LEVERAGE VIABILITY TO SECURE THE INVESTMENT RETURN FOR PALEMBANG MONORAIL PROJECT USING PUBLIC PRIVATE PARTNERSHIP FINANCIAL SCHEME

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ABSTRACT

With the population more than 1 million inhabitants, capital city in any province in Indonesia is mostly facing the problem related to urban transportation. Traffic jam mostly occurs in morning and afternoon peak hours and it reduces the productivity of the national workforce. Mass transport is one of the solutions to solve the traffic congestion, for example, monorail project is part of the urban mass transport that has been studied for several years to solve the above problem in Indonesia. Since year 2011, Palembang city, the capital city of South Sumatra Province has been selected to construct the monorail system for supporting the urban commuters and the ASIAN games 2018. Unfortunately, the financial feasibility to construct monorail did not meet the requirement of bankability. The aim of this research is develop a route to leverage the viability and to secure the investment return with Public-private partnership (PPP) financing scheme via the study case of the monorail project in Palembang. The first route is to integrate urban development by bundling the monorail projects with property development under the Transit Oriented Development (TOD) concept. The second route is an one step down approach by establishing regional state enterprise to be part of the JV of the SPV. The knowledges that have developed in this study could be considered as a probe for how to implement another similar infrastructure projects in an effective, financial and economical manner.

1. Introduction City of Palembang

Palembang is the capital city of the South Sumatra Province, Indonesia. Located on the Musi River banks on the east coast of southern Sumatra Island, it has an area of 374.03 square kilometres and a population of 1,742,186 people (Noerdin, 2014). Palembang is the second-largest city in Sumatra after Medan and the seventh-largest city in Indonesia after Jakarta, Surabaya, Bandung, Medan, Semarang and Makassar (Noerdin, 2014).

Meanwhile, if linked to the needs of urban utility itself, the total population to be served for the fulfilment of basic needs is expected to reach 2 million soon in Palembang. This is mainly due to the increasing number of people who stay in suburbs of Palembang, but they are not as registered residents in the city or the commuters in this region. Thus, in the planning of public services including later on the new city of Jakabaring, particularly with regard to basic needs, the total population which requires the public transport should be part of an integrated system into account existing urban utility services.

Table 1. The Comparison Area and Population in City of Palembang, Singapore and Kuala Lumpur

City	Area	Population
Palembang	374 km^2	1.74 million
Singapore	718 km^2	5.47 million
Kuala Lumpur	243 km^2	1.63 million

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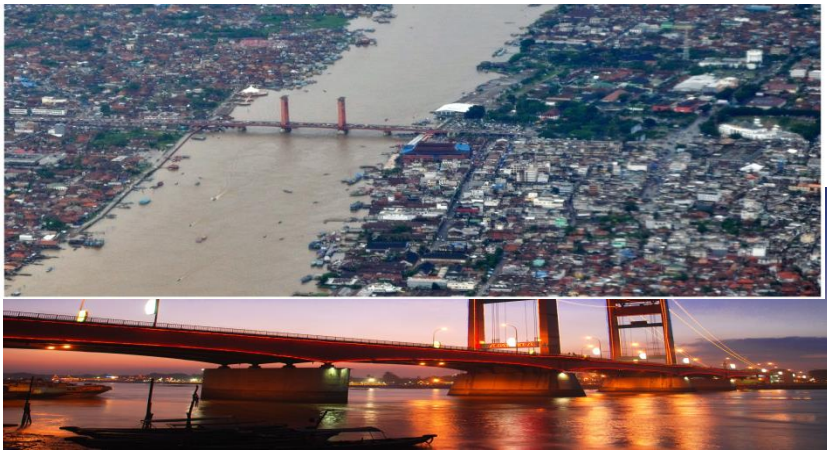
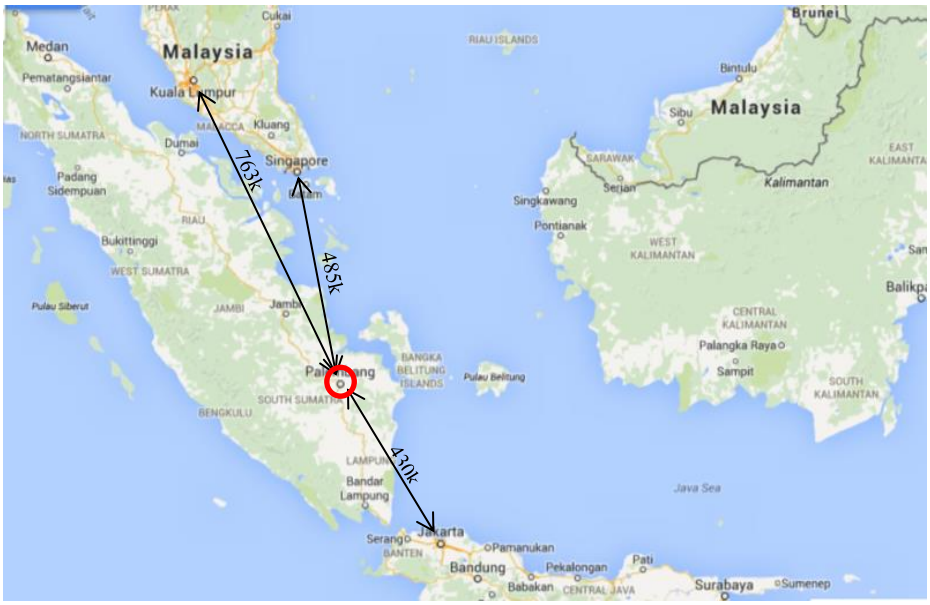


Figure 1: The Ampera Bridge, Land Mark City of Palembang

City of Palembang has the potency to become a business city to support South East Asia. City of Palembang is located in three very busy cities in South East Asia, between Singapore and Kuala Lumpur also Jakarta (see Table 1). The distance by flight among of the three cities is in less than 1.5 hours. Regular flights have been scheduled to accommodate the business flowing into and from the city.



As one of the largest cities in Indonesia but with inadequate public transport services, City of Palembang is facing the traffic jam frequently. Traffic Congestion in the city has been indicated caused by:

- High traffic volume on the main thoroughfare between Damri passing through Ampera Bridge;
- Road design layout and U-turns created along the road result in interrupted traffic flow in both road directions;
- No other effective public transport system - city buses are low in numbers and frequency;
- Traffic is 'locked-in' with the grid road layout system. Lack of secondary roads as alternatives;
- Parking on the street along main roads in the city.

