TRANSIT ORIENTED DEVELOPMENT OPTIMIZATION JAKARTA-BANDUNG HIGH SPEED RAILWAY

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Abstract.

Mass Rapid Transportation is the main requirement in a metropolitan city. This is as exemplified by the Tokyo and London with its high speed railway. In 2019 the Government initiated the construction of the Jakarta - Bandung High Speed Railway. The main reason for the construction of this fast train is due to the concentration of population along the Jakarta - Bandung route and the very high mobility between the two national and regional growth center. The concept of Transit Oriented Development is one of the innovations in compact city development. Where facilities, offices and residences will be 1 radius of coverage making it easier to be mobile. In addition, the interchange and transit facilities also make it easier to travel to certain destinations. With the development of the Jakarta Megapolitan Area and Bandung Metropliotan Area seen also from changes in land use corridors, it is hoped that this high speed railway will become the main transportation solution that is environmentally friendly and anti-congestion during peak hours. This research commonly analyze the economic and financial feasibility and also of the Jakarta – Bandung high speed rail project and calculates the NPV, BCR, IRR, PI, and PP. The government through the SOE and China International Railway consortium initiated the construction of a high speed rail from Halim to Tegalluar with a 142,3 km rail length and an average speed of 250 km/h, construction began in 2015 and is expected to be completed by 2020. The analysis is done with assumption of 75% occupancy rate, with discount rate of 2% and 3,46%, and feasibility of the project by doing comparison of feasibility method that is NPV ≥ 0, BCR > 1, IRR > r, PI > 1, and PP is faster than NPV positive.

Keywords : Jakarta – Bandung, economics environment feasibility, Mass Rapid Transportation (MRT), mobility, land use

Introduction

Jakarta well known as Capital City of Indoensia which larger of activities. The area comprises Jakarta and parts of West Java and Banten provinces, specifically the three regencies - Bekasi Regency and Bogor Regency in West Java,

and Tangerang Regency in Banten. The area also includes the cities Bogor, Depok, Bekasi, Tangerang and South Tangerang, all of which are not included administratively in the regencies. The name of the region is taken from the first two (or three) letters of each city's name: Ja-bo-de-ta-bek from Jakarta, Bogor, Depok, Tangerang and Bekasi.

The population of Jakarta metropolitan area, with an area of 6,343 km2 (2,449 sq mi), was 31.6 million according to the Indonesia 2015 Inter-Census making it the most populous region in Indonesia, as well as the second-most populous urban area in the world after Tokyo. The population share of Jakarta metropolitan area to the national population increased from 6.1% in 1961 to 11.26% in 2018.

The region is the centre of government, culture, education, and economy of Indonesia. It has pulled many people from throughout Indonesia to come, live and work. Its economic power makes Jakarta metropolitan area the country's premier centre for finance, manufacture and commerce. In 2019 data, The area has a gross domestic product of US$297.7 billion with a per capita GDP of $8,775, and a purchasing power parity of US$978.5 billion with a per capita PPP of $28,840, equal to 26.2% of economy of Indonesia (Wikipedia, 2020).

Figure 1: Jakarta Megapolitan Area Map

The region is partly defined by the areas from which people commute into the city. All municipality and regencies have access to toll road and rail service. At present public transport in Greater Jakarta consists of TransJakarta BRT, KRL Jabodetabek commuter rail, Jakarta LRT, Soekarno-Hatta Airport Rail Link, and Jakarta MRT. The transit system that is currently under construction is LRT Jabodebek. Jakarta LRT began operation by late 2019, and LRT Jabodebek is expected to open by March 2021. There are Jakarta MRT and LRT as a rapid transit system in Jakarta, the capital city of Indonesia. Before Jakarta Mass Rapid Transit was opened, the Jakarta metropolitan area was the world's largest metropolitan areas without a grade-separated rapid transit system.

