

Analysis of the Effectiveness of Connectivity Infrastructure Spending in the Bangka Belitung Islands Province



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ABSTRACT: The purpose of this study is to analyze the correlation between APBN and APBD expenditures on the achievement of connectivity indicators. Secondary data sources were obtained from the Directorate of Budget Implementation, the Sintesa application, the OMSPAN and OMSPAN TKD applications, the Ministry of PUPR, and the BPS of the Bangka Belitung Islands Province. Data analysis uses the Pearson correlation method and qualitative descriptive. The results of the study indicate that APBN expenditure is negatively and very strongly correlated with the length of national roads. In addition, APBN expenditure is positively and very weakly correlated with the length of national roads in stable condition and has a moderate positive correlation with the percentage of national road stability. APBD expenditure is very weakly correlated with the length of provincial roads and is moderately correlated with the length of provincial roads in stable conditions and the percentage of stability. Regency/City APBD expenditure also has a very weak correlation and is negatively directed to the total length of district/city roads in the Bangka Belitung Islands Province and has a moderate correlation with the length of district/city roads in stable condition and the percentage of stability. APBN expenditure has a positive and very strong correlation with the length of regional roads and is positively and strongly correlated with the length of regional roads in stable conditions. APBN spending also has a moderate correlation with the percentage of regional road stability. Based on the relationship analysis using Pearson correlation, it was found that the total length of the road has a strong correlation and has a positive relationship with the ADHK GRDP. The Bangka Belitung Islands Province has a higher road stability than the national road stability and road stability in the Sumatra Region.

KEYWORDS: State Budget Expenditure, Regional Budget Expenditure, Connectivity Indicator, ADHK GRDP

I. INTRODUCTION

Infrastructure is one of the important components in determining the success of development. The role of infrastructure in development can be seen from its contribution to driving economic growth and improving the quality of life. Economic growth will affect investment while improving the quality of life can improve welfare so that it can ultimately reduce poverty. In this context, transportation and connectivity infrastructure are important things that support human activities in meeting their needs.

Along with the development of the times, human needs are increasingly diverse, including the need for goods (clothing, food, shelter) and social activities (family and community relationships). However, because the physical location of the objects of all these needs is far from the people who need them, connectivity becomes crucial. Transportation plays an important role in economic activities and community development. The availability of connectivity infrastructure not only facilitates the transportation of goods and people but can also allocate resources optimally.

Based on the 2023 Regional Competitiveness Index, especially in the infrastructure pillar, the quality of roads in the Regency/City of the Bangka Belitung Islands Province is included in the good category, but the accessibility indicator for all regencies is still low except for Pangkalpinang City. Improving road accessibility refers to efforts to improve the quality, reliability, and accessibility of roads connecting areas within regencies/cities. This involves the construction, repair, and maintenance of existing roads, as well as the construction of new roads to connect isolated areas. Improving road accessibility has a positive impact on development and welfare. With easy access to roads, it will encourage economic growth by increasing community mobility, transportation of goods, and new business opportunities.

Connectivity between regions is expected to create business opportunities through various infrastructures so that community income can be increased through increased production capacity. Income inequality in a region can also be caused by the availability of infrastructure to support economic activities and access to production sources. The availability of road networks will open up and grow economic activities in previously isolated areas. Land connectivity is expected to encourage regional economic growth, whereas in this study land connectivity is measured by Road Length, Road Condition, and Road Stability. Where Road Length is

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defined as land transportation infrastructure that includes all parts of the road, including complementary buildings and equipment intended for traffic, which are on the ground surface, above the ground surface, below the ground surface and/or water, and above the water surface, except for railroads, lorry roads, and cable roads (Law No. 22 of 2009). Road Stability is defined as an indicator that is the target for the performance achievement of the technical agency for road construction. The level of road stability is not a fixed value but always fluctuates during the service life of the road pavement.

Considering that the Bangka Belitung Islands Province is an archipelago where connectivity is very important for the distribution of goods, services, and mobility of people, it is necessary to conduct in-depth studies related to road connectivity by utilizing the availability of existing secondary data.

II. THEORETICAL BASIS

A. Government Spending Supports Connectivity Infrastructure

Government support for improving and optimizing connectivity in the regions is carried out through APBN spending in the connectivity infrastructure sector. This is in line with several functions of the APBN, namely allocation, distribution, and stabilization. Law Number 17 of 2003 concerning State Finance explains that the allocation function of the APBN means that the state budget must be directed to reducing unemployment and waste of resources, as well as increasing the efficiency and effectiveness of the economy. The distribution function means that state budget policies must pay attention to a sense of justice and propriety. The stabilization function means that the government budget becomes a tool to maintain and strive for fundamental economic balance.

In the regional context, APBN spending to improve connectivity infrastructure is reduced through Transfers to Regions (TKD) in the form of Physical Special Allocation Funds (DAK Fisik) to local governments. Investment in this infrastructure is expected to provide a significant long-term impact on economic growth in the regions and provide a multiplier effect on community welfare.

B. The Impact of Connectivity Infrastructure on Economic Growth

The impact of connectivity infrastructure on the economy has been the subject of significant research in recent years. Connectivity infrastructure, such as roads, bridges, and other transportation routes, plays a critical role in improving a region's ability to access resources, increasing mobility, and enhancing interactions between regions.

Research conducted by Rediansyah et al (2023) in Banjarnegara Regency from 1990-2022 showed that road infrastructure has a significant and positive influence on Gross Regional Domestic Product (GRDP). Furthermore, Sukma and Hartono (2017) found that Public Works infrastructure has a positive influence on economic growth and welfare in Sumatra and Java. Likewise, research was conducted by Hidayat and Prasetyo (2023). The research conducted in Sumber Rejeki Village in 2023 showed that highway infrastructure has a significant influence on the economic growth of the community. This shows that good road infrastructure can improve the ability of a region to access resources and increase mobility, thereby increasing economic growth.

