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The Influence of the Construction of the Ocarina – Bengkong Bridge on Economic Aspects and Social Aspects In Bengkong District, Batam City

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Abstract

Infrastructure development has the potential to have an important influence on various aspects of regional development. One important piece of infrastructure is a bridge. This study aims to analyze the influence of the construction of the Ocarina - Bengkong Bridge on economic and social aspects in Bengkong sub-district. This research uses quantitative methods by distributing questionnaires to the community around the Bengkong bridge. In the economic aspect, the research results show that the construction of the bridge has made a positive contribution to economic growth in Bengkong sub-district. The availability of better accessibility between Ocarina and Bengkong has increased population mobility, enabled the growth of the trade sector, and supported the development of the tourism sector in the region. Apart from that, the construction of the bridge also triggers an increase in property values and investment around the area. In the social aspect, bridge construction has brought positive changes in people's lives. Better mobility increases social connectivity between regions, facilitates cultural exchange, and strengthens community integration. Apart from that, increasing accessibility also increases people's access to education and health services. However, this study also identified several challenges and negative influences, such as increased traffic flow which can cause congestion and environmental impacts that need to be managed well and wisely. This research provides important insights for policy makers, related parties and the general public about the importance of infrastructure such as bridges in improving the economic and social welfare of a region.

Introduction

Infrastructure development is a key aspect in the economic and social development of a country to meet the basic needs of an increasing number of people. Infrastructure development, including transportation facilities, has an important role, because we are aware of the increasing number of road users who use these facilities. Whether transportation runs smoothly or not will have quite a big impact on people's lives. So, transportation facilities are a very important thing in supporting development in all aspects of people's lives. For this reason, it is necessary to improve adequate transportation facilities and infrastructure, for example roads and bridges (Esmalian et al., 2022; Kaiser & Barstow, 2022). Bridges are a type of construction that is useful for connecting one area with another area that is separated by an obstacle, for example a valley, ravine or river or other obstacles (Ahmad, 2023; Pariela et al., 2024; Rhomaita & Ainayyah, 2022).

Batam City is the largest city in the Riau Islands Province, Indonesia. The Batam City area consists of Batam Island, Rempang Island and Galang Island and other small islands in the Singapore Strait and Malacca Strait areas. Batam City has 12 sub-districts, namely Batam Kota District, Batu Ampar District, Lubuk Baja District, Bengkong District, Nongsa District, Galang

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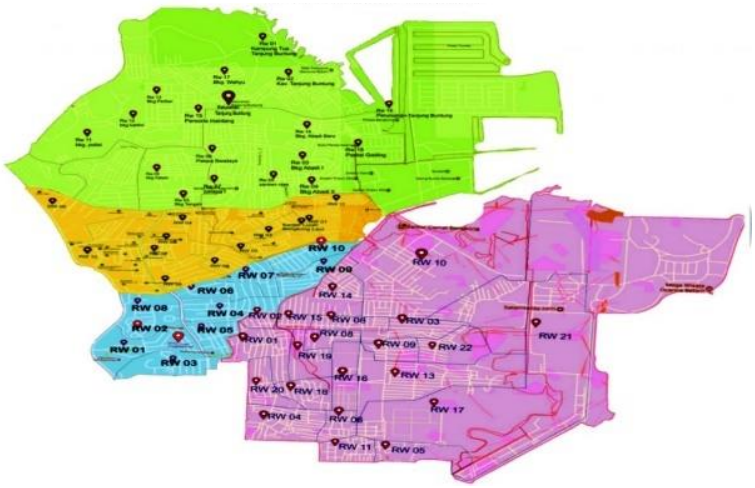
District, Behind Padang District, Sei Beduk District, Sekupang District, Sagulung District, Batu Aji District, Bulang District,

Figure 1. Batam City Map

Source: jdih.batam.go.id

Bengkong District is one of the sub-districts in Batam City with an extensive area 9,800 Hawhich borders Batam Kota District to the southeast and Batu Ampar District to the northwest. Administratively, Bengkong District has 4 (four) sub-districts, namely Bengkong Laut Village, Bengkong Indah Village, Sadai Village, Tanjung Buntung Village.