Solutions to overcome the congestion have been placed, improving bus system and build the monorail will be prioritized (Noerdin, 2014). The Palembang monorail has been selected as the case study since it was prioritized by the local government to be executed for facilitating the ASIA Games in 2018.

2. Aim and Objectives

This study aims to study how the viability and investment of return can be secured through the case study of monorail project in Palembang.Based on the findings from the case study, brief financial models will be illustrated and used for explaining the conceptual model to leverage the infrastructure projects.

3. Research Methodology

In order to understand the PPP process in Indonesia, a case study of an infrastructure project was selected to be part of this research. Case stud approach utilizes a diversity of data collection techniques and provides in-depth and multi-faceted

explorations of a complex problem in the real-life scenarios,. In the present study, several case studies were selected, and access negotiated with the Indonesia Government; however, in all but one of the projects the planned PPP infrastructure were cancelled and the process discontinued. Only one infrastructure project was continued during the research period. To obtain a thorough knowledge of this case study, the method of participant observation was employed.

This means participating in activities, asking questions, working and conducting activities together with the institution. Participant observation is also one of many methods that fits into the common category of qualitative research (DeWalt and DeWalt 2011). The method of participant observation contains the optimization of information expanded from participating and witnessing through recording and analysis. At the beginning of this research, five PPP projects were investigated as potential case studies. However, only one project is being continually funded during the research study and it become the case study in the research. To gain significant knowledge and understanding of PPP in Indonesia through single infrastructure project, data collection through participant observation has been selected. It aims to understand how the PPP projects have been planned and procured, and with the provincial government to gain understand in depth of an urban mass transport project that has been prepared and registered by the central government. In the case study, the complexity of the coordination, the functions of the related institutions, and the development of a framework for the PPP projects to support PPP infrastructure projects in Indonesia, is highlighted. The type of government supports and procedures, the supporting policy, and the amendments to support this project, are also shown.

The case study is examined in this study is the monorail project in Palembang city. The projectwas PPP based that has been prepared since 2012 up to mid-2015, however, in end of 2015, the monorail project has been changed into Light Rail Transit (LRT) project financed by Central Government through Ministry of Transportation. Because of the time constraint, this research didn't discuss the LRT project. This study is focusing on the period of 2012 to mid-2015 before the Perpres (President Regulation) No. 116 Year of 2015 of LRT has been issued (Government of Indonesia, 2015b).

The financing scenarios securing the return of investment will be illustrated in the proposed financial models. This study is notstressing on financial models, but much focus in the method of the leverage, the financial models itself would be the tools to show the method much clearly. Assessing model is about determining whether or not the models are working. Ideally, a model assessment should answer questions such as (Akintoye & Beck, 2009):

- how accurate is the model?
- how well does the model describe the observed data?
- how much confidence can be placed in the models's predictions?
- how comprehensible is the model?

Modeling is the process of constructing a model, a representation of a designed or actual object, process or system, a representation of reality (Fellows & Liu, 1997). A model must capture and represent the reality being modelled as closely as is practical; it must include the essential features of the reality while being reasonably cheap to construct and operate and easy to use (Fellows & Liu, 1997).

4. Discussions

Case Study: Monorail Project in Palembang

The South Sumatera Monorail project has been initiated by His Excellency Mr. Alex Noerdin, the Governor of South Sumatera Province. Since the beginning this monorail Palembang project initiated by the Province Government of South Sumatra in PPP scheme, therefore refer to PPP policy (Government of Indonesia, 2005, 2010, 2011, 2013), all the project developments costs are under the regional budget of the province, and the procurement process will also under the management of Province Government.

In 2012, the project was in the Feasibility Study (FS) development stage and financed by the regional budget. In 2013, the FS documents were evaluated by the BAPPENAS, Central Government, and it was found that the project had a moderate tendency to be less viable and would, therefore, require a fiscal contribution from the Viability Gap Fund (VFG). The approval of a monorail corridor was also issued in 2014. Also in 2014, since the level of viability of the project was rather low, it was advised to develop the scenario of bundling the monorail project together with Transit Oriented Development (TOD); the TOD areas were in the process of getting approval from the Governor. In 2014, the TOD was still in the process of procurement preparation. In 2015, with the new president eager to fast-track infrastructure building, responsibility for the monorail changed, and it became a central government project. The monorail project was then changed into a Light Rail Transit (LRT) project, to be financed through the fiscal budget under the Ministry of Transportation (MoT). The LRT Palembang project will now be executed by two State Owned Enterprises (SOEs). In mid of 2014, Palembang city of South Sumatera Province has been officially appointed as the host of ASIAN GAMES that will be scheduled in October 2018. Therefore the Province Government of South Sumatra is keen to make this project within the budget and schedule.

Feasibility Study and Technical Principal of the Monorail in Palembang

The Palembang Monorail Feasibility Study (Transportation Agency of South Sumatra, 2012) conducted by The Transportation, Communication and Information Agency od South Sumatra Province (DISHUB; Dinas Perhubungan, Komunikasi dan Informatika South Sumatra Province) by hiring a local consultant company from Jakarta. The feasible study covered an overview of the demand projection of the public transportation and engineering and technical aspects, organization preparation, financial

and environmental impact. The demand projection has considered as an aspect in terms of economics, current road density and transportation. The weakness of this FS is that the construction cost has been referred to that information published by monorail manufactures in 2008 and 2009. Therefore the price of monorail construction in this study was not updated yet.

The proposed monorail corridor is about 24.5 km length crossing the city centre of Palembang city with 13 stations along the corridor. There are two corridors, the first corridor is from Airport to Masjid Agung, and the second corridor is from Masjid Agung to Jakabaring sports centre up to OPI Depot. This monorail corridor is integrating business, education, governmental, hotels, shopping malls, entertainment and sports facilities within the inner city, a potential of 100 thousand passengers a day can be captured. Figure 3 is the route of Palembang monorail.

