ECONOMIC BENEFIT ANALYSIS ON IMPLEMENTATION OF PUBLIC TRANSPORTATION INVESTMENT POLICY IN THE CITY OF BANDA ACEH

Abstract

The purpose of this research is to analysed the effect of public transportation investment to the acceleration rate of traffic, to the growth of the governments' spending and income, also to evaluate the direct and indirect economic effect of this investment. The research is done using cost benefit analysis with several important assumptions. These assumptions were picking to simplify the evaluation of the effects of the government investment on public transport in the city of Banda Aceh.

The research results show that the development of public transportation in the city of Banda Aceh affects to reduce the density of traffic in the city. The investment also results in the positive economic benefits for the community. Though, for the government as the sole capital owner, the effect of this investment is not beneficial.

Rina Kemala Sari

Master Degree of Economics of Faculty of Ekonomics and Business University of Syiah Kuala
rinakeumala@gmail.com

Mohd. Nur Syechalad

Teaching Staff of Faculty of Economics and Business University of Syiah Kuala Banda Aceh
mohd.nursyechalad@unsyiah.ac.id

Muhammad Nasir

Teaching Staff of Faculty of Economics and Business University of Syiah Kuala Banda Aceh
nasirmsi@unsyiah.ac.id

INTRODUCTION

Transportation is one of the key element that supports the activities of the society and national development particularly in the economic sectors, i.n: trading and industry activities. The investment by the government is needed for the development of infrastructure such as highway facilities. These facilities, when it is adequate, ensure the execution of effective and efficient transportation system. The cost of using these infrastructures also becomes cheaper and affordable. The city of Banda Aceh to this day already have adequate enough transportation infrastructure. The quality of the existing roads and bridges were in good condition. The department of work services acts as authority for these roads, which have length 707,343 KM and the detailed of the roads are presented on the table 1

Table.1
Length of Road by Status and Condition
Banda Aceh City in 2016 (km)

| No.	Kondisi Jalan	Panjang Jalan
1.	Kondisi baik	583,75
2.	Kondisi sedang	87,38
3.	Kondisi rusak	21,49
4.	Kondisi rusak berat	14,63
Total		**707,343**

Source : Dinas Pekerjaan Umum Kota Banda Aceh 2017

From the table, it can be derived that the roads condition in the city of Banda Aceh (83%) are in good condition, while 17% are in dissatisfactory condition. The roads infrastructures such as bus stops, roads signs and traffic lights are in good condition.

The population of the road, similar to the others developing city in Indonesia, dominated by private motor vehicle, especially motorcycles. The numbers of total privately own vehicle on the road are increasing on yearly basis. The ratio between the roads and the vehicle in the city of Banda Aceh is 0.62%.

PDRB can be used to picture the condition of economic situation in the city of Banda Aceh. After suffering a few years of setback, the city economic in the year-end 2015 start to be better with 0.51% increase compared to the year 2014. Construction becomes the biggest sector that is contributed to the economy. This sector increases 0.45 point. Real estate is also big contributor to the