Bengkong District Area Map



Source: kecbengkong.batam.go.id

The construction of bridge infrastructure has a strategic role in connecting various areas in Batam, one of which is the Ocarina - Bengkong Bridge. The Ocarina - Bengkong Bridge is designed to connect areas in the Bengkong District area, which previously experienced limited accessibility. Bengkong District, with a growing population and significant economic potential, requires increased accessibility to support local economic growth and increase community welfare. Before the bridge, transportation between Ocarina and Bengkong took longer and had higher costs, which hampered the flow of goods, services and population mobility.

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Since 2016, construction of the Ocarina – Bengkong bridge has been completed, which is expected to be useful in opening up economic and social access in Bengkong District.

However, the construction of bridge infrastructure can also have negative impacts, such as increasing traffic flow which can cause congestion and environmental impacts that need to be managed well and wisely.

Research Purposes

The objectives to be achieved from this research are: (1) Analyzing the influence of the construction of the Ocarina - Bengkong bridge on economic aspects; (2) Analyzing the influence of the construction of the ocarina – bengkong bridge on social aspects.

Identification of Problems

The problems that will be discussed in this research include: (1) What is the influence of the construction of the Ocarina - Bengkong bridge on economic aspects in Bengkong sub-district. What is the influence of the construction of the Ocarina - Bengkong bridge on social aspects in Bengkong sub-district.

Methods

Research sites

The research location was carried out in Bengkong sub-district, Batam City. The location of this research was determined with the consideration that the people in Bengkong sub-district felt the direct influence of the construction of the ocarina - Bengkong bridge.

Method of collecting data

The data used in this research are primary and secondary data. Primary data is data taken directly from the research location in Bengkong sub-district through direct observation at the location and filling out a questionnaire. Filling out a questionnaire for the purpose of analyzing the influence of the construction of the Ocarina - Bengkong bridge on economic and social aspects by selecting respondents from the community around the Ocarina - Bengkong bridge. The respondents selected were 80 people with various social and educational backgrounds.

Secondary data is data obtained by conducting literature studies sourced from books and the internet and then this data is used as a reference source in this research.

Data analysis method

The data analysis method in this research was carried out by observing the influence of the construction of the ocarina - Bengkong bridge on economic and social aspects in Bengkong sub-district using quantitative analysis by calculating the level of community perception in terms of their assessment of the influence of the construction of the ocarina - Bengkong bridge on economic and social aspects. social services in Bengkong sub-district. The value calculation is based on several indicators contained in a questionnaire with 80 respondents with the following criteria:

Table 1. Assessment Terms

Answer Choices	Score
Strongly agree	5
Agree	4
Disagree	3
Don't agree	2
Strongly Disagree	1

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This analysis model explains respondents' statements by describing them using tables, and measuring them using a Likert scale. To calculate the assessment score, you can use the formula T x Pn, namely the total number of respondents multiplied by the total assessment score.

Table 2. Example of Valuation Calculation

Information	Score
Maximum	80 respondents x 5 = 400
Minimal	80 respondents x 1 = 80
Median	80 respondents x 3 = 240
Quartile I	80 respondents x 2 = 160
Quartile II	80 espondents x 4 = 320

The total score is then analyzed using the approach (Kurniawan et al., 2021), to determine the level of community participation, as follows: (a) If Quartile II < Score < Maximum; the meaning is very positive (community participation is considered active); (b) If Median < Score < Quartile II; the meaning is positive (community participation is considered quite active); (c) If Quartile I < Score < Median; the meaning is negative (community participation is considered less active); (d) If M minimum < Score < Quartile I; the meaning is very negative (community participation is considered inactive).

Results and Discussion

Understanding Bridge Infrastructure

Infrastructure is a framework or system consisting of physical structures, facilities and technology that supports human activities in an area. This includes various elements needed to facilitate and enable various activities, be it in the fields of transportation, communications, energy, clean water, sanitation, and other public services (Gultom & Tini, 2020). Infrastructure can include road networks, bridges, railways, ports, airports, electricity networks, telecommunications, clean water distribution systems, and much more.