III. RESEARCH METHODS

A. Framework

The research framework used in this study is as in Figure 1, namely to determine the relationship between government spending and road connectivity indicators. Due to limited data, the connectivity indicators that will be analyzed in this study are road length, road length in stable condition, and percentage of stability. Furthermore, the study aims to determine the relationship between these three road connectivity indicators and ADHK GRDP.



Figure 1 Framework of Thought

Source: processed by researchers, 2024

B. Operational Definitions and Data Sources

The variables used in this study can be explained as follows:

- APBN expenditure is the expenditure of Ministries/Institutions that support road connectivity infrastructure in 2018-2023 in the Bangka Belitung region. APBN expenditure data for 2021 to 2023 was obtained from the Directorate of Budget Implementation, while data for 2018-2020 was obtained from the Sintesa application.
- APBD expenditure is proxied by the distribution of Physical DAK for Roads to the Regional Government of the Bangka Belitung Islands in 2018-2023. Data was obtained through the OMSPAN and OMSPAN TKD applications.

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- c. Road Connectivity Indicators for 2018-2023 in the Bangka Belitung Islands Province are Road Length in km, road length in good condition in km, and road stability percentage in percent. There are three road statuses for each indicator, namely national roads, provincial roads, and district/city roads. Furthermore, for aggregate analysis, the length of these three road statuses is added up to obtain the total road length and total roads in good condition in the Bangka Belitung Islands. The data source for this connectivity indicator was obtained from the Ministry of PUPR.
- d. Economic indicators are represented through the value of Gross Regional Domestic Product at Constant Prices (GRDP ADHK) for 2018-2023, the data for which was obtained from the BPS of the Bangka Belitung Islands Province.

C. Data Analysis Techniques

Pearson Correlation: used to determine the closeness of the relationship between dependent and independent variables. Pearson correlation coefficient is between -1 to 1 where in absolute terms the magnitude of this value will indicate the closeness between variables. The level of closeness can be described as Table 1 Interpretation of Pearson Correlation Closeness Table 1.

Table 1. Interpretation of Correlation Closeness

Interval Koefisien	Keeratan Korelasi
0,00-0,20	Sangat Lemah
0,21-0,40	Lemah
0,41-0,70	Moderate / Sedang
0,71-0,90	Kuat
0,91-0,99	Sangat Kuat
1	Korelasi Sempurna

Source: Statistics Studio, 2024

In addition, positive or negative values in the Pearson correlation indicate the direction of the variable relationship. Positive values indicate a unidirectional relationship and are increasing, and conversely, negative values indicate a relationship that is in the opposite direction and is decreasing.

In this study, the Pearson correlation is used to determine the correlation of government spending to road connectivity infrastructure indicators. In addition, this analysis method is also used to determine the correlation of road infrastructure indicators to PDRB ADHK in the Bangka Belitung Islands. The relationships analyzed using Pearson correlation in this study include:

- a. Correlation of State Budget Expenditure to National Road Connectivity Infrastructure Indicators.
- b. Correlation of Provincial APBD Expenditure to Provincial Road Connectivity Infrastructure Indicators.
- c. Correlation of District/City APBD Expenditure to District/City Road Connectivity Infrastructure Indicators.
- d. Correlation of APBN Expenditure to Regional Road Connectivity Infrastructure Indicators.
- e. Correlation of Total Government Expenditure to Total Road Connectivity Infrastructure Indicators in Bangka Belitung Islands Province.

Qualitative Description Analysis: This analysis method is used to compare connectivity infrastructure indicators in the Bangka Belitung Islands with other provinces with the same characteristics, as well as with the Sumatra region.

IV. RESULTS AND DISCUSSION

A. Government Spending Supports Connectivity Infrastructure

In the Bangka Belitung region, K/L Expenditure as a form of central government support in road connectivity infrastructure is implemented by the Ministry of Public Works and Public Housing (PUPR Ministry), especially through the National Road Implementation Work Units I and II, as well as the Public Works Service Work Unit of the Bangka Belitung Islands Province. The realization of K/L Expenditure in these work units is used for routine preservation and maintenance activities of roads, bridges, transportation node access roads, priority and strategic area roads, as well as handling drainage, sidewalks, and road safety.

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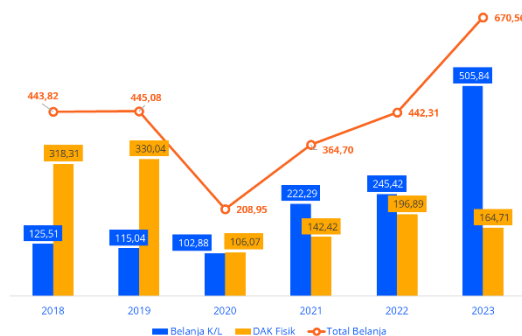


Chart 1 Government Support Spending

Source: processed by researchers, 2024

As shown in Chart 1, the realization of K/L Expenditure for road connectivity infrastructure support experienced a downward trend from 2018 to 2020, then experienced a gradual increase until 2023. In 2023, this K/L expenditure experienced a significant increase to IDR505.84 billion as a mandate for the implementation of Presidential Instruction Number 3 of 2023 concerning the Acceleration of Increasing Regional Road Connectivity. The realization of K/L Expenditure in the context of Supporting Regional Road Handling was IDR298.73 billion, in the form of goods expenditure to be handed over to regional governments.

APBD spending that supports road connectivity, in this case, measured by the Physical DAK for the Road Sector, has experienced a downward trend from 2018 to 2023. During this period, the highest allocation of Physical DAK for the road sector was in 2019, which was IDR 330.04 billion. Meanwhile, the allocation of Physical DAK for the Road Sector in 2023 was IDR 164.71 billion, or less than 50 percent of its realization in 2019. This downward trend in the distribution of Physical DAK for the road sector is visible in the allocation of the Provincial Government where the distribution continues to decline consistently from year to year.