economy with 0.51-point increase. These factors helped increasing the PDRB to the level of 6.31% in the year 2016.
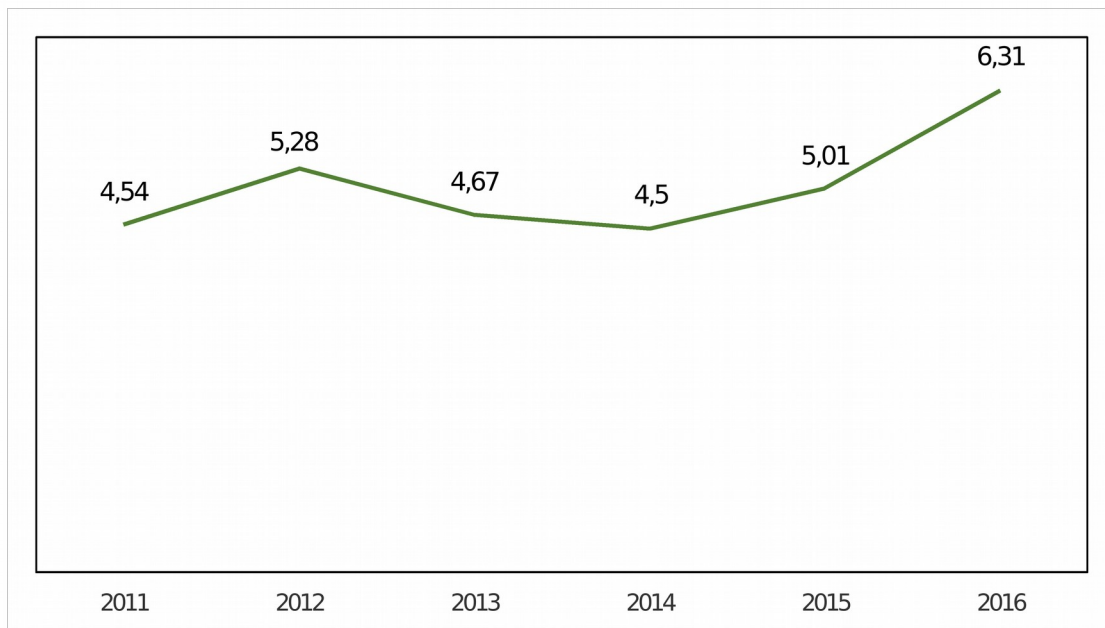
Picture 1 The economic growth rate the city of Banda Aceh

Source : Banda Aceh Dalam Angka Tahun 2016

The growth of the PDRB shows that the economic performance is also increase. The economic of the city of Banda Aceh is continued to growth based on the rate of the on the price basis (ADHB) PDRB. This PDRB ADHB on average grow around Rp. 845.57 billion on yearly basis during the period of 2010-2016.on the year 2015, the PDRB was grow in the amount of Rp. 1.09 trillion from Rp 13,64 trillion on the year of 2014 and increasing again in the amount of Rp. 1.3 trillion from Rp. 14.48 trillion in the year-end of 2015.

Prado (2012:77) argued that most of the cities in developing countries have a hard time to offered adequate public transportation. He also argued the city also struggled to offered access to non-motorized vehicle, such as bicycle or pedestrian. Although the government of the city of Banda Aceh have already offered good transportation infrastructure, it will be difficult to increase the quality of life of its citizen without accompanied by integrated public transportation system.

Hence, it is not surprising that most of the institutions that ranked most livable cities in the world placed cities with the best qualities of public transportation on the top of the list. The reality now is the city of Banda Aceh has a less than ideal public transportation system. The most telling sign is the congestion and density of the traffic at the peak time, such as the start of workings hours or at the end of working hours. It was known that high level of traffic congestion could have a significant effect to

the gross domestic regional income (PDRB) of the city and the country's gross domestic product (GDP). This is one of the economic effects of transportation management.

The research regarding economic benefits of a public transportation policy needs to be done frequently. Therefore, the topic of this research is assessment of economic benefits of a public transportation policy in the city of Banda Aceh.

THEORETICAL REVIEW

Cost Benefit Analysis (CBA)

Dunn (2003), taken from Fibiona (2012), argued that CBA is an approach to asses a policy. This method compares and then recommends a policy based on calculation of total cost and benefit in unit of money. According research and development agency of the ministry of public works (PU) define CBA as a method to compare relevant series of cost and benefit accurately and then decide which one has a better value. Moreover, after the comparation, the policy maker can decide to execute proposed plan or not. If the project is on going, the decision lies on whether to continued or to stop it.

In the context of development, CBA is done before the project start or in the development phase. Therefore, the result of the analysis can be used as a guidance of the project. Prabantoro (2012) said that the valuation component in CBA is based on 2 main component, cost component and benefit component

1. **Cost**

Cost component related to the development of a project can be classified into 4 categories :

a.   Procurement cost is the total cost that are use to procure needed element of the project. This cost usually use in the initial years (initial cost)

b.   Start Up Cost is the total cost that is used as an effort to start the project.

c.   Project Related Cost, This cost is the total of all other cost related to the implementation of the project.

d.   Ongoing and Maintenance Cost, This cost is the total cost of operation and maintenance of ongoing project.