Infrastructure plays a key role in economic, social and environmental development, as well as in improving people's quality of life (Mamirkulova et al., 2020; Grum & Kobal Grum, 2020). Investments in the right infrastructure can improve efficiency, improve connectivity between regions, facilitate economic growth, and increase access to key services such as education and health care (Surya et al., 2021). It also plays a role in strengthening a region's resilience to natural disasters and environmental change.

Infrastructure does not only consist of physical structures, but also includes information, management, and other support systems that support the operation of the physical infrastructure (Agustin & Hariyani, 2023). Therefore, infrastructure is an important foundation for the social, economic and environmental progress of a country or region. By understanding the importance of infrastructure and developing and maintaining good infrastructure, society can achieve sustainable growth and development (Hajian & Kashani, 2021; Omer & Noguchi, 2020).

The construction of the Ocarina - Bengkong Bridge in Batam City is one of the infrastructure projects which is expected to have a positive impact on the economy of the people of Bengkong District. In this discussion, the impact of the bridge construction on various economic aspects will be explained, including increasing accessibility and mobility. One of the direct impacts of the construction of the Ocarina - Bengkong Bridge is increasing accessibility and mobility between two areas previously separated by water. This bridge reduces travel time, from previously having to detour via a longer and more distant road route and frequent accumulation of vehicles. This causes travel costs to become large.

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The construction of the Ocarina - Bengkong Bridge has had a positive impact on the growth of local businesses in Bengkong District, Batam City. One of the main impacts of the construction of the Ocarina Bridge - Bengkong is increasing mobility and accessibility, which is very beneficial for the development of Small and Medium Enterprises (SMEs) in Bengkong District. With this bridge, more and more people from outside the sub-district will visit Bengkong sub-district to just relax and enjoy the culinary tourism available in Bengkong. Residents who visit will be served various types of snacks and food. In this area there are many trading stalls serving contemporary food.

Apart from that, in Bengkong District, traditional market activities are also growing and are starting to be managed well. In this case, the government provides a place and builds trading stalls. Bengkong residents and those from outside Bengkong can shop for kitchen needs, such as fresh fish, fresh meat, fresh vegetables, fruit and also second-hand goods at the market. The construction of the Ocarina - Bengkong bridge also has a positive impact on increasing investment in Bengkong sub-district. This can be seen from the increasing development of business centers in the form of shopping and culinary complexes from foreign companies.

The construction of the Ocarina - Bengkong Bridge has had a positive impact on the tourism sector in Bengkong District, Batam City. This bridge not only improves accessibility but also opens up new opportunities for developing tourist destinations, increasing the number of visits by foreign and domestic tourists. In Bengkong District, there are quite a lot of famous tourist attractions visited by residents from outside Batam and from Batam itself. One of them is Mega Wisata Ocarina which is located on 40 hectares of land on the shores of Kering Bay, and the Coastarina luxury housing complex. there is a beautiful white sandy beach shaded by pine trees, a children's playground area, an open stage with a capacity of 10,000 people and a verdant park equipped with a gazebo and jogging track. Apart from that, there is also an integrated tourist area in Bengkong District in the Golden City area which is complete with hotels, restaurants, snack centers, children's play areas, swimming pools, go-car arenas, houses of worship, dino parks, and much more.

Social Aspects of Bridge Building

Social aspects are various factors that influence people's social life, including interactions between individuals, groups and communities. The construction of the Ocarina Bridge - Bengkong has a positive influence on the social aspects of society in Bengkong District. There are several social impacts arising from the construction of this bridge, including:

Providing easy mobility for people in daily activities such as going to work, going to school and other activities that require mobility. Bengkong residents who will carry out daily activities will pass through the Ocarina - Bengkong bridge to get to their destination, for example residents who will travel to Batam Center will use this bridge to shorten the distance and travel time. Likewise, people from Batam Center who work in Bengkong will pass through the bridge.

Increased accessibility to public services. With the construction of the bridge, it is hoped that the mobility of the people of Bengkong will be easier, so that they can access health, education and public administration services more easily and quickly.

In Bengkong District there are several schools such as the Mondial school which is located close to Batam Kota District. Before the bridge existed, Bengkong residents who went to school at Mondial had to travel further and make a detour, which caused traffic buildup at certain points when school children came in the morning and in the afternoon when school children returned home. With this bridge, it is hoped that school children can arrive on time and not get stuck in traffic jams.

