Development of infrastructure related with community welfare

R T P M Djanggo¹, Y W Tamberan¹, M A Tawakal¹, P I M Risamasu¹, M A I Nahumury¹ and A R Kadir²

¹Department of Economics Development, Faculty of Business and Economic, Universitas Musamus, Merauke, Indonesia
²Departement of Management, Faculty of Economics, Hasanuddin University

Email: marodjanggo@unmus.ac.id

Abstract. The research aimed to analyze the development of road infrastructure, marine and air transportation infrastructure, economic infrastructure, agricultural infrastructure, education infrastructure, and health infrastructures with varied descriptions Towards improving community welfare and economic growth in Mappi District. This research uses a qualitative approach with a descriptive analysis method. The data analyzed are secondary time series data from 2005-2014. Secondary data sources are infrastructure development data with each indicator in Mappi district BPS. The results showed that road infrastructure, marine, and air transportation infrastructure, agricultural infrastructure with irrigation channel indicators, economic infrastructure with traditional market indicators, and educational infrastructure have Positive effect on the welfare of society, but has no positive effect on economic growth. Healthcare infrastructure has a positive effect on community welfare. Economic growth does not have a positive picture of community welfare level in Mappi district

1. Introduction

The area is required to optimize the potential of income owned and one of them by providing a larger portion of the shopping area for production sectors. The shift in shopping composition is a logical effort undertaken by local governments in order to increase the level of public confidence. This is aimed at raising capital investments. The higher level of investment capital is expected to improve the quality of public services and in turn able to increase the level of public participation (contribution) of development reflected from the presence of an increase in PAD [1].

The regional financial budget is a plan that is the basis for serving the public so that public service can run as it should. Regional budget documents or commonly called the regional spending income budget, either at the provincial, district or city level. The budget preparation process for post-law 22/1999 and ACT 32/2004 involves two parties: executives and legislatures, respectively through a team or budget committee [2]

Economic growth is generally closely related to the increase or increase in the production of goods and services, which can be measured with gross domestic Regional product (PDRB) which is a macro indicator to see the economic development of a region. [3–5] mentioning that the factors affecting economic growth are capital accumulation, population growth and technological advancement.
In the region of Mappi district and also in general the province of southern Papua is now the development and expansion of agricultural areas where agriculture and plantation become its own attraction for development and development Cities. This is in line with the city's developmental model presented by [6] the following: When the population continues to grow, however the boundaries of the agricultural region will move from the city. Because the right area for the farm depends only on how far the distance from the city, not important in which direction, the farm will spread to all branches; Despite the distance to the point of the branch, agriculture develops in every direction except towards the main branch line [7]

2. Methods
The approach used in this study is a qualitative descriptive approach. As a qualitative descriptive approach, the first thing that is done in this research is the collection of data and information on infrastructure development in Mappi District from 2005 – 2014. The data on infrastructure development compiled throughout this period is the road infrastructure development data, marine and air transportation infrastructure development data, economic infrastructure development data with main indicators of market facilities especially traditional market facilities, agricultural infrastructures, educational infrastructure, and healthcare infrastructure. The Data that has been compiled is then done verification and withdrawal in the form of a description or overview of the development of infrastructure and its correlate with the welfare level of the community.

The steps in this plan by Miles and Huberman (1990) can be referred to as data reduction, data presentation, and Conclusion drawing and verification ("display").

The final goal of this study is the discussion of its correlate and causal relationships or interactive relationships with the level of community welfare where the level of community welfare in each district.

3. Results and discussion
Infrastructure Road of Mappi District Mappi district did not have roads built and maintained by the central government and the provincial government, so there was no state and provincial road. The long Road Data of Mappi District can be seen on the figure 1. chart below.

![Figure 1. The long road data of Mappi District](image)

The figure 1. chart above explains that there is no State road and provincial Road in Mappi District. This is due to the geographical state of Mappi district which does not require a longer road net than is already present. The district road built by the Mappi District government is specifically to meet the needs of people and Governments in the capital of the district alone, while for transportation needs that connect the district capital to the district-Ditrik Required provision of river and swamp transportation
infrastructure, except for Nambioman Bapai District in the town of Mur which has land transportation with the district capital Mappi. The number of motorists crossing a 811.542 km long road can be seen in the figure 1.2 chart below.

