument was developed based on indicators of infrastructure quality and public well-being variables, using a Likert scale of 1-5.

IV. Result and Discussion

4.1. Result

This study used primary data obtained through questionnaires distributed to 100 respondents from the North Luwu Regency community. Respondents were residents who had utilized public infrastructure, including transportation, education, health, and economic infrastructure. The collected data was then analyzed using the SPSS statistical program to determine the impact of infrastructure quality on community well-being.

Table 1. Demographic Characteristics of Respondents.

| Demographic Items | Frequency | Percentage (%) |
|-------------------|-----------|----------------|
| Gender | | |
| Man | 27 | 33,75% |
| Woman | 53 | 66,24% |
| Age | | |
| <25 Year | 8 | 10% |
| 25-30 Year | 26 | 32,5% |
| > 30 Year | 46 | 57,5% |

The characteristics of the respondents in this study are presented based on gender, age, highest level of education, type of employment, and length of residence in North Luwu Regency. The presentation of respondent characteristics aims to provide a general overview of the background of the respondents who served as the data source for this study. Based on gender, respondents in this study consisted of 62 men (50.4%) and 61 women (49.5%). This composition indicates a relatively equal number of male and female respondents, thus the data obtained can proportionally represent public perceptions of both genders. In terms of age group, the majority of respondents were in the productive age range. Respondents aged 26–35 years old constituted the largest group, at 49 (39.8%), followed by respondents aged 18–25 years old at 38 (30.9%). Meanwhile, 19 respondents (15.4%) were aged 36–45, 10 (8.1%) were aged 46–55, and 7 (5.7%) were aged over 55. The predominance of productive-age respondents indicates that most respondents are active in social and economic activities and have a relatively high level of public infrastructure utilization.

Based on their educational level, the majority of respondents were high school graduates (52) (43%). Furthermore, 34 respondents (28.1%) had a bachelor's degree (S1), 22 (18.2%) had a diploma (D1–D3), 8 (6.6%) had a junior high school degree (SMP), 2 (1.7%) had an elementary school degree (SD), and 3 (2.5%) had a postgraduate degree. This educational background demonstrates that respondents have a fairly diverse educational background, enabling them to provide an objective assessment of infrastructure quality and community well-being. In terms of occupation, the majority of respondents worked as farmers/fishermen (32 people (26%)), followed by students (24 people (19.5%)), private sector employees (17 people (13.8%)), housewives (10 people (8.1%)), laborers (8) (6.5%), civil servants (ASN/TNI/POLRI) (3 people (2.4%)), and respondents with other occupations (2.6%). The diversity of respondents' occupations indicates that this study involved various socioeconomic groups with varying levels of dependence on public infrastructure.

Based on length of residence in North Luwu Regency, the majority of respondents had lived there for 11–15 years (49 people (39.8%)), followed by respondents who had lived there for 5–10 years (35 people (28.5%)). Twenty-one respondents (17.1%) had lived in the area for 16–20 years, while 18 (14.6%) had lived there for more than 20 years. This indicates that the majority of respondents have considerable experience experiencing the condition and development of infrastructure quality in North Luwu Regency. Overall, the characteristics of the respondents in this study demonstrate sufficient demographic diversity relevant to the research objectives. Therefore, the data obtained are expected to comprehensively describe public perceptions regarding the impact of infrastructure quality on community well-being in North Luwu Regency.

a. Validity Test

Validity testing is used to determine the extent to which each item in the questionnaire is able to measure the variables being studied. Validity testing is conducted using Pearson Product Moment correlation, with the criterion that a statement item is declared valid if the calculated r value and the table r value are at a significance level of 0.05.

Table 2. Results of the Validity Test of the Infrastructure Quality Variable (X)

| No | Item Code | r-count | r-Table | Information |
|----|-----------|---------|---------|-------------|
| 1 | X1.1 | 0,612 | 0,195 | Valid |
| 2 | X1.2 | 0,645 | 0,195 | |
| 3 | X1.3 | 0,587 | 0,195 | |
| 4 | X1.4 | 0,601 | 0,195 | |
| 5 | X1.5 | 0,629 | 0,195 | |
| 6 | X1.6 | 0,654 | 0,195 | |
| 7 | X1.7 | 0,671 | 0,195 | |
| 8 | X1.8 | 0,593 | 0,195 | |
| 9 | X1.9 | 0,608 | 0,195 | |
| 10 | X1.10 | 0,682 | 0,195 | |