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Community Response to Economic Aspect Variables

Researchers have created a questionnaire containing questions about the impact of the construction of the Ocarina - Bengkong bridge from an economic aspect to obtain alternative answers that are available in this questionnaire. This can be seen from the following pie chart data results:

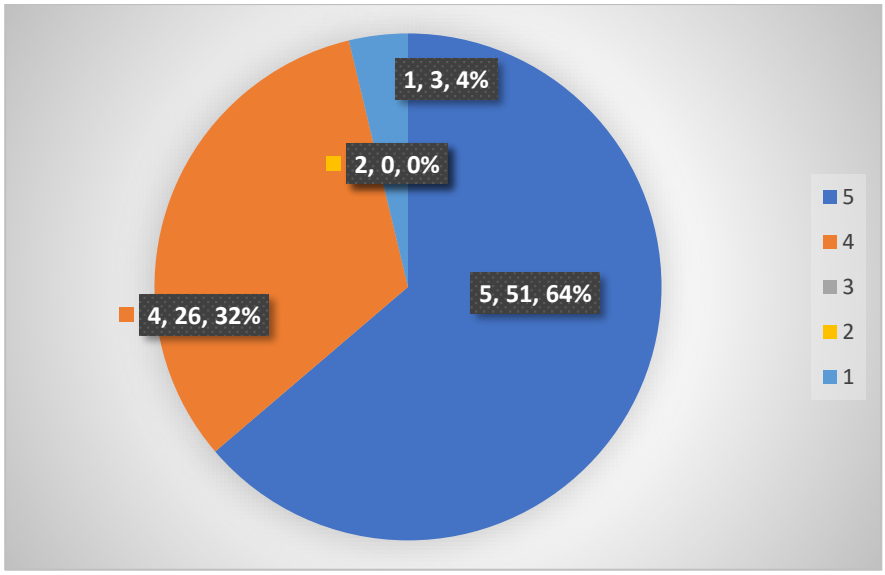

Figure 9. Construction of the Ocarina – Bengkong Bridge opens up accessibility and connectivity between surrounding areas

Based on 80 data obtained from respondents' answers to the variables above, the results were 51 said they strongly agreed (55%), 32 said they agreed (41%) and 3 said they strongly disagreed (4%), which can be seen in the pie diagram above.

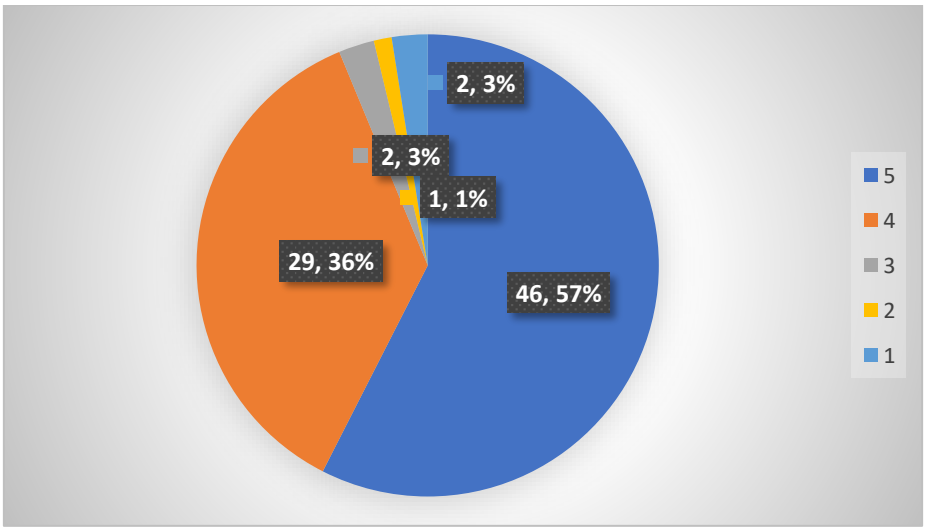

Figure 10. The construction of the Ocarina - Bengkong Bridge encourages economic growth, business opportunities and new jobs in the Bengkong area

Based on 80 data obtained from respondents' answers to the variables above, the results were 46 said they strongly agreed (57%), 29 said they agreed (36%), 2 said they disagreed (3%), 1 said they disagreed (1%), and 2 stated that they strongly disagree (3%), which can be seen in the pie chart above.