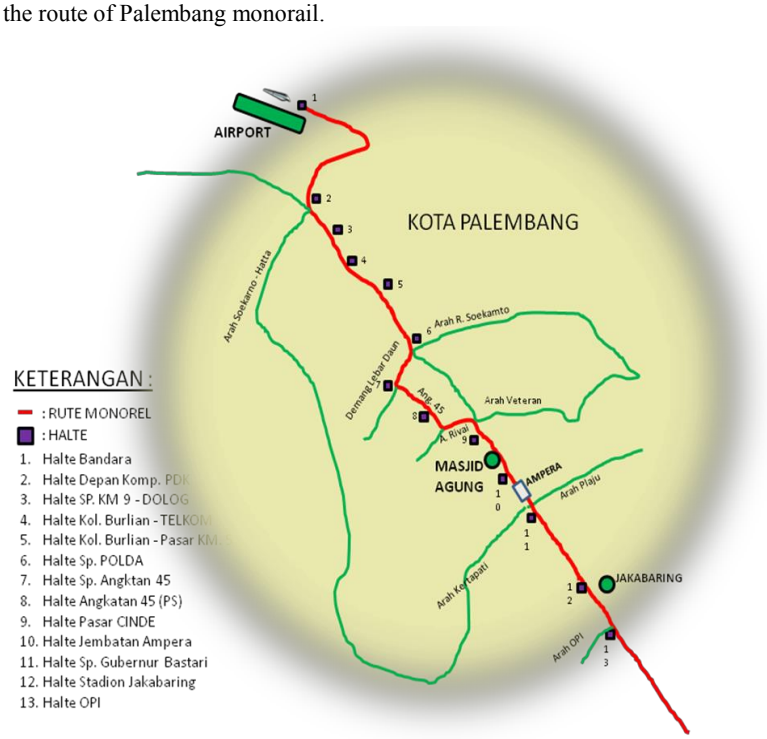


Figure 3: Monorail Corridor in Red Line from Airport to Masjid Agung to Jakabaring Sports Centre up to OPI Depot (Transportation Agency of South Sumatra, 2012)

Palembang has high traffic density in its city centre and its main roads. During peak hours, large events and public holiday, the traffic intensifies. The monorail has been selected as the urban transport solution for Palembang because it provides the best outcomes for neighbourhood impact, high reliability, route flexibility and safety. The straddle-beam monorail technology is the most widely used monorail system in the world, and it provides safe, reliable and successful monorail implementations. Therefore, in the near future, when a petrol energy crisis may occur, Palembang will have an energy efficient, flexible and yet reliable alternative rapid transportation system.

In the infrastructure project, the government's greatest concern is always the internal rate of return (IRR). The result of the FS has recommended that the monorail project can reach an IRR of 8.96%, with the investment being about USD 20 million per km, and the total investments estimated around USD 550 million. It is estimated as being capable of carrying 100,000 passengers per day, and the fare would be IDR 20,000 (USD 2). The project would be economically feasible under several conditions. The first condition is that the transportation network must be integrated and the Palembang Bus Rapid Transit (*Transmusi*) must become the feeder solution for the monorail, and will also serve to extend the monorail's coverage. The monorail will be the backbone and dominant transportation solution for the city. The second condition is that the daily users of the monorail should be no less than ninety thousand a day. The third condition to be met is that the ticket price should be no less than IDR 15,000 (USD 1.5) per corridor. Another approach to achieving the higher IRR would be through financial support of the government. The financial review and sensitivity analysis can be checked in the following table and figure.

Table 2: Financial Basic Assumptions in Financial Model of FS (Transportation Agency of South Sumatra, 2012)

	Variable	Pessimist	Moderate	Optimistic
1	Passenger Volume per day	90.000	100.000	110.000
2	Average Tariff (Rp)	15.000	20.000	25.000
3	Investment per Km (million USD)	30	20	15

4	Loan interest	6%	6%	6%
5	Loan and Capital Ratio	30:70	30:70	30:70
6	Section distance 1 (Airport – Masjid Agung)	15 Km	15 Km	15 Km
7	Section distance 2 (Masjid Agung – Jaka Baring)	10 Km	10 Km	10 Km
8	Number of route sections	2 Sections	2 Sections	2 Sections
9	Full load train capacity	780 person	780 person	780 person
10	Taxes	30%	30%	30%

Based on the FS that is constructed in the year 2012, there are three scenarios of financial modelling: pessimist, moderate and optimist. With the basic assumptions in the financial model, the results of the FS are as follows:

- ✓ The NPV in scenario Pessimist is negative, so it temporary cannot be considered to be proceeding.
- ✓ Moderate scenario and optimist can be followed for the development of the process of further funding scenario.

The assumption of local interest used in the FS is 6%. The high-interest rate requir prospective investors to be able to provide a cheaper source investment fund or source funds from abroad, when compared to a commercial loan from a commercial bank in Indonesia, which has a 12% interest rate per annum based on the bank rate issued by State Bank of Indonesia[5]. Assumptions for the existing corporate tax is at a rate of 30%, which can be considered quite high given that the infrastructure is for public services.

Table 3: Financial Sensitivity (Transportation Agency of South Sumatra, 2012)

Matrix 1 (Conservative 1)			**Matrix 5 (Optimistic 1)**		
Investment / Km	30.00	million USD	Investment / Km	15.00	million USD
Throughput	100,000.00	People	Throughput	90,000.00	People
Tariff	20,000.00	Rupiah	Tariff	25,000.00	Rupiah
Initial investment	825.00	million USD	Initial investment	412.50	million USD
IRR	4.94	%	IRR	13.81	%
BCR	0.84		BCR	1.41	
NPV	- 58.15	million USD	NPV	367.38	million USD
Matrix 2 (Conservative 2)			**Matrix 6 (Optimistic 2)**		
Investment / Km	30.00	million USD	Investment / Km	15.00	million USD
Throughput	90,000.00	People	Throughput	100,000.00	People
Tariff	20,000.00	Rupiah	Tariff	25,000.00	Rupiah
Initial investment	825.00	million USD	Initial investment	412.50	million USD
IRR	4.03	%	IRR	15.26	%
BCR	0.78		BCR	1.49	
NPV	- 124.44	million USD	NPV	446.52	million USD
Matrix 3 (Conservative 3)			**Matrix 7 (Optimistic 3)**		