![Figure 2. The number of motorists crossing the road for 811.542 km](image)

The results showed that up to the year 2007, in Mappi district there is no record of the number of vehicles operating. Since 2008 New Years there is a record of the number of vehicles operating in Mappi. The number of vehicles continues to increase every year in which the two-wheeled vehicles (motorcycles) occupy the highest number. The Government of Mappi District provides general public transport on the three main routes that are served by buses from the Perum Damri, in three districts of Obaa district, Edera District, Assue District.

1. Obaa District: Kepi – AIDRort – Emete – Soba – Dagimon – Agham.
2. Edera District: Bade – Gimikya
3. Assue District: Eci – Area of Eci village

3.1. Infrastructure of sea and river transportation of Mappi

The transportation of the area is connected to Mappi district with other regencies in the region of southern Papua or with other districts outside the Papua province. Mappi County has a port of the pioneers that can be used as a place for pioneer ships or other private ships. The ports that can be visited by the pioneer ships are the port of Bade in Edera District, the port of Mur in Nambioman district of Bapai, Kepi port in Obaa District, Senggo Port in Citak Mitak District, and the port of Eci in Assue district.

The largest part of the Mappi region is the swamp area and many streams flow through the rivers. River flows can be utilized as transportation between the village and between districts. The rivers used as a means of transportation of Mappi, in table 1 below
Table 1. List of rivers to transport district Mappi

| No | River       | Length of river (Km) | Port |
|----|-------------|-----------------------|------|
| 1  | Digoel River| 180                   | Bade |
| 2  | Edera River | 170                   | Bade |
| 3  | Mappi River | 145                   | Moor |
| 4  | Ia River    | 95                    | Ia   |
| 5  | Obaa River  | 165                   | Keppi|
| 6  | Bapai River | 107                   | Bapai|
| 7  | Widelman River | 130          | Cabang Tiga |
| 8  | Dearam River| 115                   | Senggo|
| 9  | Yuliana River| 145                  | Haju |
| 10 | Assue River | 160                   | Eci  |

The table above shows that almost the entire Mappi county region has a river infrastructure that connects one region to another. List of ports in Mappi district that can be used for river transportation or sea transportation in the table 2 below.

Table 2. List of ports of transportation sector in Mappi

| No | Port Name | Length (m) | Width (m) | Status                  | Description |
|----|-----------|------------|-----------|-------------------------|-------------|
| 1  | Kepi I    | 21         | 6         | People's Wharf Nusantara Jetty | Wooden pole, hardwood floor Iron Pole, concrete floor |
| 2  | Kepi II   | 32         | 6         | Nusantara Jetty         | Iron Pole, concrete floor |
| 3  | Bade      | 70         | 8         | People's Wharf Nusantara Jetty | Iron Pole, concrete floor |
| 4  | Mur       | 28         | 5         | People's Wharf          | Iron Pole, hardwood floor |
| 5  | Eci       | 33         | 6         | Nusantara Jetty         | Iron Pole, concrete floor |
| 6  | Banamepe  | 31         | 6         | People's Wharf          | Iron Pole, concrete floor |
| 7  | Senggo    | 32         | 6         | People's Wharf          | Iron Pole, concrete floor |

The table 2 above shows that Mappi has adequate facilities for sea and river transportation. The data used to measure the correlation between sea and river transport variables on the economic growth of Mappi is the amount of port data listed in the table above.
3.1.1. Air transport infrastructure of Mappi. The air transport mode in Mappi District is one of the main modes of transportation, because in addition to connecting between regions in Mappi District can also connect Mappi District with other districts in the territory of Papua Province The South. The list of airfields in Mappi district used for smooth air transport mode can be seen in table 3 below.

| No | Airport Name            | Length (m) | Width (m) | Surface Type  | Description                          |
|----|--------------------------|------------|-----------|---------------|--------------------------------------|
| 1  | Kepi in Mappi District   | 750        | 23        | Concrete      | directorate General of Transportation. Air |
| 2  | Edera in the district of Bade | 900      | 20        | Concrete      | directorate General of Transportation. Air |
| 3  | Senggo in Citak Mitak District | 600    | 20        | Reinforced concrete | Directorate General of Transportation. Air and Zending |
| 4  | Aboge in Assue District  | 600        | 20        | Land          | The Indigenous Lands |
| 5  | Miyaro in Haju District  | 500        | 20        | Tanah         | The Indigenous Lands |