Research Background

Transit Oriented Development (TOD) to Improving Accessibility

The needs of society in carrying out activities in the future will be oriented by the development of technology and information which will always develop in order to facilitate humans in carrying out activities. Distance will no longer be a major obstacle and will be distorted by speed and time. The need for high speed railway transportation is not just a new and modern public transportation, but the development of high speed railways is expected to be able to adapt to local culture so that it becomes a mixture of modern culture with local culture that will stimulate the community's economy. The need for easy accessibility is the main requirement in developing futuristic and modern high speed railway transportation facilities and infrastructure. In the future, the need for accessibility in carrying out activities from one room to another must be supported by effective and efficient policies and can run dynamically following developments in the era of technology and information. Therefore, in developing high speed railway transportation, it is necessary to orientate towards Mobility as a Service

(MaaS). This concept has been widely practiced in developed countries and is a breakthrough in transportation policy in the information and digitalization era, so it is hoped that there will be a shift in movement from private mode to public service mobility.

Transit Oriented Development (TOD) on the concept of developing a high speed railway that implements the development of new, sustainable urban areas. According to (Li & Huang, 2020; Pan, Shen, & Liu, 2011; Trepci et al., 2019) the TOD concept is to apply the concept of a combination of land use and transportation modes, so that this concept can become a recommendation in efforts to develop sustainable urban areas.

Figure 2. TOD concept Jakarta-Bandung High Speed Railway

Economic Sector Growth

Responding to the need for transportation facilities in the two cities of Jakarta-Bandung and vice versa, many transportation service providers have emerged, be it land, sea or air transportation, all of whom are trying to position themselves as the best way to achieve its goals, namely to make profit and provide optimal service. Therefore, even fierce competition cannot be avoided, in order to maintain and increase survival company. Train, is a means of transportation with multiple advantages that save land, cheap, safe, comfortable, low pollution, mass nature, adaptive to increasingly changing technology. Environmentally friendly so that the potential can be used on a national scale.

Environment Sector

In the environmental aspect, the procurement of the Jakarta-Bandung Fast Train is considered by the Indonesian Forum for the Environment (Walhi) to pay less attention to environmental management and protection, as well as based on a less comprehensive Environmental Impact Analysis (AMDAL). One of the benchmarks in assessing the direct environmental impact that has occurred is the decrease in water availability in several water catchment locations due to the construction of fast train infrastructure and also the construction of settlements around fast train stops. According to Walhi, the Fast Train project

Jakarta-Bandung will in fact increase the potential for environmental degradation along the railroad tracks. In addition, the construction of the Jakarta-Bandung Fast Train will utilize 56.6 ha of production forest land. In addition, there will be an indirect impact in the form of conversion of agricultural land of 150 ha to non-farm around the station and fast train tracks.

With the conversion of agricultural land functions, it will reduce national food barn. With the increase in land value in the area around the high-speed railroad track, it is predicted that those who will benefit from project procurement are the community groups middle to top. Based on this description, shows the importance of conducting a more in-depth study. On figure 2 it can be seen environment codition during Jakarta – Bandung Project on going.

Figure 3. Environment Condition Jakarta – Bandung Along High Speed Railway Track

(Source: https://tirto.id/kereta-cepat-jakarta-bandung-dihentikan-bermasalah-sejak-awal-eCp1)

Methodology

Jakarta Bandung fast train is an alternative solution in solving problems related to congestion. The method used in this research is to compare with similar research and also existing regulations including regulations in West Java Province and also regulations in regencies and cities. The development of world cities in creating mass-based transportation systems has made the Jakarta Megapolitan Area make a breakthrough to build a mass transit-based transportation system. After successfully building Mass Rapid Transportation (MRT), the government plans to build a fast train that connects Jakarta - Bandung.

This research consists of methods of obtaining data and methods of analyzing data. Some of the data needed are existing data regarding land use, movement and number of passengers also Gross Regional Domestic Product. This collection aims to provides information on the economic and financial feasibility analysis. Also Spatial Planning and related data for environmental impact analysis.