[5] http://www.bi.go.id/id/perbankan/suku-bunga-dasar/Default.aspx

Investment / Km	30.00	million USD	Investment / Km	15.00	million USD
Throughput	90,000.00	People	Throughput	110,000.00	People
Tariff	15,000.00	Rupiah	Tariff	25,000.00	Rupiah
Initial investment	825.00	million USD	Initial investment	412.50	million USD
IRR	1.65	%	IRR	16.62	%
BCR	0.62		BCR	1.56	
NPV	- 287.10	million USD	NPV	525.46	million USD

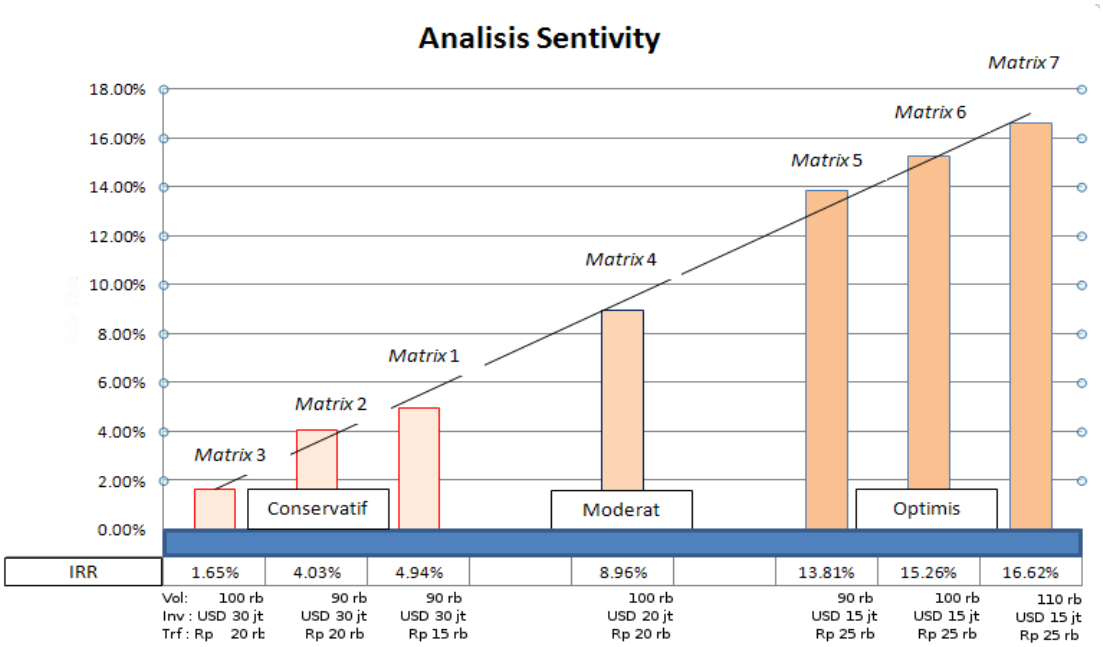


Figure 4: the Sensitivity Analysis of IRR to Passenger Estimated Volume, Tariff and Investment Cost per km based on the FS (Transportation Agency of South Sumatra, 2012)

The optimistic scenario was based on revenue streams originating from the target number of passengers. In the optimistic scenario, the IRR is sufficiently attractive, as it is higher than the interest rate of the State Bank of Indonesia. In the situation, thethe investors bidding can be direct procured without any fiscal support from the government. However, the assumption of the investment cost is about USD 15 million per km (based on 2009 data), and hence it is an obsolete rate. This will make it difficult for the monorail project to find investors at the proposed rate of return.

In the moderate scenario, the IRR is very low and the NPV is negative, and will thus require government support, such as asset contributions, Viability Gap Funds (VGF), guarantees and share capital (government investment), as well as corporate tax cuts stimuli.

Based on the FS there are a number of strategies, project planning and risk mitigations that can be proposed. One strategy to ensure a successful and lucrative monorail operation is to have a combination of good government support on energy, subsidised tariffs, and a transportation policy that strengthens the monorail as the premier solution for transportation in Palembang. A second strategy is to attract business investment in South Sumatra, which include tourism, property and manufacturing industries. These strategies also need to be stated in the structure of a PPP scheme so that investors and lenders have fewer risks in bearing the financing. The third strategy is to use a design and build scenario in the project implementation to mitigate technology and construction design risks; these include the electronic power technology, traffic control systems and safety technologies (Transportation Agency of South Sumatra 2012).

The result of the FS also recommended the application of fiscal support from the central government of about USD 150 million and a 30% subsidy for the ticket tariff. Those two types of government support were discussed by the relevant Ministries in the central government in 2014. However, in 2014, it was the presidential election and political conditions were unstable, therefore up to 2014, requests for government support which related to direct fiscal supports had been declined, and the central government didn't allocate any budget for any PPP projects. As a result, the Central Government willing to take over this project and issue the Perpres (President Regulation) No. 116 Year of 2015 to chance the monorail to LRT project for Palembang city (Government of Indonesia, 2015b). n 2014, the study of another leverage method without any direct fiscal support began.

Obstacles in the Palembang Monorail Project

Land acquisition in this project is relatively not a problem since the monorail will be constructed elevated above the existing roads. Land acquisition only will be needed in several areas of the intersections to secure the alignments of the monorail. The process of obtaining corridor approval from the Transportation Department Central Government was nearly one year process in 2014 (Government of Indonesia, 2012).

This project is still facing lots of obstacles. The first obstacle is the complexity of coordination amount of the government institutions, and the second obstacle is the developing framework for a PPP infrastructure project since this project is not financially viable.

Another complexity is to develop coordination works with the Ministry of Finance (MoF) Central Government and SOEs (State Own Enterprises) under the management of MoF in order to process government support related to fiscal such as capital support for construction costs, the viability gap fund and political guarantee also the taxes incentives.

Complexity in developing PPP framework and political risk in changing regulation, in earlier 2015 discussing with the new Minister of Transportation, there will be a budget from Transportation Department in Specific Allocation Budget (DAU) to be allocated for Palembang monorail as direct contribution of the reducing of the gasoline subsidy. Therefore in earlier 2015, the Transportation Agency has started to persuade it. Then the process itself has been finalizing by issuing the Perpres No. 116 Year of 2015 (Government of Indonesia, 2015b).