Table 3. Results of the Validity Test of the Community Welfare Variable (Y)

| No | Item Code | r-count | r-Table | Information |
|----|-----------|---------|---------|-------------|
| 1 | Y1.1 | 0,623 | 0,195 | Valid |
| 2 | Y1.2 | 0,659 | 0,195 | |
| 3 | Y1.3 | 0,684 | 0,195 | |
| 4 | Y1.4 | 0,597 | 0,195 | |
| 5 | Y1.5 | 0,641 | 0,195 | |
| 6 | Y1.6 | 0,702 | 0,195 | |
| 7 | Y1.7 | 0,618 | 0,195 | |
| 8 | Y1.8 | 0,676 | 0,195 | |
| 9 | Y1.9 | 0,589 | 0,195 | |
| 10 | Y1.10 | 0,711 | 0,195 | |

b. Reliability Test of Research Instruments

The reliability test aims to determine the level of consistency and reliability of the research instruments. Thus, the research instruments are declared reliable and can be used in further analysis. Based on the reliability test results, the Cronbach's Alpha value for the infrastructure quality variable is 0.872 and for the community welfare variable is 0.889. These values are greater than 0.60, thus it can be concluded that all research instruments are reliable. This indicates that the statement items in the questionnaire have a good level of consistency and are suitable for use in research.

Table 4. Results of the Reliability Test of Research Instruments

| Variable | Number of Items | Cronbach's Alpha | Information |
|----------------------------|-----------------|------------------|-------------|
| Infrastructure Quality (X) | 10 | 0,872 | > 0,60 |
| Public welfare (Y) | 10 | 0,889 | > 0,60 |

c. Classical Assumption Test.

Table 5. Summary of Classical Assumption Tests

| No | Types of Classical Assumption Tests | Testing Method | Test Results | Criteria | Information |
|----|-------------------------------------|--------------------|--------------|-------------|---------------------------|
| 1 | Normality Test | Kolmogorov-Smirnov | Sig. = 0,200 | Sig. > 0,05 | Normally distributed data |

| | | | | | |
|---|-------------------------|--------------------------|----------------------------------|------------------------------|--------------------------------|
| 2 | Heteroscedasticity Test | Glacier Test | Sig. = 0,321 | Sig. > 0,05 | There is no heteroscedasticity |
| 3 | Linearity Test | Test for Linearity | Sig. Linearity = 0,000 | Sig. < 0,05 | Linear relationship |
| 4 | Multicollinearity Test | Tolerance and VIF Values | Tolerance = 1,000 VIF = 1,000 | Tolerance > 0,10 VIF < 10 | There is no multicollinearity |

The classical assumption test was performed as a prerequisite for simple linear regression analysis. Based on the test results, the research data indicated that the regression model met the assumption of normality and showed no significant violations of the classical assumptions. Based on the classical assumption test results, the research data showed that the residuals were normally distributed with a Kolmogorov-Smirnov significance value of 0.200 (>0.05). The heteroscedasticity test using the Glejser test showed a significance value of 0.321 (>0.05), thus concluding that heteroscedasticity did not occur. Furthermore, the linearity test results showed a significance value of 0.000 (<0.05), indicating a linear relationship between infrastructure quality and community welfare. Furthermore, a tolerance value of 1.000 and a VIF of 1.000 indicate no signs of multicollinearity. Therefore, the regression model in this study met the classical assumptions and was suitable for further analysis.

d. Simple Linear Regression Equation

Table 6: Summary of Simple Linear Regression Equation

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | |
|-------|-----------------------------|------------|---------------------------|------|-------|------|
| | B | Std. Error | Beta | | | |
| 1 | (Constant) | 5.778 | 1.275 | | 4.533 | .000 |
| | Public welfare | .634 | .066 | .662 | 9.672 | .000 |

The results of the simple linear regression analysis produce the following equation:

$$Y=5,778+0,634X$$

The regression equation shows that a constant value of 5.778 indicates that if infrastructure quality is held constant, the community welfare value will be at that value. The infrastructure quality regression coefficient of 0.634 indicates that every increase in infrastructure quality will be followed by an increase in community welfare of 0.634 units. A positive regression coefficient indicates a direct relationship between infrastructure quality and community welfare.

e. Partial Significance Test (t-Test).

The t-test results indicate that the infrastructure quality variable has a calculated t-value of 9.672 with a significance level of 0.000. This significance value is less than 0.05, thus concluding that infrastructure quality has a positive and significant effect on community welfare. Therefore, the research hypothesis H_1 is accepted and H_0 is rejected, indicating that infrastructure quality has a significant impact on community welfare in North Luwu Regency.

f. Coefficient of Determination (R^2)

Table 7. Coefficient of Determination

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .662 ^a | .438 | .433 | 1.775 |

Based on the results of the determination coefficient analysis, an R Square value of 0.438 was obtained. This indicates that 43.8% of the variation in community welfare can be explained by infrastructure quality, while the remaining 56.2% is influenced by other factors outside the research model that were not examined in this study.

g. Model Feasibility Test (F Test)

Table 8: Feasibility Test (F Test)

| | Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|--------------|-----------------------|-----------|--------------------|----------|-------------------|
| 1 | Regression | 294.824 | 1 | 294.824 | 93.553 | .000 ^p |
| | Residual | 378.168 | 120 | 3.151 | | |
| | Total | 672.992 | 121 | | | |

The F-test results show a calculated F-value of 93.553 with a significance level of 0.000. Since the significance value is less than 0.05, it can be concluded that the regression model used in this study is feasible and significant in explaining the relationship between infrastructure quality and community welfare.