Research Object

The object of research for the Fast Train is located on the island of Java, with the first route, namely from the capital city of Jakarta (Halim Station), Karawang Station, Walini Station, and finally Bandung City (Tegalluar Station). The length of the route traveled by this fast train is along 142.3 km.

Data Collection Methods

The first data collection stage is the study of literature needed to support this research, such as the theory of railroad development, studies on economic and financial feasibility analysis, other scientific sources from journals, papers, etc. In this research, the data used is only secondary data which can be obtained from the website for the Indonesian-Chinese Fast Train (kcic.co.id) itself and research that has been done previously in order to obtain the assumed values that will be used in the analysis of economic benefits in the research

Data Analysis Methods

In this study, an analysis was carried out using several values that are commonly used as a reference in determining the feasibility of a project to be implemented. These values is Location Quotiens (LQ). The following is an explanation of the criteria values.

$$LQ = \frac{\left(\frac{\text{Regional Industry Employment}}{\text{Regional Total Employment}}\right)}{\left(\frac{\text{State Industry Employment}}{\text{State Total Employment}}\right)}$$

Value	Implication
LQ > 1	Area has proportionally more workers employed in a specific industry sector than the larger comparison area
LQ ≥ 1.25	Area industry has potential to be classified as exporter
LQ < 1	May indicate opportunity to develop businesses in the local area

…… …….. (1)

Besides from LQ, this study uses spatial planning analysis, feasibility analysis and environmental impact analysis.

Result

Transit Oriented Development of Jakarta-Bandung High Speed Railway in Urban Planning

Transit Oriented Development is a mixed-use community, that encourages people to live near transit services and to decrease dependence on their driving (Still 2002, Bernick and Cervero 1997 in in Bevilacqua, 2013), and also the practice of developing or intensive residential land use near rail stations and housing, along with complementary public uses, jobs, retail and services, are concentrated in mixed-use developments at strategic points along the regional transit systems. In the TOD area there is an intensive use of residential land near to train stations along with complementary use of public spaces such as offices, shopping centers that built around transit areas.

TOD is one of the development concepts of urban areas developed in many large cities because of the benefits of being able to provide a more comfortable and the quality (a more livable city) (KCIC, 2020). TOD offers convenience in reaching various public facilities and social facilities as well as creating a pedestrian-oriented urban space and maximizing the use of public transportation as a means of mobilizing. By integrating the use of public transportation and urban areas sustainably, TOD will stimulate economic growth and promote a better quality of life. TOD development can create a mixed-used development area, which is a combination of residential and business areas in one area. Mixed used development will increase community productivity and encourage local economic activities.

As the future leading mode of mass transportation, the Jakarta-Bandung High Speed Railway comes with TOD areas around the train stop stations, namely Halim (Jakarta), Karawang (West Java), Walini (West Java), and Tegalluar (West Java). The development of Jakarta-Bandung High Speed Railway TOD adopts the concept of density mixed-use planning. These TOD are targeted become new cities in which a number of shopping, health, education, entertainment, sports, banking and other facilities will be built.

TOD Halim is located in the center of DKI Jakarta, namely East Jakarta. Meanwhile, the other three TODs are located in West Java Province which apart from being a new potential area but also encouraging development of the surrounding area. The existence of the Jakarta-Bandung High Speed Railway can stimulate a new economic center or point, especially in the TOD area and its surroundings. Therefore it is very important to consider the potential for regional economic development. The economic optimization of TOD area discussed on West Java which includes 3 stations, namely Karawang, Walini and Tegalluar. Through data on Gross Domestic Regional Product (GDRP), economic growth can be calculated which illustrates a real increase in the economic capacity of a region.

The LQ method is used to assess economic conditions that lead to the identification of the specialization/basis of economic activity in an area. This analysis technique has not been able to provide final conclusions from the sectors identified as strategic sectors. However, the first stage is sufficient to provide an overview of the capacity of a region in the identified sectors. The table shows the LQ index based on GRDP in three West Java districts which are the locations of the Jakarta-Bandung Transit Oriented Development plan.