Developing Scenarios to Leverage the Viability

Facing complexity in developing PPP framework and complexity in arranging modality, it has raised this research to simulate methods of leverage viability for this project. It needs to be understood the practical constraints on private financing in infrastructure investment and the effects of different approaches and instruments aimed at addressing the viability gap. It would be done by assessing the current instruments available in FS to mobilize support or address risk in infrastructure financing including the government supports, capital transfers, concessionary financing, output-based aid, consumer subsidies as well as credit enhancements, insurance and guarantee products. It needs to identify mapping them against various market failures to assess which is the most effective instrument under what sort of constraint.

Insights about the political, regulatory, institutional and viability constraints on private financing of infrastructure investment compared with results of empirical analysis and financial modelling would be verified through a financial modelling exercise. In this study case of Palembang monorail, the financial performance in moderate scenarios based on FS becomes the basic guideline for next proceeding. Since the result of this FS in the moderate scenario has a low level of financial performance with the very low IRR and negative NPV. Therefore it will require government supports or applied other type modalities to leverage the feasibility of the project.

There will be two possible route to leverage the feasibility that will be applied in the exercises. The first scenario is developing the project is to integrated urban development by bundling the monorail projects with property development under the Transit Oriented Development (TOD) concept. AThe second scenario is one step down approach by establishing regional state enterprise to be part of the JV of the SPV.

Integrated Urban Development for Palembang City

The first method to leverage the feasibility of the monorail project, without fiscal support, is by bundling the monorail project with the TOD estate property development as integrated urban development for Palembang city. This method was proposed to the Governor and related agencies to get approval. The scenario of combining the monorail project with TOD property estate development in the city has been approved in principal by the Governor of South Sumatra in 2014. The development of the Palembang Monorail should be integrated with the Urban Property Development and land assets of the Province Government of South Sumatra that is available along the monorail track. It is envisaged this will accelerate the development of the project.

This new policy, which has been prescribed in Indonesian Presidential Decree number 38, 2015 (Government of Indonesia 2015c), has allowed for the development of the areas as integrated urban development. The usual approach to developing integrated urban development uses the TOD concept. TOD refers to any form of “transportation-oriented development,” including bus and rail-oriented development as well as development along freeways (Lefaver 1997; Chisholm 2002). Closely related to TOD is transit joint development (TJD). While the distinction between the two is not always clear, in general, their differences lie in their scale. TOD encompasses multiple city blocks, representing more or less a neighbourhood in size and character. TJD, on the other hand, tends to be project-specific, often occurs within a city block and is tied to a specific real estate development. Whereas TOD is often spearheaded and choreographed by a public agency, TJD usually occurs through a partnership of public and private interests working in tandem to achieve “win-win” outcomes, whether in the form of air rights leasing of publicly owned space, station connection fees, or the joint sharing of capital-construction costs (Chisholm 2002). The right term for the bundling of the monorail project would be TJD; however, the most common understanding in Indonesia is that of the term ‘TOD’.

In combining with TOD asset development to overcome the viability gap, several related agencies that have authority to manage the government assets that might be bundled in the project(s) have not yet reached an agreement. There are several difficulties in coordination. Provincial agencies, such as the Regional Planning Agency and the Public Work Agency, have their agenda as regards the government assets in the TOD areas. It is ego-sectorial that relatively normal in Indonesia. These agencies would like to keep the TOD projects separate from the monorail project, and they want to manage the tendering process themselves under their authority. To develop the monorail project together with TOD estate development, the Governor needs to issue a Governor's Decree to secure the areas and public assets that will be included in the monorail project as the TOD estate development. The Governor's Decree to combine bundled the monorail and TOD projects was given in early 2015, but it ceased in mid-2015. Also, the monorail project was transformed into an LRT project financed through the fiscal budget.

The amalgamation of the Palembang Monorail project and urban property development will require the participation of a global consortium, which consists of companies; the monorail operator, the monorail manufacturer, urban developers, funders and urban designers. To develop this amalgamated monorail project by optimizing provincial government assets in the Public Private Partnership (PPP) mechanism, the financing method that is possible to apply is the Total Return SWAP. The Total Return SWAP method is used together with the management of property development as Transit Oriented Development in order to gain a viability bonus, and the viability bonus from the property development is expected to cover the viability gap of the monorail operation.

The location of TOD estate development around monorail stations that have been planned is as follows:

a) Hajj station, with an area of 20,000 m^2
b) Provincial Hospital station, with an area of 50,000 m^2
c) Station before Flyover (BP3MD Office), with an area of 3,394 m^2
d) Office of Transportation and BAPPEDA Station Prov. South Sumatra, with an area of 9694 m^2
e) Cinde Market Station, with an area of 6.540 m^2
f) Station Home Jakabaring Stadium Sports City, with an area of 20,000 m^2
g) Station Home OPI, with an area of 20,000 m^2
h) Stations and Depots OPI Jakabaring, with an area of 40,000 M2

An additional area that could be developed to achieve a viability bonus and support the monorail project would be at Special Economic Zones (SEZs) at Tanjung Api-Api. The provincial government in of South Sumatra has planned to develop the SEZ Tanjung Api-Api as a new industrial area to support economic development in the region.

The construction of the monorail has developed into two phases with the priority of building the selected stations with having TOD areas. Phase 1 is the 7 km from Depot OPI to Masjid Agung. And Phase 2 is the 17.5 km from Mesjid Agung to the airport.

Figure 5: The Proposed of Staging Contracting Monorail and Station in line with TOD Development and 13 Stations
Source: (Transportation Agency of South Sumatra 2012) and survey modification

The previous plan has 13 stations as shown in Figure 5. In the bundling project scenario, the number stations have been reduced to seven stations as prioritized to be built together with the TOD areas in Figure 6.

Figure 6: The 7 Prioritized Monorail Stations which have Large Areas to be developed in Integration TOD
Source: (Transportation Agency of South Sumatra 2012) and survey modification

There are some potential areas, assets of province government that not yet agreed but very relevant to be explored in the bundled project. These areas have been studied in this research to look for potency to increase the viability of the monorail project. These areas are shown in Figure 7 up to Figure 10.