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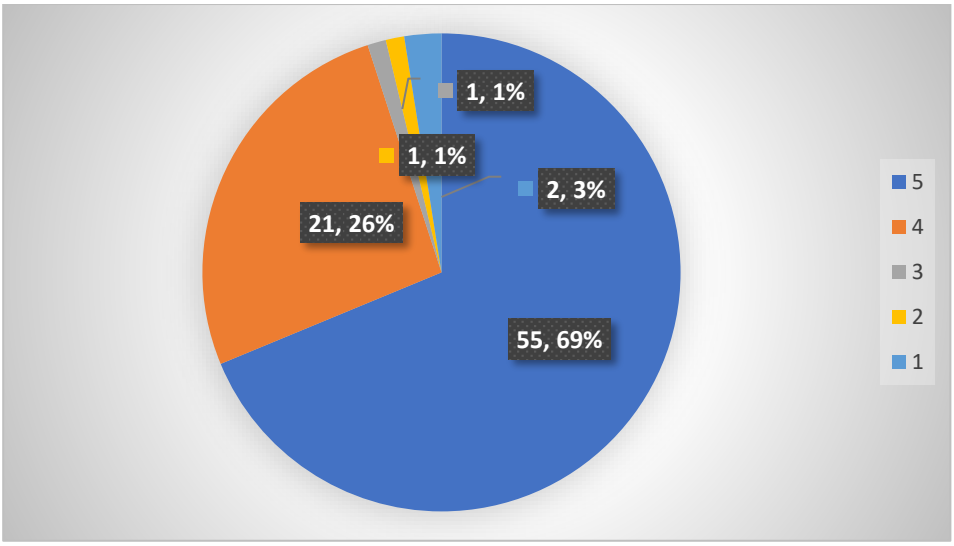

Figure 11. The construction of the Ocarina – Bengkong Bridge has had a positive impact on the tourism sector in the Bengkong area.

Based on 80 data obtained from respondents' answers to the variables above, the results were 55 said they strongly agreed (69%), 21 said they agreed (26%), 1 said they disagreed (1%), 1 said they disagreed (1%), and 2 stated that they strongly disagree (3%), which can be seen in the pie chart above.

Community Response to Social Aspect Variables

Researchers have created a questionnaire containing questions about the influence of the construction of the Ocarina - Bengkong bridge from a social aspect to obtain alternative answers that are available in this questionnaire. This can be seen from the following pie chart data results:

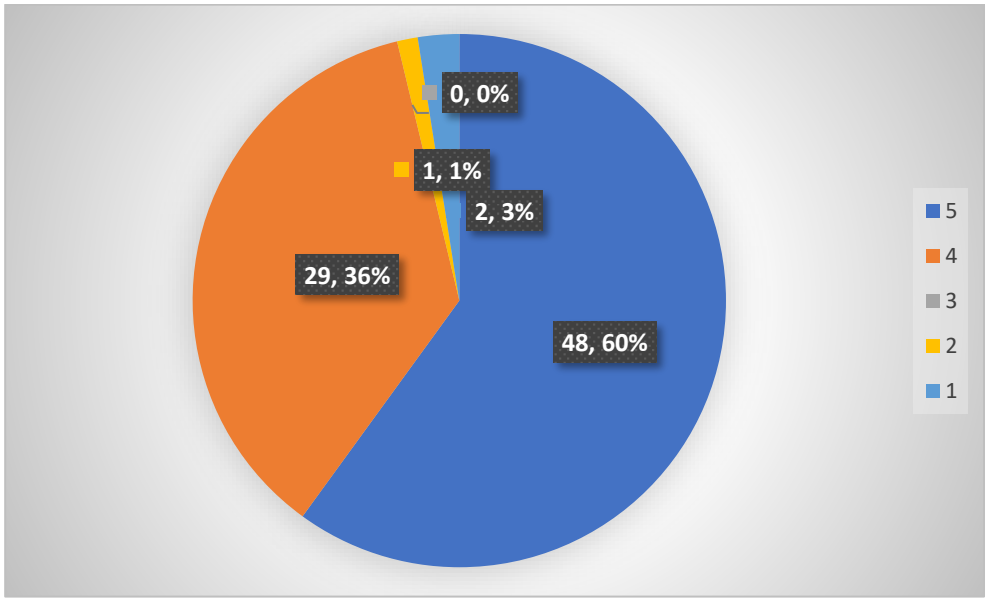

Figure 12. The construction of the Ocarina – Bengkong Bridge provides easy mobility for people in their daily activities.