The aiIDRort, which was built in Mappi, was a pioneer aiIDRort to serve small-size aircraft such as Twin Otter, Cessna Grand Caravan, Pilatus Turbo Porter. Three of the five aiIDRorts have been given layers of concrete asphalt, reinforced concrete, while the other two aiIDRorts still have land foundation. The land of two aiIDRorts and its construction namely KEPI and Edera are owned and done by the directorate general of air transportation, Senggo AiIDRort in Citak Mitak was built and managed for the cooperation of Ditjen. Air transportation and Zending. The land Status of two other aiIDRorts such as Miyaro in Haju and Aboge in Assue is customary land.

Flight data arrives and departs as well as passenger data arriving and departing at three paved airfields in Mappi can be seen on figure 3 below.

**Figure 3.** Number of planes, passengers arriving and departing aiIDRort Bade, Senggo, and Keppi

Based on figure 3 above describes the number of planes landing at Bade AiIDRort, Senggo, and Kepi continue to increase where in 2005 it recorded 331 aircraft, increased to 816 aircraft in 2014 or increased by 147 percent. The number of passengers who landed at Bade AiIDRort, Senggo, and Keppi continued to increase as many as 2,937 passengers in 2005 increased to 7,380 passengers in 2014 or increased by 151 percent.
3.1.2. Economic Infrastructure of Mappi. The government has built a number of traditional markets in Mappi to serve the needs of the sellers and buyers. A number of traditional markets built by the Government to support economic growth are:

a. Wogi market, which is the main market in the capital of Mappi District, which is a building with a size of 150m x 200m. This market replaces the old market Marwa Nggem that has not been used anymore.

b. Mur market in Nambioman district of Bapai, on the banks of Mappi River, where the town of Mur is one of the pioneering port towns in Mappi County region.

c. Senggo Market in Citak Mitak district.

d. Haju market in Haju district.

e. Bade market in the port city of Bade, Edera district. This market becomes the main container market for the distribution of goods to and from Mappi District by sea/river.

f. Agham market, which is built in Nambioman district of Bapai, but is located near the Keppi Kora, so this market becomes the main container market for the parent market in Mappi County city.

g. It Zain market in the Zain it district.

h. Venaha Market

i. Tiga branch Market in the suburbs of Keppi, Obaa district.

3.2. Agricultural infrastructure of Mappi

The potential of the region of Mappi district since the expansion of year 2002 until now is still based on the agriculture sector which includes the forestry sub-sector, fishery/marine Sub-sector, plantation Sub-sector, livestock Sub-sector and plant Sub-sector Groceries. The development of infrastructure to support the growth of sub-sectors of food crops especially rice paddy fields do not get serious attention compared to other sub sectors. This is due to the topography of the region, which although the rivers are lined, but the area is more of a lowland with a maximum of 8 °, which is likely to occur with the puddle of rain that forms the swamp in the rainy season. Potential development of agricultural infrastructure development in the form of irrigation channel development for irrigation of rice fields has not been developed. Agricultural infrastructure data in the form of data on irrigation channels cannot be used as a measuring data affecting the economic growth of Mappi District.

3.3. Education infrastructure of Mappi

The advancement of a community's education is determined by many factors. The availability of adequate facilities and infrastructure in the number and quality is a determining factor to succeed in advancing the education world. Data on the number of school of Mappi districts ranging from elementary to college schools in table 1.7 below.
Figure 4. Total school in Mappi period 2005-2014

Based on figure 4 above explains that there was significant growth in the number of schools during the research period in Mappi. In the year 2005 the number of schools, ranging from elementary to college schools in Mappi district was 147 units, increased to 174 units or increased by 57.4 percent. Year 2007 is the starting year of vocational secondary school.