Table 2. Realization of Physical DAK Distribution in the Road Sector Per Regional Government

Pemerintah Daerah	2018	2019	2020	2021	2022	2023	Tren
KAB. BANGKA	33,48	36,92	10,21	9,54	46,13	16,02	
KAB. BANGKA BARAT	33,70	35,91	10,23	31,27	4,90	10,33	
KAB. BANGKA SELATAN	18,27	31,89	-	22,06	30,38	53,64	
KAB. BANGKA TENGAH	34,12	27,39	10,59	7,68	16,60	16,72	
KAB. BELITUNG	15,97	54,00	-	10,77	40,38	29,72	
KAB. BELITUNG TIMUR	15,58	51,95	15,00	11,63	15,48	9,05	
KOTA PANGKALPINANG	88,05	23,04	9,54	8,78	14,16	-	
KEP. BANGKA BELITUNG	79,14	68,94	50,51	40,69	28,86	29,22	
TOTAL	318,31	330,04	106,07	142,42	196,89	164,71	

Source: OMSPAN, processed 2024

Based on information from the Regional Development Planning and Research Agency (Bappeda) of the Bangka Belitung Islands Province, the decline was partly due to the quality of roads in the Bangka Belitung Islands Province which were considered good, so the allocation of Physical DAK for the Road Sector decreased. Pangkalpinang City did not receive an allocation of Physical DAK for the Road Sector in 2023. To overcome this, the Regional Government proposed the construction and preservation of provincial roads and district/city roads through the Regional Road Presidential Instruction mechanism.

B. Road Connectivity Infrastructure Indicators in the Bangka Belitung Islands

The Bangka Belitung Islands Province is one of the island provinces in Indonesia with a total land area and sea area of the Bangka Belitung Islands Province reaching 81,725.06 square kilometers. The land area is at least 16,424.06 square kilometers or 20.10 percent of the total area. The sea area is approximately 65,301 square kilometers, or 79.90 percent of the total area of the Bangka Belitung Islands Province (Babel Provincial Government, 2024). The land area of the Bangka Belitung Islands consists of two main islands, namely Bangka Island and Belitung Island, which are further divided into 6 Regencies and 1 City.

Due to its characteristics as an archipelago, the determination of road status in the Bangka Belitung Islands Province has different criteria from other provinces. For example, the Ministry of PUPR defines national roads as arterial and collector roads in the primary road network system connecting provincial capitals, national strategic roads, and toll roads. However, in the Bangka Belitung Islands, which is designated as primary collector road 1 (JKP-1), there is no connection between provincial capitals.

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Based on the Decree of the Minister of PUPR Number 430/KPTS/M/2022 concerning the Determination of Road Sections in the Primary Road Network According to Their Function as Primary Arterial Roads and Primary Collector Roads-1 (JKP-1), the length of national road sections in 2023 in the Bangka Belitung Islands is 598.65 km. The length of this section has decreased by 1.75 km from the previous year due to the handover to the local government.

Meanwhile, based on the Decree of the Governor of the Bangka Belitung Islands Province Number 188/79/PU/I/2018 concerning the Determination of Road Status in the Primary Collector Network According to Its Role as a Provincial Road, the total length of provincial roads in the Bangka Belitung Islands is 850.99 km and has not changed until 2023. Meanwhile, the total length of Regency and City roads added up from the Decrees of the Governors of each Regency/City is 4,816.70 km. There is a difference between the results of the addition of the length of Regency/City roads based on the Decree of the Regional Head and the data available at the Ministry of PUPR, where the length of Regency/City roads in the Bangka Belitung Islands in 2023 is 4,346.06 km, but there are no details of the location of the road sections. This is because the data obtained based on the Decree of the regional leader in each Regency/City is not yet the most recent.

This study was conducted to analyze aggregate data on road infrastructure conditions in the Bangka Belitung Islands Province, using data from the Ministry of PUPR. The development of road length in the period 2018-2023 is shown in Table 3 below.

Table 3. Road Length Trends 2018-2023

Tahun	Jalan Nasional	Jalan Provinsi	Jalan Kabupaten
2018	600,40	850,99	3928,80
2019	600,40	850,99	3928,80
2020	600,40	850,99	3928,80
2021	600,40	850,99	3928,80
2022	600,40	850,99	3928,80
2023	598,65	850,99	4346,06

Source: Ministry of PUPR, 2024

In terms of total road length, Belitung Regency has the longest road section compared to other Regencies/Cities, although its area is the fifth largest of the seven Regencies/Cities. Support for national roads, provincial roads, and district roads in Belitung Regency is aimed at optimizing the region as one of the priority areas for national tourism.

If the length of national roads, provincial roads, and district/city roads are added together and then compared with the area of each region and Each district/city, the ratio of road length to area can be seen. The largest ratio is in Pangkalpinang City, where there are 5.27 km of roads in every km² of area. However, in the other 6 districts, the ratio of road length to area is still between 0.23 and 0.56 km per km² of area. South Bangka, as the largest area in the Bangka Belitung Islands Province, has the lowest ratio of 0.23 km per unit area. The mobility availability of road networks can make it easier for people per individual to move (Julkarnain et.al., 2019). The mobility figure is obtained by dividing the length of the road by the population and has a unit of km/1000 people.

From Table 4, it is known that Pangkalpinang City has the smallest mobility rate compared to other areas. This means that the road network in Pangkalpinang City serves a denser population compared to other regencies in the Bangka Belitung Islands.