Table 1: LQ Index Calculation Results for Karawang, West Bandung and Bandung Regency 2019

Gross Domestic Regional Product Industry (billion rupiah)	**GDRP of West Java (billion) 2019**	**LQ**		
		Karawang	**Bandung Barat**	**Bandung**
Agriculture, Forestry, and Fishing	104.656,78	0,41	1,72	0,95
Mining and Quarrying	24.791,42	1,26	0,63	1,22
Manufacturing	641.352,05	1,66	0,95	1,20
Electricity and Gas	5.373,58	1,77	2,10	0,32
Water Supply; Sewerage, Waste Management, and Remediation Activities	1.168,93	0,85	0,47	0,43
Construction	126.631,20	0,50	0,88	0,82
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	232.876,12	0,65	0,89	0,87
Transportation and Storage	71.064,36	0,39	1,07	0,74
Accommodation and Food Service Activities	40.928,32	0,40	1,91	0,90
Information and Communication	63.861,23	0,32	0,59	0,57
Financial and Insurance Activities	36.520,83	0,47	0,34	0,28
Real Estate Activities	19.348,73	0,20	1,51	1,04
Business Activities	6.861,26	0,08	1,07	1,07
Public Administration and Defence; Compulsory Social Securit	28.754,68	0,42	1,22	1,00
Education	42.156,30	0,34	1,34	1,11
Human Health and Social Work Activities	12.448,02	0,37	0,66	1,03
Other Services Activities	32.912,01	0,42	0,50	0,95

Gross Domestic Regional Product Industry (billion rupiah)	**GDRP of West Java (billion) 2019**	**LQ**		
		Karawang	**Bandung Barat**	**Bandung**

Source: Analysis, 2020

Based on the results of LQ calculations, the economic sector with an LQ value > 1 is manufacturing and electricity and gas sector for Karawang Regency, accommodation and food service activities, agriculture, forestry and fishing, electricity and gas sector for West Bandung Regency, manufacturing, mining and quarrying and educational services sector for Bandung Regency.

The opportunity to develop TOD in Karawang station has the potential for regional growth to the south of Karawang. The focus of developing TOD Karawang is on the vertical industrial sector and the creative economy that is able to create workforce. Karawang is currently the largest industrial city in Indonesia, which is in accordance with its nickname as the industrial city of Karawang. Based on literature review, West Bandung Regency is known for its natural tourism potential. This is in accordance with the developing economic sector, namely the accommodation and food and beverage sectors. Likewise, Bandung Regency is known as a tourist area and the largest textile industry producer in West Java (bandungkab.go.id, 2020). The development of TOD in Bandung Regency has the opportunity to develop the East Bandung area.

Figure 4: Route Map of Jakarta-Bandung High Speed Railway and the TOD

Jakarta-Bandung High Speed Railway Synchronization in the Spatial Planning Development

Jakarta-Bandung High Speed Railway project is one of the programs in the National Strategic Project which is further regulated in Presidential Regulation Number 107/2015 concerning the Acceleration of Implementation of High Speed Railway Infrastructure and Facilities between Jakarta and Bandung. Jakarta-Bandung High Speed Railway development project has been listed in the 2014-2019 Revised RPJMN. The plan has been stated in the National Railway Master Plan (RIPNAS 2030) document, namely the Minister of Transportation Regulation Number PM 43/2011 concerning the National Railway Master Plan.

TOD of Jakarta-Bandung High Speed Railway project in four stations, requires an integrated environmental arrangement.

Development must be based on spatial planning, reviewing spatial structure and spatial pattern so that the utilization, control and evaluation of development can be measured by considering economic, social, cultural and environmental conditions.