Figure 5. Students ’ ratio of classrooms and student ratios to Mappi district teachers

The figure above explains that the ratio of teachers to students at the elementary school level of 40.5 ratio in 2005 decreased to 30.5 in 2014. This explains that there has been an increase in the number of elementary school teachers. The ratio of teachers to students at junior secondary education was decreasing from the ratio number 23 in 2005 down to 13.5 in 2014. This also explains that there is an increase in SMP teachers. The ratio of teachers to students at high school levels did not change despite the fluctuations in the ratio of each year, from 2005 to 2014. Student-to-classroom ratios on the primary school education level increased the ratio rate, while student-to-school ratio of classrooms to Junior and senior high schools was decreasing the ratio rate. This explains that from the aspect of infrastructure availability, there is an increase in the number of classrooms compared to the number of students.
3.4. Health infrastructure of Mappi District

The improvement of adequate health facilities in the amount and quality can be an indicator of improvement of health services to the community. The number of health infrastructures in Mappi district are hospitals, Primary Health Centers, maid health centers, traveling centers, and Integrated Service Pos continue to increase. Data on the increase in the total health facilities of Mappi District in figure 6 below.

![Figure 6. Health facilities of Mappi District year 2005 – 2014](image)

Based on figure 6 above Mappi District was formed through the process of the expansion of Merauke Regency in 2002, New in 2008 began to have a hospital. Primary Health Center which began to be built in 2007 as many as six units, continued to grow until the year 2014 into nine units. Primary Health Center experienced an increase in the number of seven units in 2005 increased to twelve units in 2014 or increased by 71 percent. Maid Health care experienced a very significant increase, from the number of 30 units in 2005, increased to sixty units in the year 2014. Health centers around Four wheels also increased from the number for three units in the year 2005 increased to six units in the year 2014. Health service facilities using speed boat continue to increase, from six units in 2005 increased to eleven units in the year 2014. Health Service facilities using the long boat also experienced a significant boost, from two units in the year 2005 increased shalDRly to fifteen units in the year 2014. Integrated Service Pos from 41 service posts increased to 137 service posts. Overall the total health infrastructure of Mappi district experienced an increase in numbers although fluctuated in number from year to year, but experienced a tendency to increase, from the number of 142 units in the year 2005 increased number of Total to 307 units in the year 2014. Data on the overall amount of health facilities above becomes data used to calculate the correlation of health infrastructure to the welfare level of the people of Mappi Distric.

3.5. The economic growth of Mappi

One indicator of the economic growth of an area is the increase in the PDRB Per Capita based on the prevailing price. Mappi's PDRB Per Capita Data on the basis of the price is valid from 2005 until 2014.
Figure 7. Gross regional domestic income Per capita on the basis of price applicable Mappi District

The table above explains that an increase in PDRB Per Capita on the basis of the prevailing price in Mappi District from 2005 to 2014. The percentage increase fluctuates but the nominating value is clearly an increase. The highest increase percentage occurred in 2012 which amounted to 55 percent, and the lowest percentage occurred in the year 2013 which was 9 percent.

3.6. Community welfare level Mappi District

The forming component of human development index is life expectancy, average length of school, literacy rate, and Per capita real expenditure. Data of the IPM of Mappi District and its components throughout the period 2005-2013 can be seen in the table below.

Table 4. Mappi district human development index year 2005-2013

| Years | Life expectancy (year) | Average length of school (years) | Literacy rate (percent) | Real Per capita expenditure (IDR. 000) | Human Development Index |
|-------|------------------------|---------------------------------|-------------------------|---------------------------------------|------------------------|
| 2005  | 65.20                  | 2.20                            | 31.20                   | 569.90                                | 47.00                  |
| 2006  | 65.40                  | 2.80                            | 31.30                   | 573.90                                | 48.00                  |
| 2007  | 65.64                  | 3.80                            | 31.30                   | 576.70                                | 49.04                  |
| 2008  | 65.79                  | 3.80                            | 31.30                   | 582.77                                | 49.59                  |
| 2009  | 65.99                  | 3.89                            | 31.35                   | 584.06                                | 49.88                  |
| 2010  | 66.18                  | 4.27                            | 31.43                   | 586.21                                | 50.45                  |
| 2011  | 66.28                  | 4.30                            | 31.46                   | 590.07                                | 50.83                  |
| 2012  | 66.30                  | 4.36                            | 33.47                   | 592.62                                | 51.53                  |
| 2013  | 66.66                  | 4.37                            | 33.50                   | 596.97                                | 52.08                  |