2. **Benefit**

a. Direct benefit can be seen in increase in ouput either in the quantitative or qualitative sense, such as from the usage of better equipment or skill

b. Indirect benefit, This benefit arises from the external source. This external benefit is indirectly influence by the project. The example of this benefit is the improvement of the income of the citizen around the area of the project

Transportation

Public Transport System

Transportation defines as the movement of people and goods from one origin to others in the relevant area. The movement can be done with all means and modes for a particular purpose. On the individual scale, transportation define as a journey from on place to others in order to do a specific activity in the place of destination (Santoso, 1996).

The transportation problem is usually come from the availability of infrastructure of the transportation (salim, 2000). Transportation activities need continuous improvement. It needs to adapt the technology and social development. This is needed to improve the efficiency of the transportation activities. This activities called efficient when the movement of people and goods can be done in less time with minimal cost and have small risk.

In general, Transportation system formed from a set of hardware such as infrastructure and facilities. Moreover, these components operated using operating system (a software) that considered some factors such as passenger frequency and tariff (Santoso, 1996).

The infrastructure and facilities of a public transportation are:

a. Infrastructure: route network system, terminal, track along the right of way of each route and stop.

b. Facilities: Type of vehicle, its dimension and design

Therefore, it is important to prepare a suitable infrastructure to achieved a decent overall performance. The important aspects in order to have a good public transportation are the movement pattern, operating system and level of services.

Regulation of the system of public transportation that is less then ideal can worsen the existing problems such as: overlapping route, bigger-than-needed fleet, low level of services, longer traveling time and increasing traffic congestion.

Factors Affecting the Selection of Public Transportation Modes

The choice of public transport mode is influenced by several factors, namely:

a.   Family income level

Trips made by passengers of public transport vehicles can be distinguished for groups that do not have a choice of modes (captive) and for those who have a choice of modes, namely using a private

vehicle or public transportation (choice). This passenger group basically depends on the high income level, which has a vehicle. The percentage of passengers who do not have a choice (captive) should be lower than the class of passengers with low income.

To support the effectiveness of public transport advice, efforts should be made to minimize the proportion of passenger choice in order to switch to using public transport vehicles. The following three factors will affect the proportion of passengers on public transportation.

b. Travel time

Travel time ratio by using public transport vehicles and private vehicles will affect the choice of transportation mode which requires the shortest time to arrive at the destination. The higher the ratio of travel time, the fewer passengers will be interested in public transport.

c. Service time

Service time ratio is a comparison between the service time required by public transport vehicles and those required by private vehicles. Service time ratios are basically similar to the ratio of travel time. The higher the service time ratio, the fewer passengers are interested in public transport. Travel time ratios are considered separately from travel time because passengers tend to be less tolerant of long waiting times. Meanwhile, the length of travel time in a public transport vehicle is generally still acceptable.

d. Travel expense

The ratio of travel costs by using public transport vehicles and private vehicles will also affect the choice of transport modes. Passengers tend to choose cheap modes of transportation. The higher the ratio of travel costs, the fewer passengers will choose public transport vehicles.

Public Transportation condition in city of Banda Aceh

Public transportation in Banda Aceh is mostly served by Labi-Labi. With the increasing of population welfare, level of ownership of private vehicle is also increase. Consequently, the total number of passenger using Labi-Labi also dropped significantly. For example, in year 2000, the city of Banda Aceh served by more than 1000 fleet of labi-labi which cater of 17 routes. Nowadays, the registered fleet are 352 vehicle served 10 route.

On the year 2000, the occupancy rate of Labi-Labi is 100% on the peak hours. Today, it was only 30%. Moreover, the waiting time becomes uncertain which lower the confidence level to the fleet. This makes the passenger using different modes of transportation. Based on the pre-feasibility study (2014) conducted by Banda Aceh transporation team, it can be conclude that most of passenger using Labi-labi are student.

Furthermore, from the total of 352 vehicles, in reality only 80 fleet that are fully operational. Load factor is below 50% for the fleet even in the peak hours. Travel pattern of passenger is from the suburb of the city of Banda Aceh to Keudah terminal (city center). The waiting time is become too lengthy that makes passenger's level of trust to the fleet plummeted.

This research conducted by using main data from several sources. Pre-feasibility of Rapid transit system (BRT) in Banda Aceh's Report and Cities Development for Asia's Report (2017) are the main sources of data for this research.