Infrastructure development in West Java were included in the 3rd mission of the West Java Government, which is to accelerate the growth and distribution of sustainable environmental and spatial based development through increasing regional connectivity and regional structuring in the 2018-2023 West Java Provincial Regional Medium-Term Development Plan (RPJMD). The development of transportation infrastructure is carried out in order to improve services for the movement of people and goods and develop a convenient regional public transportation system. One of the programs to support this mission is the development of a rail-based urban mass transportation network system and the improvement of railway safety (mass rapid transport). Therefore, Jakarta-Bandung High Speed Railway project is still in line with the infrastructure development plan.

In the West Java Provincial Spatial Plan (Regional Regulation Number 22/2010), there is a transportation infrastructure development plan, namely the development of urban mass transit which aims to improve connectivity, accessibility and mobility between regions. Although it does not specifically mention the mass transit of the Jakarta-Bandung High Speed Railway. Development of a railway network that functions as a link between National Activity Center (PKN) and between PKN and PKNp (province) and Regional Activity Center-province (PKWp). With a length of the track line reaching 142,3 km, the Jakarta-Bandung High Speed Railway get through 9 districts and cities, 83 urban villages and villages (KCIC, 2020).

Table 2

Regional Development based on West Java Province Regional Spatial Planning 2009 - 2029

TOD Area	Development Area (WP)
Karawang Regency	**WP Purwasuka** Karawang Regency, is directed to be supporting node for the development of Bodebek Urban Area PKN, for sustainable wetland agricultural activities, marine business, non-polluting and non-extractive industries that do not interfere with irrigation and water reserves, as well as agro-industrial activities.
Bandung Barat Regency	**WP KK Cekungan Bandung** West Bandung Regency, directed as part of the PKN with the main activities of non-polluting industries, agriculture, creative industries and high technology.
Bandung Regency	**WP KK Cekungan Bandung** Bandung Regency, directed as part of the PKN, with the main activities of non-polluting industries, agro-industry, nature tourism, agriculture and plantations

Source: Analysis, 2020

Figure 5: Coverage Area connectivityof Jakarta-Bandung High Speed Railway

Jakarta-Bandung High Speed Railway project from the very beginning has not been specifically stated in the regional spatial planning (RTRW) of the regency and cities affected by the project. Through Presidential Regulation number 107/2015 concerning the Acceleration of Implementation of High Speed Railway Infrastructure and Facilities between Jakarta and Bandung, the President instructs the Heads of Regions whose areas the High Speed Railway project passes to make adjustments to the city and regency spatial plans. Efforts are being made, such as revising spatial products to accommodate the Jakarta-Bandung High Speed Railway development plan. The Regional Planning and Development Agency of Karawang Regency stated that the central government agreed to make a special detailed spatial plan to support the construction of the Jakarta-Bandung High Speed Rail in five villages around Karawang (Bappeda Jabar, 2017). Meanwhile for West Bandung Regency, KCIC is in the master plan synchronization stage with the West Bandung Regency government before any physical development of the area occurs.

Sustainability Transportation Development

High speed railway makes Indonesia the first country in Southeast Asia to have High speed railway transportation. The development of the high speed railway transportation mode has made Indonesia a pioneer in developing this fast train. Comprehensive studies must continue to be carried out in various disciplines so that the development of the high speed railway can continue to be targeted and beneficial both from a social, economic, financial, cultural and environmental perspective.

The development of transportation in Indonesia is still possible to carry out this development based on the condition of Indonesia as a developing country that has a lot of potential in the transportation sector. The increase in population and the development of urbanization which is increasing every year make transportation a means that must be developed. In big cities in Indonesia such as Jakarta, Bandung, Semarang, Surabaya and other cities, the need for intermodal integration is very much needed in order to suppress the increasingly uncontrolled growth of private transportation rates. This is one of the factors that causes congestion on roads in big cities. The impact of this congestion causes many losses, namely:

a. Economic

Congestion creates economic problems for the community which affects the movement pattern of people who prefer 2-wheeled transportation as an alternative to travel. As a result, vehicle growth is increasing which reduces the capacity of a road space.

b. Financial

The impact of congestion is the farther the distance from one place to another which affects the time traveler for logistics, industrial and public transportation shipments.

c. Environment

The disadvantages arising from congestion on the environment are: Air pollution, wasted fuel, noise.

d. Social

Congestion makes people lazier to travel so that it affects the pattern of community activities.