Based on 80 data obtained from respondents' answers to the variables above, the results were that 48 said they strongly agreed (60%), 29 said they agreed (36%), 1 said they disagreed (1%), and 2 said they strongly disagreed (3%), can be seen in the pie chart above.

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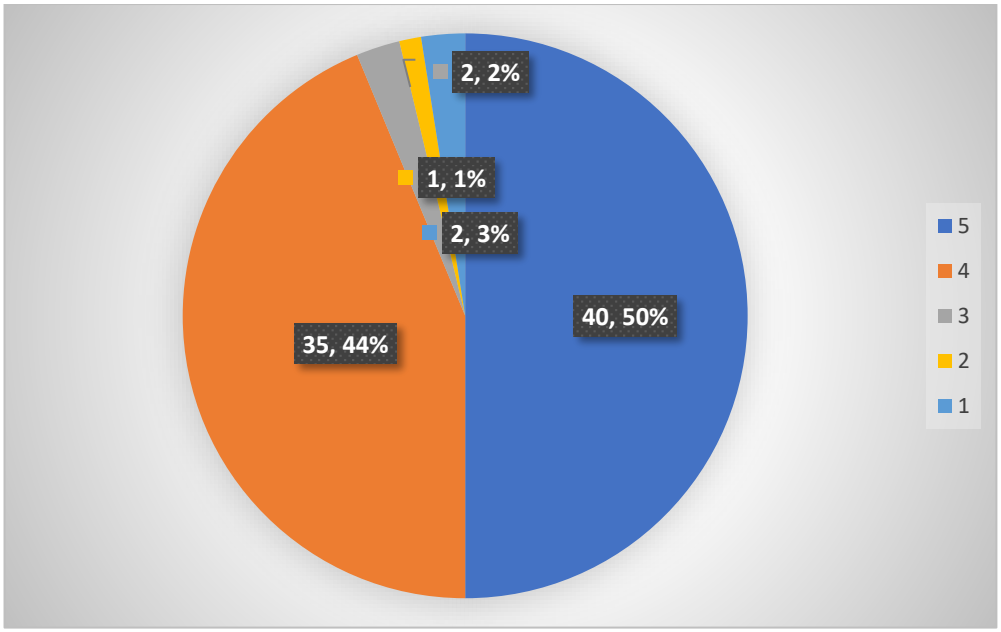

Figure 13. Construction of the Ocarina – Bengkong Bridge helps improve community access to educational services and markets.

Based on 80 data obtained from respondents' answers to the variables above, the results were 40 said they strongly agreed (50%), 35 said they agreed (26%), 2 said they disagreed (2%), 1 said they disagreed (1%), and 2 stated that they strongly disagree (3%), which can be seen in the pie chart above.