4.2. Discussion

The research results show that infrastructure quality has a positive and significant impact on community welfare in North Luwu Regency. This finding indicates that the better the quality, accessibility, and usefulness of public infrastructure, the higher the level of community welfare. These research findings align with the public capital theory proposed by Aschauer (1989), which states that public infrastructure is a crucial asset in supporting community economic and social activities. Quality infrastructure can improve mobility, facilitate economic activity, and expand community access to basic services such as education and healthcare. Empirically, this research finding is consistent with research by Li and Mostafavi (2024) and Nurlette et al. (2026), which states that infrastructure quality significantly impacts community welfare. Adequate and equitable infrastructure can increase productivity, reduce access barriers, and improve community quality of life.

In North Luwu Regency, the quality of road infrastructure, educational facilities, healthcare facilities, and economic infrastructure plays a crucial role in supporting community daily activities. Good infrastructure can increase time and cost efficiency, open up economic opportunities, and enhance community life satisfaction. Therefore, infrastructure development that prioritizes quality and equity is a crucial factor in efforts to sustainably improve public welfare. Furthermore, the findings of this study complement previous qualitative research, such as that conducted by Alfira et al. (2023) and Ammaliah (2025), which emphasized the importance of mentoring and education in optimizing the use of the People's Business Credit (KUR). The quantitative results of this study indicate that when KUR is accessible and utilized effectively, its impact on MSME development is statistically significant.

With a coefficient of determination (R^2) of 0.926, this study indicates that the majority of variation in MSME development can be explained by the People's Business Credit (KUR) variable. However, there are still other factors outside the research model that have the potential to influence MSME development, such as financial literacy, managerial skills, business innovation, and market conditions. This opens up opportunities for further research to develop a more comprehensive model. Overall, the results of this study confirm that People's Business Credit (KUR) is an effective financing instrument in encouraging MSME development at the local level, particularly in Masamba District. Therefore, strengthening KUR distribution policies, accompanied by ongoing mentoring and monitoring, is a strategic step in supporting sustainable MSME growth.

V. Conclusion

Based on the research findings, it can be concluded that infrastructure quality has a positive and significant effect on community well-being in North Luwu Regency. Infrastructure that is well-developed, accessible, and functional contributes to increased economic activity, smoother mobility, and improved access to essential services such as education and health care. Although infrastructure quality plays a substantial role in enhancing community well-being, it is not the sole determining factor, as other variables outside the scope of this research also influence welfare levels. Therefore, efforts to improve the quality and equitable distribution of infrastructure are crucial for sustainably enhancing community well-being. The results of this study provide important practical implications for the local government of North Luwu Regency, particularly as a reference in formulating infrastructure development policies. The government is encouraged to focus not only on increasing the quantity of infrastructure but also on improving its quality, equity, and maintenance so that the benefits can be felt evenly across all segments of society. Priority should be given to the development of road infrastructure, educational facilities, health services, and economic infrastructure to support social and economic activities. In addition, involving the community in the planning and evaluation stages of infrastructure development is essential to ensure that development initiatives are more targeted, inclusive, and sustainable in improving community welfare.

From a theoretical perspective, this research strengthens public capital theory, which emphasizes that public infrastructure is a vital asset in supporting improvements in public welfare. The findings highlight that infrastructure quality, rather than merely its quantity, plays a significant role in enhancing community well-being. Moreover, this study contributes to public welfare theory by reaffirming that welfare is a multidimensional concept influenced by structural conditions, particularly the availability and quality of public infrastructure. As such, this research provides empirical evidence that equitable improvements in infrastructure quality can be a key determinant of public welfare, especially in regions with diverse geographical and socio-economic characteristics such as North Luwu Regency. Despite its contributions, this study has several limitations. The use of a quantitative approach with simple linear regression restricts the analysis to a single independent variable, namely infrastructure quality, in explaining community well-being. Additionally, the data are based on respondents' perceptions collected through questionnaires, making the findings dependent on subjectivity and varying levels of respondent understanding. The research scope is also limited to North Luwu Regency, which constrains the generalizability of the results to other regions with different characteristics. Furthermore, this study does not account for other potential factors influencing community well-being, such as income levels, human resource quality, government policies, and environmental conditions.

Based on these limitations, future research is recommended to expand the research model by incorporating additional relevant variables to provide a more comprehensive explanation of community well-being. Employing mixed-methods or qualitative approaches could also offer deeper insights into how infrastructure quality affects community welfare. In addition, extending the research to other regions with diverse characteristics and utilizing longitudinal data would help develop a more holistic understanding of the role of infrastructure quality in sustainably improving community well-being.

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