The table 4 above explains that the average number of years of life expectancy of Mappi County Society increased from 2005 to 2013. This is in line with the increasing health services adequate. The average population of Mappi in fifteen years old and above who attended the school's formal education continued to increase, from an average of 2.20 years in 2005, increasing to an average of 4.37 years in 2013, despite being The average number of Papua province is 6.87 years. The average percentage of the population of Mappi district aged 15 years and over was able to read and write also increased from an average figure of 31.20 percent in 2005 increased to an average of 33.50 percent by 2013 and still under The average percentage of Papua's population in 2013 is 75.92 percent. The average amount of per capita real expenditures of the population of Mappi in 2005 was IDR 569.900,-(five hundred sixty nine thousand nine hundred Rupiahs), increased to an average of IDR. 596,970,-(five hundred ninety six thousand nine hundred Seventy rupiah) in 2013. Mappi District Human Development Index of
2005 is the 47.00 increase to 52.08 in 2013 used as a level of data for community Welfare Mappi District to measure its correlate with Mappi District economic growth data, data Infrastructure, health infrastructure data.

3.7. The linkage of the infrastructure and welfare of Mappi District

The development of various infrastructures undertaken by local governments to improve the welfare of the community occurred also in Mappi district.

Table 5. Community infrastructure and welfare Mappi District

| Years | Road (Km) | Sea and Air (Unit) | Economics (Unit) | Agriculture (M) | Education (Unit) | Health (Unit) | Economic growth (%) | Welfare (HDI) |
|-------|-----------|--------------------|------------------|----------------|-----------------|---------------|-------------------|--------------|
| 2005  | 302.991   | 3                  | 2                | 0              | 147             | 142           | 20                | 47.00        |
| 2006  | 329.691   | 4                  | 2                | 0              | 151             | 161           | 40                | 48.00        |
| 2007  | 339.680   | 4                  | 3                | 0              | 143             | 221           | 24                | 49.04        |
| 2008  | 698.355   | 5                  | 4                | 0              | 163             | 224           | 40                | 49.59        |
| 2009  | 714.855   | 6                  | 6                | 0              | 169             | 346           | 18                | 49.88        |
| 2010  | 720.855   | 6                  | 6                | 0              | 215             | 655           | 24                | 50.49        |
| 2011  | 767.960   | 6                  | 9                | 0              | 164             | 397           | 11                | 50.83        |
| 2012  | 775.040   | 7                  | 9                | 0              | 175             | 346           | 55                | 51.53        |
| 2013  | 785.120   | 7                  | 9                | 0              | 175             | 346           | 9                 | 52.08        |
| 2014  | 811.542   | 7                  | 9                | 0              | 174             | 307           | 10                | 55.74        |

Table 5 above showed that infrastructure transportation group especially sea and river transportation, air transport shows a strong correlation with the welfare level of people of Mappi district. Transportation group infrastructure continues to experience growth ranging from three units in the year 2005 increased to 12 units in the year 2014. The Ocean/river Transportation Infrastructure indicator is the dock and Pioneering airfield air transportation infrastructure indicators. Although the amount of infrastructure is still very limited, but the utilization is increasing and the community feels more. This can be seen in the data on the increasing number of aiIDRlanes arriving and departing from each aiIDRort in Mappi District region, increasing the number of passengers arriving and departing. Similarly, the voyage in the Marshland and the rivers. Mappi District has 10 rivers that can be used as a natural infrastructure for transportation that is used by people for various economic activities. The ports that can be visited by the pioneer ships are the port of Bade in Edera District, the port of Mur in Nambimian district of Bapai, Kepi port in Obaa District, Senggo Port in Citak Mitak District, and the port of Eci in Assue district. Thus the transportation infrastructure of the sea/river and air has a positive influence in improving the welfare of the Community Mappi District.