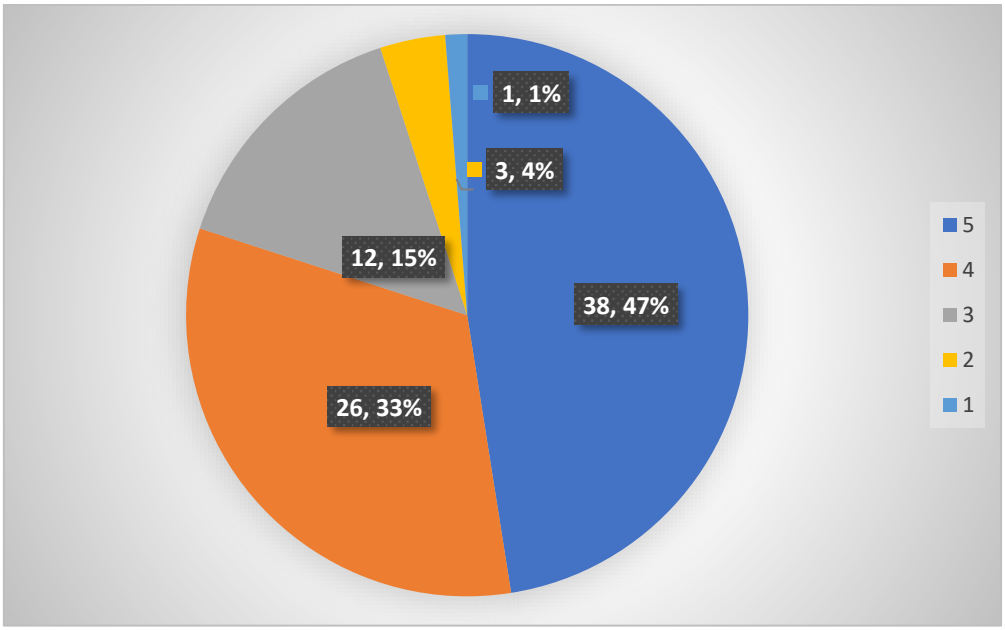

Figure 14. The construction of the Ocarina – Bengkong Bridge brought about changes in people's lifestyle and behavior

Based on 80 data obtained from respondents' answers to the variables above, the results were that 38 said they strongly agreed (47%), 26 said they agreed (33%), 12 said they disagreed (215%), 3 said they disagreed (4%), and 1 stated that they strongly disagree (1%), which can be seen in the pie chart above.

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Economic aspect

Table 3. Coefficient of Determination

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.040a	,042	.013	2.50795
a. Predictors: (Constant), bridge construction				

The construction of the Ocarina Bridge affected the Economic Aspect by42%while the rest is influenced by variables outside this research.

The research results presented in Table 3 through the Coefficient of Determination (R^2) aim to quantify the impact of the construction of the Ocarina Bridge on the economic aspect. The model summary shows an R value of 0.040, an R^2 value of 0.042, and an adjusted R^2 value of 0.013. However, there seems to be a critical misinterpretation in the provided explanation. An R^2 value of 0.042 indicates that only 4.2% of the variance in the economic aspect is explained by the construction of the Ocarina Bridge, not 42% as stated. This discrepancy needs to be corrected to ensure accurate communication of the findings.

To improve the content quality, it is essential to clarify this interpretation and delve deeper into its implications. The low R^2 value suggests that while the construction of the Ocarina Bridge has some impact on the economic aspect, it is relatively minor, and most of the variance is influenced by other factors not included in this research. Discussing potential external variables, such as local business activities, infrastructure development, or government policies, would provide a more comprehensive understanding of what drives the economic aspect. Additionally, highlighting the limitations of the current model and suggesting areas for future research to explore these other influential variables would enhance the depth and relevance of the analysis. This approach would offer a more balanced perspective on the significance of the Ocarina Bridge construction and its broader economic implications.

Table 4. Multiple Linear Regression Equation

Coefficientsa						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	19,386	3,798		5.104	.011
	Bridge Construction	,049	,150	,040	.329	,003
a. Dependent Variable: Economic Aspects						

The construction of the Ocarina Bridge has a positive effect on the Economic Aspect as evidenced by a significance value of 0.03 below 0.05

The research results presented in Table 4 through the Multiple Linear Regression Equation aim to determine the impact of the construction of the Ocarina Bridge on economic aspects. The table shows the unstandardized coefficient for bridge construction (B = 0.049), indicating a positive effect on the economic aspect. The significance value (p-value) of 0.003, which is below the threshold of 0.05, confirms that this positive effect is statistically significant. The constant term (19.386) suggests the baseline level of the economic aspect when the bridge construction variable is zero. While these results provide a clear indication of the relationship, the explanation can be further improved for clarity and depth.