Table 4 Length of Road Sections and Comparison to Area and Population

Kabupaten/ Kota	Jalan Nasional (km)	Jalan Provinsi (km)	Jalan Kab/Kota (km)	Total Panjang Jalan (km)	Luas Wilayah (km ²)	Panjang Jalan thd Luas Wilayah (km/km ²)	Jumlah Penduduk (jiwa)	Angka Mobilitas (km/1000 jiwa)
Pangkalpinang	25,42	42,89	403,14	471,45	89,4	5,27	226.297	2,08
Bangka Tengah	63,76	158,05	441,39	663,20	2155,77	0,31	205.510	3,23
Bangka Selatan	95,32	106,00	633,97	835,29	3607,08	0,23	202.263	4,13
Bangka Barat	81,79	110,58	809,31	1.001,68	2820,61	0,36	209.413	4,78
Bangka	173,97	132,35	734,50	1.040,82	2950,68	0,35	334.344	3,11
Belitung	105,53	146,74	1.042,00	1.294,27	2293,61	0,56	186.331	6,95
Belitung Timur	52,86	154,39	752,40	959,65	2506,91	0,38	130.463	7,36
Total	598,65	850,99	4.346,06	5.795,70	16.424,06	0,35	1.494.621,00	3,88

Source: Ministry of PUPR, Bappeda of Bangka Belitung Islands Province, 2024

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The province has good road stability. This road stability is partly due to the road network in the Bangka Belitung Islands Province not being used for inter-provincial traffic so it bears a lighter load compared to roads on large islands. The percentage of national road stability from 2018 to 2023 has a stable stability of over 99 percent. The percentage of road stability in 2023 is the highest in 6 years, namely at 99.85 percent with a road length of 589.65 km. This achievement is also the highest percentage of national road stability in Indonesia.

Meanwhile, the condition of provincial road stability experienced a sharp decline in 2019 to 83.66 percent but was restored to 95.87 percent in 2021.

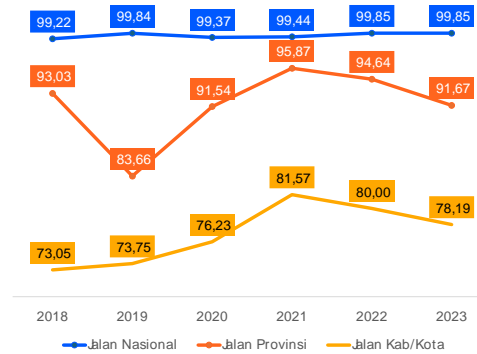


Chart 2. Percentage Trend of Road Stability in Bangka Belitung Islands

Source: processed by researchers, 2024

However, the percentage of provincial road stability has decreased again in the last two years even though the length of provincial roads has not changed, which is 850.99 km. In 2023, the percentage of provincial road stability is at 91.67 percent and is the second highest on a national scale. On the other hand, district/city roads in the Bangka Belitung Islands have the lowest percentage of stability on average compared to national roads and provincial roads in the 2018-2023 period. Similar to provincial roads, the percentage of district/city road stability has experienced a downward trend starting in 2021, although in 2023 its length increased to 4,346.06 km after five years previously being 3,928.80 km. The decline in the condition of district/city road stability requires further attention from the local government considering that district/city roads are the longest road sections of all roads in the Bangka Belitung Islands.

The Infrastructure Pillar Score (Pillar 2) of the 2023 Regional Competitiveness Index in the Bangka Belitung Islands is 2.96 out of 5 and is above the national score of 2.77. Several components of Pillar 2 are road accessibility and road infrastructure quality. Table 5 shows the scores per Regency/City within the Bangka Belitung Islands for these two components.

Table 5. Accessibility and Quality Score of Road Infrastructure According to IDSD 2023

Kabupaten/ Kota	Aksesibilitas Jalan	Kualitas Infrastruktur Jalan
Belitung	0,31	4,95
Bangka Barat	0,29	4,41
Bangka Tengah	0,24	3,92
Bangka Selatan	0,29	3,60
Belitung Timur	0,31	4,35
Pangkalpinang	5,00	5,00
Bangka	0,46	3,98
Provinsi	3,53	5,00

Source: Ministry of PUPR, 2024

The quality score of road infrastructure in the Bangka Belitung Islands Province is very good. This is in line with the high percentage of road stability in the Bangka Belitung Islands. This road infrastructure quality component is measured based on the ratio of the length of national, provincial, and district/city roads in an area with good and moderate (stable) quality compared to the total road length. On the other hand, the road accessibility score per Regency/City in the Bangka Belitung Islands can be said to be still low, except in Pangkalpinang City which received a score of 5. The value for the 6 Regencies in the Bangka Belitung Islands is below 1 and ranges from 0.24 in South Bangka Regency to 0.46 in Bangka Regency. This accessibility index is the ratio of road

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length compared to the area of a region. The value of fulfilling the minimum service standards for road accessibility is the difference (gap) between the accessibility index in the area compared to the SPM that must be met at a certain population density.

C. Correlation of APBN and APBN Expenditure to Road Connectivity Indicators according to Road Network Status

Correlation of State Budget Expenditure to National Road Connectivity Indicators: Table 6 shows the correlation of State Budget Expenditure to the length of national roads, the length of national roads in good condition, and the percentage of national road stability. In this case, State Budget Expenditure is the Expenditure of Ministries/Agencies that provide support for road connectivity infrastructure in the Bangka Belitung Islands.

Table 6. Correlation of APBN Expenditure to National Road Indicators

Panjang Jalan	Panjang Jalan Mantap	Persen Mantap
- 0,92	0,16	0,53
Sangat Kuat	Sangat Lemah	Sedang

Source: Directorate of PA, synthesis, Ministry of PUPR, processed, 2024

Based on Table 6, APBN Expenditure is negatively and very strongly correlated with the length of national roads. This is an anomaly caused by a significant increase in the realization of APBN Expenditure in 2023 to support the Presidential Instruction on Regional Roads which is accompanied by a decrease in the length of national roads due to the transfer to regional governments. In addition, APBN Expenditure is positively and very weakly correlated with the length of national roads in stable condition and has a moderate positive correlation with the percentage of national road stability.