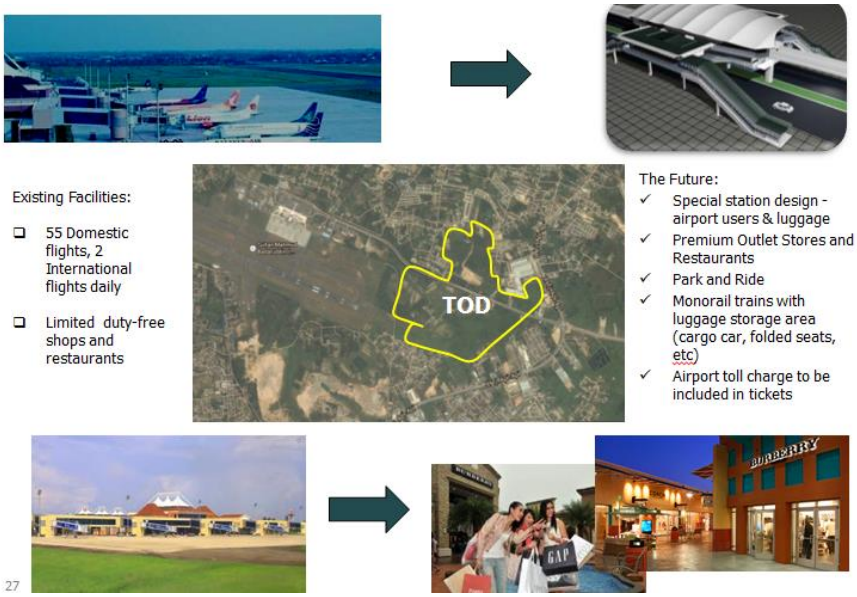


Figure 7: TOD at Palembang Airport with about 20 Hectare Areas
Source: Field survey, google map and artist impression

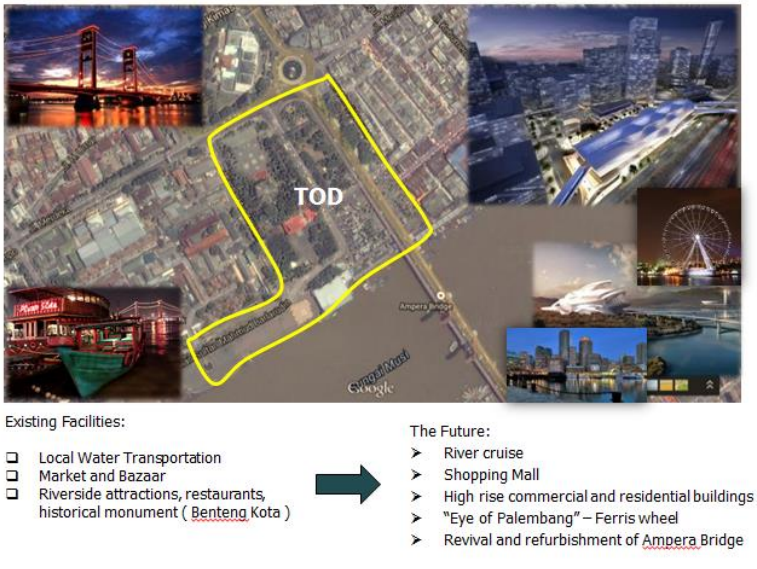


Figure 8: TOD at Ampera Bridge with about 3 Hectare Areas
Source: Field survey, google map and artist impression

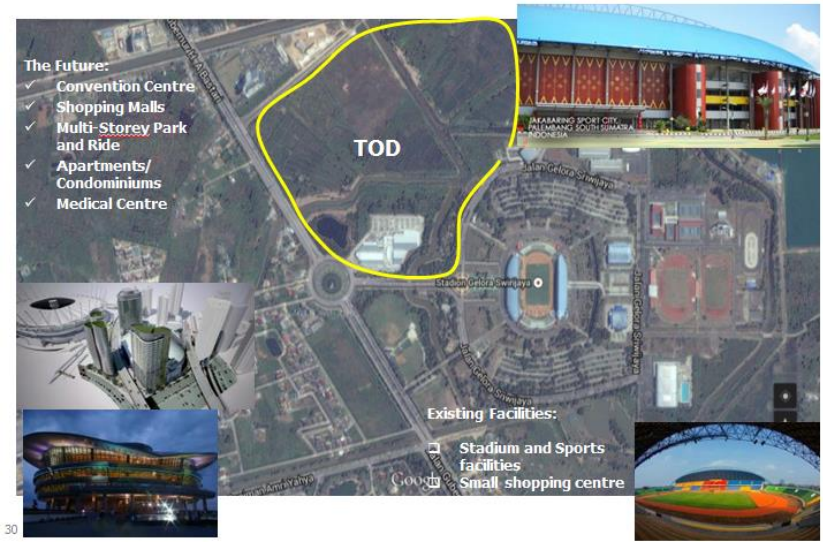


Figure 9: TOD at Jakabaring Sports City with about 20 Hectares Areas
Source: Field survey, google map and artist impression

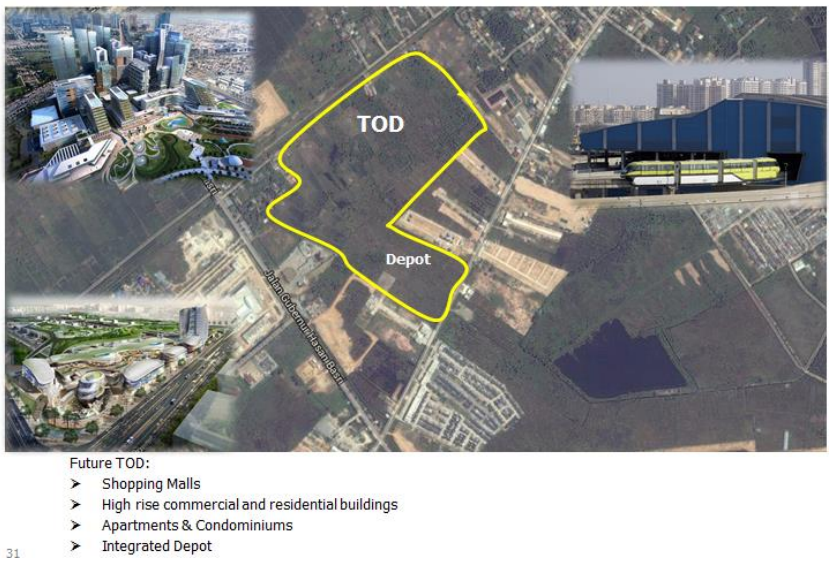


Figure 10: TOD at OPI Depot with about 3 Hectares Areas

Source: Field survey, google map and artist impression

Viability of Bundling Projects

The type of work includes the design & build of monorail rolling stock, and the form of the contract for this is BOLT (Build Operate Lease Transfer). For the design and build of the monorail systems, the form of contract is EPC. For the design and build for civil works, the form of the contract is EPC, and for the design and build of the depot and secondary stations, the form of the contract is also EPC.