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Firstly, the coefficient for bridge construction (0.049) indicates that for each unit increase in bridge construction efforts, there is a corresponding 0.049 increase in the economic aspect. However, this effect size is relatively small, suggesting that while bridge construction has a positive impact, it is not a major determinant of economic improvement. This nuance should be highlighted to provide a more balanced interpretation of the results. Additionally, the discussion would benefit from addressing the implications of this positive relationship. For instance, explaining how bridge construction might enhance economic activities by improving connectivity, reducing transportation costs, or attracting investments could provide practical insights into why this variable is significant. Moreover, acknowledging the small effect size and suggesting further research to explore additional factors that significantly influence the economic aspects would offer a more comprehensive understanding of the economic dynamics at play. This approach would enrich the analysis by connecting statistical results to real-world economic impacts and future research directions.

Social aspect

Table 5. Coefficient of Determination

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.040a	,042	.018	2.40919
a. Predictors: (Constant), bridge construction				

The construction of the Ocarina Bridge affected social aspects by42%while the rest is influenced by variables outside this research.

The research results presented in Table 5 through the Coefficient of Determination (R^2) aim to measure the impact of the construction of the Ocarina Bridge on social aspects. The model summary shows an R value of 0.040, an R^2 value of 0.042, and an adjusted R^2 value of 0.018. There is a critical misinterpretation in the explanation provided: an R^2 value of 0.042 indicates that only 4.2% of the variance in the social aspects is explained by the construction of the Ocarina Bridge, not 42% as stated. This discrepancy needs to be corrected to ensure the accurate communication of the findings.

To improve the content quality, it is essential to clarify this interpretation and provide a deeper analysis of its implications. The low R^2 value suggests that while the construction of the Ocarina Bridge has some impact on social aspects, it is relatively minor, and the majority of the variance is influenced by other factors not included in this research. Discussing potential external variables, such as community engagement, social policies, or other infrastructure projects, would provide a more comprehensive understanding of what drives social changes. Additionally, addressing the limitations of the current model and suggesting areas for future research to explore these other influential variables would enhance the depth and relevance of the analysis. This approach would offer a more balanced perspective on the significance of the Ocarina Bridge construction and its broader social implications.

Table 6. Multiple Linear Regression Equation

Coefficientsa						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	20,159	3,648		5.526	.000
	Bridge Construction	,144	,150	,044	.355	,004
a. Dependent Variable: Social Aspects						

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The construction of the Ocarina Bridge has a positive effect on the Social Aspects as evidenced by the significance.

The research results presented in Table 6 through the Multiple Linear Regression Equation aim to determine the effect of the construction of the Ocarina Bridge on social aspects. The table shows the unstandardized coefficient for bridge construction (B = 0.144), indicating a positive effect on social aspects. The constant term (20.159) suggests the baseline level of social aspects when bridge construction is not considered. The t-value (0.355) and the significance value (p = 0.004) indicate that this positive effect is statistically significant, meaning that the relationship between bridge construction and social aspects is unlikely to be due to chance.

While these results provide a clear indication of a positive and significant relationship, the content quality can be improved by providing a more comprehensive interpretation. The coefficient of 0.144 suggests that for each unit increase in bridge construction, there is a corresponding increase of 0.144 in social aspects, which is a relatively modest impact. This modest impact should be highlighted to ensure that the findings are not overstated. Additionally, it would be beneficial to discuss the practical implications of this relationship. For instance, explaining how the construction of the Ocarina Bridge might enhance social aspects by improving connectivity, fostering community interactions, or providing better access to social services could provide valuable insights. Addressing these points would enrich the analysis and provide a more nuanced understanding of the findings, connecting statistical results to real-world social improvements and highlighting areas for future research to explore additional factors that influence social aspects.

Conclusion

From this research several conclusions can be drawn as follows: (a) This research shows that the construction of the Ocarina - Bengkong bridge has a positive effect on economic aspects in Bengkong sub-district, encouraging economic growth, new business and job opportunities, opening up accessibility and connectivity between surrounding areas, and providing a positive impact on the tourism sector in Bengkong sub-district; (b) The construction of the Ocarina - Bengkong bridge has a positive influence on social aspects in Bengkong sub-district, providing ease of community mobility in daily activities, helping to increase community access to educational services and markets, and providing changes in community lifestyle and behavior.

Recommendation

In the future, the government will continue to maintain and improve the infrastructure facilities of the Ocarina - Bengkong bridge because the benefits will really be felt by the people in Bengkong District, even the people who live in Bengkong District.

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