Correlation of Provincial Budget Expenditure to Provincial Road Connectivity Indicators: The construction and maintenance of provincial roads is the responsibility of the Provincial Government. Therefore, Provincial Budget expenditure, as measured by the Physical DAK for Roads, should reflect an increase in the achievement of connectivity indicators. However, this is not reflected in the results of the correlation calculation between Provincial Government Budget Expenditure and provincial road connectivity indicators. Budget expenditure is very weakly correlated with road length, and moderately correlated with the length of provincial roads in stable condition and the percentage of stability. Moreover, these three correlations have a negative direction. In this case, the weak correlation shown between Provincial Budget Expenditure and the length of provincial roads is caused by the absence of an increase in road length during the 2018-2023 period.

Table 7. Correlation of Provincial APBD Expenditure to Provincial Road Indicators

Panjang Jalan	Panjang Jalan Mantap	Persen Mantap
- 0,00	- 0,48	- 0,48
Sangat Lemah	Sedang	Sedang

Source: OMSPAN, Ministry of PUPR, Processed, 2024

Correlation of Regency/City APBD Expenditure to Regency/City Road Connectivity Indicators: In line with provincial roads, Regency/City APBD Expenditure also has a very weak and negative correlation to the total length of regency/city roads in the Bangka Belitung Islands Province. In addition, APBD Expenditure also has a moderate correlation to the length of regency/city roads in stable condition and their stability percentage.

Based on the results of the correlation analysis shown in Table 6, Table 7, and Table 8, it is known that the realization of APBN, Provincial APBD, and Regency/City APBD spending is not positively and strongly correlated with each road status according to its authority. This is due, among other things, to the acceleration of increasing regional road connectivity funded by K/L Spending, as well as the realization of connectivity spending which experienced a drastic decline in 2020 due to the shift in priorities to address the Covid-19 pandemic.

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Table 8. Correlation of Regency/City APBD Expenditure to Regency/City Road Indicators

Panjang Jalan	Panjang Jalan Mantap	Persen Mantap
- 0,15	- 0,51	- 0,62
Sangat Lemah	Sedang	Sedang

Source: OMSPAN, Ministry of PUPR, Processed, 2024

Correlation of APBN Spending to Regional Road Connectivity Indicators: The Central Government provides support for regional road connectivity through Physical DAK, and in addition also through K/L Spending including with the regional road connectivity improvement acceleration program. This can be seen from the correlation between APBN Spending and regional road connectivity indicators, which are the total of provincial roads and district/city roads.

Table 9. Correlation of APBN Expenditure to Regional Road Indicators

Panjang Jalan	Panjang Jalan Mantap	Persen Mantap
0,92	0,88	0,43
Sangat Kuat	Kuat	Sedang

Source: Directorate of PA, Synthesis, Ministry of PUPR, processed, 2024

Table 9 shows that APBN spending has a positive and very strong correlation with the length of regional roads, and is positively and strongly correlated with the length of regional roads in good condition. Meanwhile, APBN spending is moderately correlated with the percentage of regional road stability. This relationship explains the increase in APBN spending in the form of goods spending to be handed over to regional governments, which is accompanied by an increase in the length of regional roads by 417.26 km in 2023 (as per Table 3) and an increase in the length of regional roads in good condition by 229.61 km.

D. Correlation of Total Government Expenditure to Road Connectivity Indicators in Bangka Belitung Islands Province

Furthermore, the total government spending which is the sum of APBN Spending and APBD Spending is analyzed for its correlation to the overall road connectivity indicators in the Bangka Belitung Islands. In this case, the length of the road is the total length of the national road, provincial road, and district/city road. Likewise, the length of the road is stable, and the percentage of its stability.

Table 10. Correlation of Government Spending to Road Connectivity Indicators in the Bangka Belitung Islands Province

Panjang Jalan	Panjang Jalan Mantap	Persen Mantap
0,79	0,48	- 0,02
Kuat	Sedang	Sangat Lemah

Source: Directorate of PA, Synthesis, Ministry of PUPR, processed, 2024

Government spending has a strong and positive correlation with the total length of roads in the Bangka Belitung Islands Province with a correlation value of 0.79. However, the relationship between government spending and the length of roads in stable conditions is only moderately correlated with a correlation value of 0.48. Meanwhile, a very weak negative relationship is shown by government spending on the percentage of overall road stability with a value of minus 0.02.

E. Correlation of Road Connectivity Indicators to the Economy of the Bangka Belitung Islands

GRDP is one of the important indicators that describe the economic conditions of a region. This relationship is very complex and influenced by various factors, one of which is the availability of connectivity. Road connectivity has a strategic role in driving economic growth in a region. Increasing road connectivity can help increase GRDP by facilitating trade, investment, and mobility.

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Table 11. Correlation of Road Connectivity Indicators to PDRB ADHK P Bangka Belitung Islands Province

Panjang Jalan	Panjang Jalan Mantap	Persen Mantap
0,77	0,87	0,53
Kuat	Kuat	Sedang

Source: Central Statistics Agency of Bangka Belitung Islands Province, processed 2024

Table 11 shows the correlation between road connectivity indicators and ADHK GRDP. The connectivity indicators used are the total length of national roads, provincial roads, and district/city roads in the Bangka Belitung Islands Province, as well as the total length of stable roads and the percentage of their stability.

Based on the relationship analysis using Pearson correlation, it is known that the total length of roads has a strong correlation with the ADHK GRDP with a coefficient value of 0.77. In line with this, the total length of roads in stable conditions is strongly correlated with a value of 0.87. On the other hand, the percentage of road stability turns out to only have a moderate correlation with the ADHK GRDP. These three correlation factors have a positive relationship with the ADHK GRDP.

There are several things that explain the positive relationship between road connectivity and the economy, including:

1. *Smooth Trade:* Good road infrastructure allows trade to be smoother. With an efficient land transportation network, shipping costs can be minimized. This helps improve business efficiency and the region's economic competitiveness.
2. *Access to Markets:* Well-connected roads allow access to various markets. Both producers and consumers can easily access other areas, expand business opportunities, and increase transaction volumes.
3. *Investment and Regional Development:* Road connectivity influences investment decisions. Areas with good road infrastructure tend to attract more investment. This investment creates jobs, increases incomes, and contributes to economic growth.
4. *Distribution of Goods and Services:* An integrated road network facilitates the distribution of goods and services. With good access, products can be distributed efficiently from producers to consumers. This has a positive impact on productivity and growth of the economic sector.
5. *Tourism Sector Development:* Road connectivity also impacts the tourism sector. Good access to tourist attractions increases tourist arrivals, drives the local economy, and creates employment opportunities.