Based on the above problems, it requires a mode of transportation that is economical, environmentally friendly, and humanist so that it can solve the above problems so that the presence of a convergent high speed railway can be an alternative solution in developing sustainable transportation through a balance of development from the economic, social and environmental sectors. Growth in terms of economic efficiency and stability must be balanced with social equality, community participation, and long-term environmental preservation. The high speed railway was built in a long term with a concession period of 100 years that applies energy safety and security so that in the future it can maintain energy use and support better economic development in the future.

Investation Project Jakarta-Bandung High Speed Railway

High speed railway is an intermediary for the growth center of new economic zones Karawang, Wallini, and Tegalluar West Java. West Java is the best investment location which is most attractive to foreign investors. In addition to the support of adequate infrastructure and sufficient resources, West Java is in great demand by large companies to build factories and become an attractive investment place in the eyes of investors. Thus, in order to support infrastructure needs in order to facilitate the most productive and most active line in Indonesia of business, the construction of the High speed railway is in line with the needs of new sustainable economic growth.

Based on research conducted by Giantara, O.T., Purba, A., Herianto, D. (2018). Regarding the economic and financial analysis of the Jakarta - Bandung High speed railway by taking into account the economic and financial benefits (*cost*) of the construction of the Jakarta - Bandung High speed railway, it is feasible to build and operate, this is because NPV and BCR have met the requirements since the first year. In addition, several factors to support the sustainable development of the high speed railway include:

a. High speed railway infrastructure development planning is a breakthrough high-tech innovation to increase the mobility of people from Jakarta to Bandung

b. With the increase in high mobility, supporting variables are needed to support this mobility, namely the concept of Transit Oriented Development.

c. Transit Oriented Development is a concept to support areas that are integrated with space and transportation that require high mobility.

d. Supporting components for the concept of Transit Oriented Development are

needed such as workability, integrated transport, cashless for payments, and Mobility as a Service (MaaS) facilities.

Environment Impact Analysis

The very high economic potential in Indonesia, the Government decided to carry out infrastructure development in the form of a fast train in the Jakarta-Bandung corridor in order to further increase the movement of economic development, the tourism sector, etc. which occurred in Jakarta, Bandung and cities that are passed by the train line fast, including Bekasi Regency and City, Purwakarta Regency, Bandung Regency. Under these conditions. Jakarta – Bandung High speed Railway is the government's choice as a form of mass transportation modernization in Indonesia, starting from Jakarta-Bandung in building intercity connectivity between provinces, and regional development. (Kadarisman, 2017)

So that environmentally the development of this area is very good for increasing the economic sector. However, it must pay attention to the concept of environmental sustainability in which production forests, green lines and open spaces cannot be completely changed.

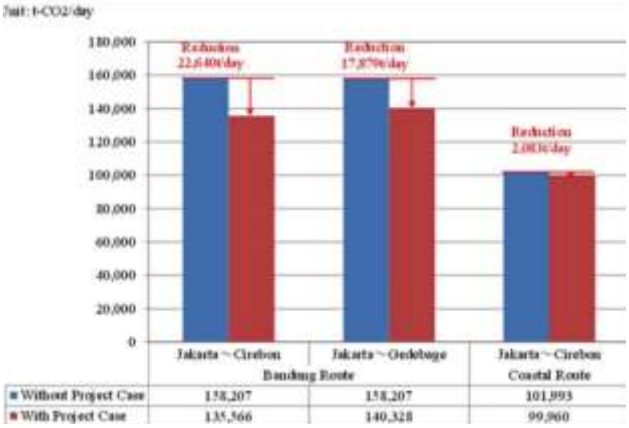

Figure 6: Jakarta – Bandung Demand Growth

(Source: *Yachio Engineering Co Ltd; China International Consultant for Transportation Co Ltd,* 2012)