Mappi District does not have a road that is well-financed development and maintenance with the cost of the central government and the provincial government. The 811 km long road is a road built by the district government of Mappi around the regency and between the city of Keppi and the capital of the Nambimian Bapai district in the port town of Moor. While transportation between the capital of other districts with the district capital only through rivers and marshes.

Education infrastructure flourished in 147 units in 2005 increased 174 units in 2014, but education in Mappi district has not experienced any meaningful developments. The student-grade ratio and teacher-pupil ratio ranging from elementary to high school education levels are not progressing. One of the factors was the low awareness of people to put their children in school. Thus, the development of education infrastructure has not been able to improve the welfare of the community. The healthcare
infrastructure expanded from 142 units in 2005 to 307 units in 2014. The growth of health facilities has not been able to support the development of the health field thoroughly, due to the various other factors such as public awareness for the treatment of existing health facilities, lack of medical personnel, especially doctors.

The development of the economic infrastructure with the main indicators is the traditional market also experienced growth in which in the year 2005 recorded two units developed into nine units in the year 2014. This very limited number of markets is generally located in the capital and district capitals, where only the public officers live there. People in general are still making a living for their own needs and not for sale. The market building in some places does exist, but the market activity does not take place effectively. So the growth of economic infrastructure with traditional market indicators has not been able to improve the welfare of society.

The percentage of the economic growth of Mappi district is very volatile with declining tendencies. In 2003 and in 2004 it recorded a percentage of economic growth of 20 percent, and between 2013 and 2014 the percentage of its growth was recorded at 10 percent. The percentage of the highest economic growth of 55 percent occurred in 2011 to year 2012 due to investing by agricultural investors in the district of Edera. Economic growth has no effect on people's welfare levels as it only affects macroeconomic growth and government spending that does not touch the micro.

4. Conclusion

Infrastructure of sea and air transportation provides a positive picture of the effort to increase economic growth and welfare of communities in Mappi District The bias goes well while the economic growth side is not Provide a positive picture of community welfare because the district only has sea and air transportation infrastructure that can connect between regencies in the province of southern Papua. The infrastructure of economics, agriculture, education and Health has a different picture in Mappi district The economic infrastructure has a positive picture. Agricultural infrastructure does not have a positive picture in Mappi district because Mappi district does not have the Agriculture infrastructure data in the research on this Data on irrigated irrigation that is good for agricultural fields with a period of time Ten years in this study. The state of education in Mappi District is very Concern, which in turn is not a positive picture in the development of educational infrastructure to the economic growth and welfare of communities in Mappi District during the Research. Although there is an increase in the number of health infrastructures in the district but there is no increase in the number of people who get adequate health care, because there are still various health service inhibitors factors such as the challenge Public awareness and lifestyle and cultural circumstances.

Suggestions

Expected attention from local district government to be more extra work in the effort to increase infrastructure development of land, sea and air transportation, to create economic growth and community welfare in Mappi District.

Government of both the central government, provincial and local governments in Mappi district is advised to pay more attention to the excellence of infrastructure in the area so that it needs to be improved to create economic development so that it happens Improvement of HDI in Mappi County

References

[1] Mardiasmo 2002 Otonomi dan Manajemen Keuangan Daerah. (Yogjakarta: Andi)

[2] Darwanto dan Yulia Yustikasari 2007 Pengaruh Pertumbuhan Ekonomi Pendapatan Asli Daerah dan Dana Alokasi Umum terhadap Pengelokasian Anggaran Belanja Modal

[3] Todaro, M. P., & Smith S C 1995 Pembangunan Ekonomi Di Dunia Ketiga (Jakarta: Erlangga)

[4] Purwono R and Mubin M K 2018 Do Infrastructures Influence the Efficiency Convergence of the Indonesian Economy? Seoul J. Econ. 31 333–53

[5] Wasiaturrahma and Ajija, Rohma S 2017 Evaluation of Inclusive Economic Growth in East Java Adv. Sci. Lett. 23 8690–5
[6] M. Fujita, P. Krugman and A J V *The Spatial Economy Cities, Regions, and International Trade* Library of Congress Cataloging-in-Publication Data.

[7] Samel Watina Ririhena R T P M D 2018 *Effects of Investment (PMTB) on Economic Growth and Employment In Papua Province* vol 226