F. Comparative Analysis of Road Connectivity Indicators

To analyze the achievement of connectivity indicators in the Bangka Belitung Islands Province, further qualitative descriptive is used by comparing the Bangka Belitung Islands Province with the Riau Islands and the Sumatra region. The Riau Islands were chosen because they have similar characteristics to the Bangka Belitung Islands Province, namely being a province in the form of an archipelago located in the Sumatra Region.

As shown in Table 12, the Bangka Belitung Islands Province has a road stability percentage of 99.85 percent. This figure is higher than the percentage of national road stability in the Riau Islands and the Sumatra Region, which are respectively at 98.68 percent and 95.15 percent. These three achievements are above the national achievement of 94.18 percent. This means that the condition of national road stability in the Sumatra region is generally very good. Similar to national roads, the percentage of provincial road stability in the Bangka Belitung Islands Province, which is 91.67 percent, is above the achievement of the Riau Islands and the Sumatra Region by more than 10 percent. Meanwhile, the percentage of district/city road stability in the Bangka Belitung Islands is below the condition of national roads and provincial roads, which is 78.19 percent. However, this condition is still better than the achievement of district/city road stability in the Riau Islands and the Sumatra region, with a relatively large difference of around 20 percent.

When viewed from the ratio of road length to area, the Riau Islands are superior when compared to the Bangka Belitung Islands Province and the Sumatra region with a value of 0.65, which means that there are 0.65 km of roads in every km² of area in the Riau Islands. Meanwhile, the ratio values in the Bangka Belitung Islands Province and the Sumatra Region are 0.38 and 0.36. This means that the accessibility of the Riau Islands roads is better in connecting its area.

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Table 12. Road Connectivity Indicators for the Bangka Belitung Islands Province Riau Islands and Sumatra Region 2023

Indikator	Kep. Bangka Belitung	Kepulauan Riau	Regional Sumatera
Persentase Kemantapan Jalan Nasional	99,85	98,68	95,15
Persentase Kemantapan Jalan Provinsi	91,67	80,78	75,98
Persentase Kemantapan Jalan Kabupaten/Kota	78,19	59,27	54,79
Rasio Panjang Jalan terhadap Luas Wilayah	0,38	0,65	0,36
Angka Mobilitas	3,88	2,44	2,88
Indeks Aksesibilitas	3,53	3,47	
Kualitas Infrastruktur Jalan	5,00	3,94	

Source: BPS, BRIN, Ministry of PUPR, Processed, 2024

As explained in the analysis above, the mobility figure is obtained by dividing the length of the road by the population and having a unit of km/1000 people. In this case, the Bangka Belitung Islands Province has a mobility figure of 3.88, which means that there are 3.88 km of roads to serve every 1000 people. This figure shows that the Bangka Belitung Islands have a lower population density in each length of road when compared to the Riau Islands and the Sumatra region. The length of the road in this mobility figure and in the ratio to the area is the total length of national roads, provincial roads, and district/city roads.

G. Connectivity Development in the Bangka Belitung Islands Province

Implementation of the Regional Road Presidential Instruction (IJD): Improving regional road connectivity aims to provide maximum benefits in efforts to boost the national and regional economy, especially to reduce national logistics costs, connect and integrate road infrastructure with economic centers, and help equalize road stability conditions, as well as to support the achievement of the National Medium-Term Development Plan targets for 2020-2024 (BPJN Babel, 2023). Therefore, the President of the Republic of Indonesia through Presidential Instruction (Inpres) Number 3 of 2023 concerning the Acceleration of Increasing Regional Road Connectivity instructed the Ministry of PUPR to handle proposals for regional road sections.

In 2023, there will be road sections in three districts on Bangka Island handled by the National Road Implementation Work Unit Region I (Satker PJN 1) of the Bangka Belitung Islands Province, including:

1. In Central Bangka Regency, PJN 1 Work Unit is implementing the Terak - Sp. Bandara Road Rehabilitation Reconstruction work package which aims to facilitate connectivity from Terak Village, Simpang Katis District, Central Bangka Regency to Depati Amir Airport or vice versa, with an effective handling length of 6.67 km. In addition, the Lubuk Besar - B2 work package is also carried out with an effective handling length of 3.43 km.
2. In South Bangka Regency, PJN Work Unit 1 is implementing two work packages, namely the Rehabilitation and Reconstruction of the Payung - Air Bara Road and the Rehabilitation and Reconstruction of the Toboali - Serdang Road with a length of 23.32 km, as well as the Rehabilitation and Reconstruction work package of the Payung - Airbara Road with a length of 10 km.
3. In West Bangka Regency, the Mancung - Belit Road Rehabilitation and Reconstruction work package was implemented with an effective length of 5.38 km.

Furthermore, in the 2023 IJD program, Satker PJN 2 of Bangka Belitung Province was assigned to handle regional roads on Belitung Island. The Aik Mungkui - Buluhtumbang Road (Hananjoeddien Airport) handling package is intended to improve road conditions on the Buluh Tumbang - Air Mungkui section, with an effective length of 3.48 km. This section is one of the accesses for people living in Badau District or East Belitung Regency to HAS Hanandjoeddin Airport. With the handling of this road section, in the future, it is hoped that it can open up opportunities and development of economic activities, as well as support road connectivity to the Belitung Geopark tourist area.

In the Belitung Regency area, the Nasik Strait – Pasir Panjang Road Reconstruction work package is also being carried out along 3.18 km. This work is intended to improve road conditions on Pasir Panjang Road which is one of the tourist destinations in Belitung Regency. In addition to opening up opportunities for the development of economic activities, the construction of this section is also for the utilization of natural resources that have the potential as tourist attractions along the coastal corridor.