The estimated cost value of project management for the TOD is USD 8 million and for project management of the monorail is USD 5 million. The estimated cost value of work to build the TOD is USD 34 million, and to establish rolling stock in BOLT is USD 70 million. To build a depot and civil works with EPC is USD 439 million. Total costs are estimated at USD 556 million.

The sources of funding scenarios for the TOD are from investor/developers, for the BOLT through leasing, and for the EPC through subsidies from TOD earnings. More detailed assumptions and financial modelling results are shown in the following tables.

Total costs, estimated at USD 556 million, are nearly the same as that planned in the FS that has been developed by the government. In the scenario of the amalgamated projects, it was able to utilize the financing schemes, such as rolling stock leasing and EPC construction, to have better project outcomes, including the development of the TOD areas.

Table 4: Scenario of the Development and the Assumptions (analysis & calculation)

Scope of Work	USD	%	Funding Options
Preliminaries	29 mil	5%	
Monorail Bridge	14 mil	2.5%	Privatized - BOT
System Integration	11 mil	2%	
Training, Spares, Warranty	10 mil	1.7%	O&M
Sub-total	**64 mil**	**11.5%**	
Civil & Structural			
Stations – TOD (3.8mil x 4 stations)	15 mil	2.7%	TOD
Stations – Secondary (2mil x 3 stations)	6 mil	1%	TOD
Sub-stations (0.8mil x 7)	6 mil	0.9%	TOD
Depot + OCC	7 mil	1.2%	TOD
Guideway Beam (incl. Moulds, Switch Decks, Depot Beams)	254 mil	45.7%	
Sub-total	**288 mil**	**51.8%**	
Systems			
Rolling Stock (12x4 cars)	75 mil	13.5%	Leasing
Signaling (ATP)	34 mil	6.1%	
Communications	28 mil	5%	
Power Supply & Dist.	42 mil	7.5%	
Depot Equipment (incl. Work Car, Special Tools & Jigs)	9 mil	1.5%	O&M
Switches (8 sets)	9 mil	1.6%	
AFC (0.86mil x 7 stations)	6 mil	1%	O&M
Total	**556 mil**		
USD per KM	$23.2mil/km		

Table 5: Funding Requirements (analysis & calculation)

Funding requirements	USD
Total loan amount for borrowing	389,250,000
Installment per year	25,950,000
Installment per day (324 days per year)	80,093

Table 6: Funding Strategy (analysis & calculation)

Funding Options	Amount (USD mil)	Scope

Total to be funded via Privatized BOT	14	Monorail Bridge
Total to be funded via O&M	25	Spares, DEQ, AFC
Total to be funded thru Leasing	75	RST
Total	**114**	
Balance required from other funding options	**442**	
➢ Total required to be funded through TOD contribution	286	All stations, Sub-stations, Depot, Guideway Beams, Prelims, SI
➢ Total required to be funded through Farebox Collection	156	Signaling, PS&D, Comms, Switches

Balance required from the monorail bundling project with the TODs is shown that total required to be funded through TOD contribution is USD 286 million and the total required to be funded through farebox collection is USD 156 million.

Table 7: Revenue Stream of the Monorail Operation (analysis & calculation)

System capacity per direction (based on ten train sets in operation)	**Value**	**Remarks**
1) No. of trains in operation	5 sets	Capacity per train set is 400 pax
2) Headway	10 mins	
3) Passenger Per Hour Per Direction (PPHPD)	2300	
4) Total numbers of passengers per day	41,000	50% Discounted Ridership
5) Revenue tickets per day	USD 29,571	At average ticket price of Rp.8000,- per person
6) Total amount recoverable after 15 years	USD 143,717,143	*Shortfall compared to the total loan amount payable above

Estimated revenue tickets per day are USD 29,571, the total amount recoverable after 15 years is around USD 143.7 million.

Table 8: Estimated Income from TOD (analysis & calculation)

	Unit	**Value**
Total Built Up Area	Ha	432
Saleable area 70%	Ha	303
Assumed Construction Cost / acre	USD	2,489,143
Total Gross Development Cost (GDC)	USD	1,860,883,200
Total Gross Development Value (GDV)	USD	2,605,236,480
Developer's Profit (DP)	USD	744,353,280
Less = 40% from DP for Project Funding	USD	(297,741,312)
Nett Developer's profit	USD	446,611,968 or (24%)

The TODs project estimated will contribute net profit of USD 446.6 million to the bundling project.

The bundling approach's financial modelling has shown that the viability of the monorail project can be leveraged. The TOD profits could be the additional income necessary to leverage the infrastructure monorail project.

One Step-Down Approach

As a back-up to the combined projects approach, another route has also been achieved, that of leveraging the viability by applying the one step down approach. This method will require the project team appointed by the provincial government to establish a regional state-owned company with the Provincial Government of South Sumatra as the majority shareholder. The one step-down approach is another method applicable to PPP mechanisms. In cooperation between government and business entities, it is sometimes difficult to find a shared matching of interests. The government's priority may be delivering public infrastructure services, while the private commercial partner typically has the priority of generating a return on investment and profit. To negotiate and establish the same interests, the government needs to step-down by establishing a state-owned company.

The state-owned company can then negotiate with the business entity to cooperate to achieve a profit and to look for a solution to secure investment in a shared vision.

In this Palembang Monorail case, the regional state-owned company has yet to be established. Once established, it will then hold the direct fiscal contribution that can be allocated from both regional and central budgets to support the monorail and the TOD estate development projects. The fiscal support will be assigned to the state-owned company as equity and working capital.