The change in the type of movement from conventional trains and road-based modes to the Jakarta-Bandung Fast Train will reduce carbon emissions per day. That the emission reduction is based on the Bandung route scenario 10 times greater than the reduction in carbon emissions through the North Coast route scenario. Another environmental issue concerns the use of forest reserves and production forests, as well as landslide prone areas. However, this issue can be resolved if the Jakarta-Bandung High Speed Railway project has been equipped with an Environmental Problem and Impact Analysis (AMDAL) document and the use of cutting edge technology. Apart from these environmental issues, there are also social issues as raised from the results of observations related to the Jakarta-Bandung High Speed Railway construction project.

It was explained that this project would displace the community in a large number of ways. There are 1200 to 3000 households that have to be evicted to carry out the construction of the high speed rail this. The following is the detail of land acquisition in hectares and households that must be evicted in three lane scenarios on two different routes. It can be seen at Table 2 below.

Table 2: Land Acquisition and Resettlement Jakarta – Bandung High Speed Railway Project Comparison

	Bandung Route		Coastal Route
	Jakarta-Cirebon	Jakarta-Gedebage	Jakarta-Cirebon
Land Acquisition (ha)	430	222	360
Resettlement (household)	2000-3000	1200-1800	1500-2000

Source: *Yachio Engineering Co Ltd; China International Consultant for Transportation Co Ltd, 2012*

Conclusion

By integrating the use of public transportation and urban areas sustainably, TOD will stimulate economic growth and promote a better quality of life. TOD development can create a mixed-used development area. TOD Halim is located in the center of DKI Jakarta. Meanwhile, the other three TODs are located in West Java Province which apart from being a new potential area but also encouraging development of the surrounding area. It is very important to consider the potential for regional economic development for TOD development. Based on the results of LQ calculations, the economic sector with an LQ value > 1 is manufacturing and electricity and gas sector for Karawang Regency, accommodation and food service activities, agriculture, forestry and fishing, electricity and gas sector for West Bandung Regency, manufacturing, mining and quarrying and educational services sector for Bandung Regency. Based on literature review, Karawang is currently the largest industrial city in Indonesia and West Bandung Regency is known for its natural tourism potential. Likewise, Bandung Regency is known as a tourist area and the largest textile industry producer in West Java.

Efforts are being made to sync high speed railway project with the spatial plan, such as revising spatial products to accommodate the Jakarta-Bandung High Speed Railway development, make a special detailed spatial plan to support the construction of the Jakarta-Bandung High Speed Rail in five villages around Karawang, and synchronization master plan with West Bandung Regency government before any physical development of the area occurs.

With the high speed railway, new growth centers will be born so that transportation routes should not be seen only from meeting the needs of the volume of movement for existing mobility, but also as a reason to give birth to the idea of a new city. TOD planning must be connected to the surrounding area in line with the objectives of infrastructure development to increase regional connectivity. Development should not only focus on the TOD area but also mobility or links to the station.

The high speed railway was built in a long term with a concession period of 100 years that applies energy safety and security so that in the future it can maintain energy use and support better economic development in the future.

Based on research conducted by Giantara, O.T., Purba, A., Herianto, D. (2018). Regarding the economic and financial analysis of the Jakarta - Bandung High speed railway by taking into account the economic and financial benefits (*cost*) of the construction of the Jakarta - Bandung High speed railway, it is feasible to build and operate, this is because NPV and BCR have met the requirements since the first year.

Enviromental impact analysis tells that the change in the type of movement from conventional trains and road-based modes to the Jakarta-Bandung Fast Train will reduce carbon emissions per day. That the emission reduction is based on the Bandung route scenario 10 times greater than the

reduction in carbon emissions through the North Coast route scenario.

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Appendices

See on the title: The Policy of Jakarta – Bandung High Speed Train for Environment Friendly Public Transportation.

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