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In addition to Belitung Regency, the IJD program is also implemented in East Belitung Regency, namely through the Cendil - Tanjung Road Reconstruction work package. Batu Pulas, with an effective length of 7.9 km to open access to tourist areas and the Manggar - Tg. Modong - Gantung Road Reconstruction work package, 18.53 km long. The Manggar - Tanjung. Modong - Gantung road section is an alternative access connecting Manggar District and Gantung District, access to Modong Beach and Mirang Beach tourism. The people in the area generally work as fishermen and farmers, so with the handling of this regional road, it is hoped that in the future it can provide easy accessibility for the community.

Tanjung Ular Port: Tanjung Ular Port is a local feeder port located in Air Putih Village, Mentok District, West Bangka Regency. Since it was operated in April 2023, Tanjung Ular Port has now become the center of activity for a number of loading and unloading ships. The port, which has a pier measuring 80 x 10 meters and a depth of 30 meters, is projected to be able to serve unloading activities of 22,384 tons in 2023 and 39,976 tons in 2040, as well as loading activities of 11,867 tons in 2023 and 28,647 tons in 2040. The construction of this port is intended to increase the mobility of goods and increase the competitiveness of production results from West Bangka Regency and from the Bangka Belitung Islands Province, especially CPO and tin. Meanwhile, passenger transportation remains centered at Tanjung Kalian Port, West Bangka Regency.

Due to its status as a local feeder port, Tanjung Ular Port is under the authority of the Regency. Currently, Tanjung Ular Port is still operated by the Harbormaster and Port Authority Office (KSOP) of the Ministry of Transportation while waiting for the readiness of the HR of the West Bangka Regency Government.

Trans Bangka and Trans Belitung Roads: In order to improve connectivity, the local government plans to build the Trans Bangka and Trans Belitung roads. The Trans Bangka Road is planned to cross the west side of Pulau Bangka to open new access, especially from South Bangka to West Bangka, and to develop the economy in the region. In addition, the Trans Bangka Road is also intended to facilitate connectivity from the Sadai Industrial Area in South Bangka Regency to Pangkalpinang City, and vice versa.

Currently, the construction of the road is still under technocratic discussion and it is hoped that it can be funded by the APBN. A feasibility Study has been conducted by the central government and land acquisition has been carried out in the southern part. However, the construction of the road cannot currently be intervened by the Central Government because the current access is still a non-status road. It is hoped that the development of the road can be carried out with the IJD mechanism.

In addition, there is a discourse to raise the status of the eastern cross-road of Pangkalpinang City to the north to become a national road, although it is currently still in technocratic discussions. On the east side of Bangka Island, there are beaches that have the potential to become tourism areas, but currently, there is still no economic activity. By raising its status from a provincial road to a national road, it is hoped that a new economic area can develop in this area.

Sadai Port Shipping Route: Sadai Port known as Bangka Belitung Port is currently a vital transportation access for the people of the Bangka Belitung Islands Province. This is because Sadai Port is a means of docking for ships that will carry out loading and unloading activities for container and bulk cargo. In addition, Sadai Port is also used for passenger ship activities, as a transportation access for the people of South Bangka who will go to Belitung Island or other small islands in the Regency in the Bangka Belitung Province such as Lepar Island and Pongok Island.

Considering the important role, Director of Navigation of the Directorate General of Sea Transportation, Capt. Budi Mantoro said that the government will soon determine the Entry Shipping Lane for Sadai Port, Bangka Belitung Islands Province. Based on the Decree of the Minister of Transportation Number. 432 of 2017 concerning the National Port Master Plan (RIPN) and its amendments, the hierarchy of Sadai Port is as a Collecting Port (PP), located in Tukak Sadai District, South Bangka Regency or on the southeast side of Pangkal Balam Port.

According to the results of the hydro-oceanographic survey conducted by the team from the Palembang Class I Type A Navigation District, data on shipping lanes for shipping entry has been obtained, where Sadai Port has a depth varying from 3 to 25 meters LWS, a channel length of 16 Nm or 30 Km, a width of 150 meters, and the route system is set as a 2-way route (two ways routes). A proper and effective shipping lane will provide great benefits, both for sailors crossing the waters and for the entire community that depends on the activities of the port and the surrounding waters. With good shipping lane management, there will be an increase in the efficiency of the distribution of goods and services, a reduction in logistics costs, and new opportunities for the tourism sector and other industries. Moreover, a safe and secure shipping lane will help maintain the sustainability of the marine environment, maintain biodiversity, and reduce negative impacts on the maritime ecosystem.

In the FGD activity on the Determination of the Entry Shipping Lane for Sadai Port, Bangka Belitung Province on April 3, 2024, in Bekasi, Capt. Budi Mantoro also said that the arrangement of the entry shipping lane for Sadai Port should be implemented to be immediately determined through a Decree of the Minister of Transportation in order to obtain an ideal shipping lane and fulfill various aspects of safety and smooth navigation interests as well as protecting the sustainability of the maritime environment.

Bakit-Mantung Ferry Pier: Currently, people who want to travel from Belinyu, Bangka Regency to West Bangka Regency must take a detour and travel time of two to three hours. In 2024, two piers will be built in Mantung, Belinyu District, Bangka Regency, and Bakit Village, Parit Tiga District, West Bangka Regency to connect the northern side of Bangka Island which is separated by

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Kelabat Bay. The construction of this pier is planned to take seven months and is funded by the State Budget through the Ministry of Transportation.



Figure 2. Map of Bukit and Belinyu Locations
Source: BPS Bangka Regency, 2024

Mantung and Bukit ports will have a positive impact on inter-village development, especially in the economic sector. Connectivity between the two regions becomes more effective through sea transportation with RoRo ships that can cut travel time to 30 minutes. RoRo ships (short for roll-on/roll-off) are a type of ferry that has an entry and exit door that can be raised and lowered for vehicle lanes, both two-wheeled and four-wheeled.