The Provincial Government was aware that investment in mass transport such as the monorail typically requires large investments with a relatively low viability level. Thus the effort to reduce monorail investment costs to reduce the liability of investors needs to be undertaken. Therefore, once again in early 2015, with a new President of Indonesia and a new Minister of Transportation, and also a new Head of the Transportation Province Agency, the Provincial Transportation Agency requested the Ministry of Transportation/Railways Directorate General to specifically allocate a budget to develop the monorail bridge that crosses along the Musi River and stretches approximately 1.2 km. With an estimated budget of Rp.500 billion (about USD 50 million) required, the construction costs will be further studied by the provincial transportation agency. At the same time, the Provincial Transportation Agency will try again to apply for the Viability Gap Fund to the Ministry of Finance, supported by the Ministry of Transportation, with the VGF proposal worth Rp.1.5 trillion (about USD 150 million). This was declined in 2014 by the previous ministry cabinet. The fiscal support from the Central Government will contribute to their share in the regional state-owned company.

The application of the one-step-down approach, by establishing the state-owned company, can be completed through two procurement methods. The first method is open tender. In this case, the state-owned company is prepared to be the partner of the private company that wins the tender. The second method is a direct negotiation. The Governor can provide a letter of appointment to the state-owned company to be the owner of the project. The state-owned company could then undertake direct negotiations with a private company, which will have the relevant professional experience to build, manufacture, operate and maintain the monorail.

Type of Government Support to Leverage Viability of Infrastructure Projects

Government contribution is a very essential method to leverage the infrastructure projects. In Indonesia, they have implemented several of government contribution. In this research also has successfully gathered information to classify the government contribution.

There are four types of government contribution have been implemented in Indonesia, namely:
i) the public asset contribution
ii) fiscal support including government capital, VGF, subsidy and government loan
iii) government policy including permits, government guarantee and taxes incentives
iv) appointed to state-owned companies

The finding in this research has added more methods of government contribution to leverage the modality of infrastructure projects. The additional government contributions that have been indicated in this study are:
i) Bundling projects that have been illustrated in this paper
ii) SWAP Trading
iii) Monetize natural resources and sovereign guarantee
iv) Hybrid scheme combine with municipal bonds and infrastructure bonds

5. Summary

The city of Palembang is currently starting to face traffic jams. For the future sustainability of development in the city, it has planned to introduce a monorail as an integrated urban development. In preparation for the Asian Games in 2018, urban mass transport has been planned to accommodate the movement of people from the airport to the city and the sports centres.

This case study of the Palembang Monorail has illustrated the approach to leverage viability of PPP infrastructure projects.

A basic FS of the monorail project, with a planned total investment of nearly USD 550 million, has shown that the IRR in the moderate scenario is about 8.9% with a very low NPV. The result of the FS has recommended that the monorail project can reach an IRR of 8.96% with an investment of about USD 20 million per km, with total investments estimated around USD 550 million, and an estimated 100,000 passengers per day, with a tariff of Rp.20.000. The FS has recommended that it would require the fiscal support from the central government about USD 150 million and a 30% demand subsidy.

Coordination between the many government institutions and government bureaucracy is arising as the most complex element in developing the PPP framework. The changing of the president and the cabinet, and also the changing of high-level government officials, has led to differing levels of political risk. In 2014, there was no fiscal support from central government, as it had been declined, so a solution to securing a return on investment had to be found. The integrated urban development has been briefly presented in this research to illustrate the method of leveraging monorail project through the TOD bundling projects.

The financial models for bundling the Palembang Monorail with TOD projects have been developed to show empirically how to secure the return on investment for an infrastructure project. Total costs have been estimated to be USD 556 million, which is nearly the same as planned for in the FS that had been developed by the government. Balance required from the monorail bundling project with the TODs is shown that total required to be funded through TOD contribution is USD 286 million and the total required to be funded through fare box collection is USD 156 million. In the scenario of the combined projects, financing schemes, such as rolling stock leasing and EPC construction, have been utilized to have better project outcomes, including the development of the TOD areas.

In mid-2015, the monorail project in Palembang became an LRT project. As a case study, this project has demonstrated various complexities such as the length of project preparation, the complex inter-institutional coordination, the moderate then low-level viability assessment of the project, and the change of policy and uncertain political risk. These types of complexities have been faced by many infrastructure projects delivered in Indonesia.

6. Recommendations for Further Research

Supported Regional Government Policy

The target is that the Palembang Monorail project will be launched in 2018 to support the Asian Games 2018. To support the success of monorail operation services, it will be necessary to enact several Regional Regulations of the Provincial Government of South Sumatra, including:

i. Regional Regulation of Prohibition of On-Street Parking along the monorail road corridors and the inner city-centre streets to encourage the public to use the monorail for their daily travel activities.
ii. Regional Regulation of The Electronic Road Pricing (ERP) System on the main corridor of roads in the City of Palembang, restricting access to motorcycles and private vehicles to the main corridor thoroughfare.
iii. Regional Regulation to require government officials to use the monorail for their daily activities, and to provide subsidized monorail tickets for the government officials from the local budget.
iv. Regional Regulation of Concessional Monorail Ticket Subsidy for students and seniors/elders; to be budgeted at the beginning of the year and can then be reimbursed in the supplementary budget.
v. Other Regional Regulations to support other public transport to be more integrated with the monorail.

Artist impression of Integrated Urban Transport for Palembang City :

Figure 11: Artist Impression of Integrated Urban Transport Development for Palembang City

In general other concern need to be done is related to the institution to accelerate the infrastructure development and utilized capital market. To overcome the complexity in inter-coordination in a government institution, Infrastructure deputy in National Planning Development Agency has been dissolved and transferred to other sectoral ministries, the effectivity of these new lines bureaucracy need further research (Natahadibrata, 2015). And the committee of Acceleration of Priority Infrastructure Development (KPPIP = Komite Percepatan Pembangunan Infrastruktur Priority) has been established directly under the President Secretariat.

Further study for alternating of funding from capital markets, one of the policies that has been studied by the OJK (FSA: Financial Service Authority) is about the Special Purposed Bond or Infrastructure Bond. Capital markets have developed so rapidly over the past two decades that regulators have struggled to keep pace with the changing markets they supervise. Across the regulatory spectrum, from bank supervision to securities regulation, from accounting requirements to anti-money laundering

efforts, national authorities are finding that the ability to achieve their objectives at a reasonable cost is influenced by the actions (or inaction) of their counterparts in foreign jurisdictions (Simmons, 2001).

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