Head of the Class III Land Transportation Management Center (BPTD) of the Ministry of Transportation Pitra Setiawan said that the construction of the two ports each occupies an area of one hectare. The project is being carried out in two stages with a total budget ceiling of Rp153 billion. The first stage will focus on the waterside, while the second stage will be the construction of roads and equipment on land.

H. Connectivity Constraints in the Bangka Belitung Islands

Geographical Conditions: The Bangka Belitung Islands Province is an archipelago, so connectivity access to and from the region is highly dependent on sea and air transportation. The main passenger crossing within the province is on the Pangkalpinang - Tanjung Pandan shipping route which connects Bangka Island and Belitung Island. This route is served by the Express Bahari ferry operator with a frequency of 3 times a week and a travel time of approximately 4 hours and 30 minutes. In addition, there are several flights with the Pangkalpinang - Tanjung Pandan route, although the frequency is not too much now.

Meanwhile, access to outside the province via ferry is done via the Tanjung Kalian, West Bangka route to Tanjung Api-Api, Banyuasin, South Sumatra, and vice versa. As for flights, the Bangka Belitung Islands have two main airports, namely Depati Amir Airport, Pangkalpinang, and HAS Hananjoeddin Airport in Belitung. Depati Amir Airport Pangkalpinang serves flights with routes that are not too many, including from and to Tanjung Pandan, Palembang, and Jakarta. In 2024, there are airlines that serve the Pangkalpinang - Batam route, but they do not operate every day.

Based on information obtained from the Regional Development Planning Agency of the Bangka Belitung Islands Province, the frequency of crossings and passenger flights from Bangka Island to Belitung Island and vice versa is currently not as busy as before the Covid 19 pandemic. At that time, flights had more routes to other cities in Indonesia with more frequent frequencies. In addition to the limited frequency and routes, the high price of commercial airline tickets is currently one of the obstacles to connectivity in the Bangka Belitung Islands Province. In fact, the high price of air transportation tickets is often the main factor causing inflation in the Bangka Belitung Islands Province.

Funding Constraints: In addition to the constraints of geographical conditions in the form of islands, funding for connectivity infrastructure work is one of the problems faced by local governments in developing their regions. On a consolidated basis, approximately 80 percent of APBD revenue still comes from TKD so local governments experience limited fiscal capacity to fund connectivity infrastructure projects that are under their authority.

The distribution of Physical DAK for roads for the Provincial Government has experienced a downward trend in the last six years. Therefore, the IJD program has a very crucial role in balancing the decline in this Physical DAK because local governments can submit road construction proposals to the central government to be funded by the APBN. However, for the construction of new roads and road widening work, there is a problem, namely land acquisition, which is not covered by the IJD program so it becomes the responsibility of the APBD.

One example is Tanjung Ular Port in West Bangka which has now been inaugurated as a port intended for loading and unloading activities. However, access to the port is considered inadequate for the traffic of vehicles transporting goods. The road section is a

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district road whose authority lies with the West Bangka Regency Government. The status of the road cannot yet be upgraded to a provincial road or a national road because Tanjung Ular Port currently still has the status of a Local Feeder Port whose service coverage is within the district scope. In addition, efforts to widen the road through the IJD program cannot currently be carried out due to constraints on land acquisition on the side of the road which is land owned by PT Timah. As mentioned above, land acquisition is charged to the local government's APBD and currently there is no funding allocated for this. Due to limited road access, Tanjung Ular Port cannot yet function optimally.

The local government has not planned to implement a funding strategy from financing, for example from PT SMI. This is because the financing strategy is constrained by the term of office of the regional leader. Currently, the Bangka Belitung Islands Province is led by an Acting Governor before being replaced by a definitive Governor after the 2024 General Election. Therefore, the financing strategy cannot be considered because the installment payments will continue to the next term of the definitive Governor.

On the other hand, the mega project of the Bahtera Sriwijaya bridge which is planned to connect South Sumatra with Bangka Island is not expected to be built in the near future. Based on information from the Provincial Bappeda, the results of a feasibility study by the PUPR Ministry show that the construction of the 13.5 km bridge can only be carried out in 2045. The construction of this bridge is difficult to realize in the near future because the cost is very high, estimated at up to 15 trillion rupiah.

RECOMMENDATION

Based on the results of the analysis of government spending and road connectivity infrastructure indicators in the Bangka Belitung Islands, several recommendations can be submitted, namely as follows:

1. In relation to the declining condition of the stability of provincial and district/city roads, the regional government needs to map out sections that are in unstable condition for further follow-up, either with APBD funding or by submitting a proposal to the PUPR Ministry for handling through the Regional Road Presidential Instruction program.
2. Connectivity indicators have a strong correlation to GRDP. Therefore, it is necessary to increase the allocation of spending related to connectivity infrastructure to support the economy of the Bangka Belitung Islands Province which is currently slowing down. In addition to increasing connectivity and economic growth in the region, this spending is usually labor-intensive so it can open up new jobs and increase people's income.
3. In order to optimize the function of Tanjung Ular Port:
 - a. Encourage the local government to immediately establish the Tanjung Ular industrial area.
 - b. Opening road access from Air Limau to Tanjung Ular to support the mobilization of ship cargo from and to the Port.
 - c. Encourage the central government and provincial governments to intervene in the construction of this road access, especially from the funding side. The financing mechanism options carried out include land acquisition grants, road and bridge construction through the Regional Road Presidential Instruction program, financing both from OIP such as PT SMI, and loans between regional governments.
 - d. Preparation of human resources for Tanjung Ular operations so that the operational handover of the Port can be immediately handed over by KSOP to the local government. This can increase revenue for the local government. However, it must be ensured that the operationalization of this Port can provide a surplus of income compared to its operational costs. In this case, the management of the Port by the local government can be handed over to the BLUD Area Manager.

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