From the survey on the BRT Banda Aceh's report can be conclude that on average per week, a household spend around Rp.126.000,- for transportation. If it is assume that number of working days are 22 days, the average spending per day per household are Rp.5.730,-. The following part explained the correlation between the level of income and cost of transportation based on the survey:

- Household with average income level less than Rp. 2.000.000,- per month, the weekly transportation cost is between Rp. 20.000 - Rp. 50.000.
- Household with average income level between Rp. 2.000.000 - Rp. 4.000.000 per month, the weekly transportation cost is between Rp. 50.000 - Rp. 100.000.
- Household with average income level between Rp. 4.000.000 - Rp. 10.000.000 per month, the weekly transportation cost is Rp. 100.000 - Rp. 200.000.
- Household with average income level more than Rp. 10.000.000 per month, the weekly transportation cost is Rp. 200.000 or more.

From this survey, it can be concluded that the expenditure for transportation is increasing when the household income increasing. In the context of this study, also for the future, it is important to note that there is direct correlation between increasing in monthly income with a demand for mobility.

In conclusion, the survey shows that there is a demand from the society regarding good public transportation. It also can be conclude that Bus Rapid Transit (BRT) system is the most suitable type of transportation for the city of Banda Aceh.

Direct And Indirect Impact Of Public Transportation Against The Population Well-Being

The growth rate of Human Development Index (HDI) is closely related to the level of facilities and infrastructure that support it. Balkombe, et al (2004) argued that there are several goals for transportation policy to improve the standard of living its society. First goal is the level of effeciency in economy. The goal is to maximizing the net economic profit. Furthermore, the transportation policy that have a goal to protect the environment. Decreasing the pollution such as noise and air can decrease the impact on environment. Lastly, the goal is to increase the level of security and decrease the level of traffic accident.

BAPPENAS RI in its Long and Medium Development Plan (RPJMP) emphasize the important of increasing the Human Development Index in a region by improving the infrastructure, facilities and transportation system in the area. In this report, it stated that to decrease the economic discrepancy between regions, it is important to developed underdeveloped region that focused on empowerment local economy. This can be done by improvement in access of transportation to these area. BAPPENAS also suggest that in order to create livable cities, local government needs to improve its public transportation system with integrated services and adjust the modes of transportation based the geography of served area.

Therefore, based on this review this research assumes that there is positive correlation, whether it is direct or indirect, between public transportation and improvement the well being of the population.

RESEARCH MODEL

This research used CBA analysis. On the CBA, the analysis is done on a project that is conducted by an entity to fulfill its function. For a company, the financial profit is the goal. Contrast for a government, its ultimate goal that needed to fulfill is to offer the best services for its citizen. On this research, an investment on the public transportation by the Government of the city of Banda Aceh will be valued using CBA.

The said project is based on Transkoetaradja. CBA is done on 2-project variation. These projects are differentiated by the usage of several mechanisms and operational variable. The Transkoetaradja project that being considered only the one with the full-operated corridor. Below are presented the detailed description of each projects:

Project 1: addition of 4 new corridors that are equipped by 20 full operational bus stops for each new corridor. This project also supported by feeder. Extra bus with smaller size will be used as feeder.

Project 2: Addition of 4 corridors that are equipped with bus stops. These bus stops are adjusted by need and road size so that it is not hold up the usage of sidewalk. The existing Labi-Labi will be used as feeder.

Both project are compared using CBA. Moreover, the chosen project will again compared with no-project scenario. The no project-scenario means scenario when the condition of the transportation in the city of Banda Aceh are as business-as-usual case, with maintained spending and management ratio.

Financially, the project are analysed using Net Present value (NPV) and Internal Rate of Return (IRR) method. Thus, the investment are conceptualised as the time-value of money. For finansial analysis, Real Market Value was use. Meanwhile for economic analysis, the Shadow price was use. This price reflected cost and profit beyond the value for money, such as: travel time, pollution and the possible accident level that may or may not affected by doing the chosen project. These values are converted on Rupiah value.

The financial and economic analysis was done using consolidation method. This is done to simplify valuation of loss and benefit. Therefore, the suitable assumptions are used. The assumptions that are related with NPV and IRR calculation are presented on the related part.

For Financial analysis, the chosen method are the Discounted Cash Flow (DCF). The cash flow for the investment is originate from the cost of investment, operational cost, profit and sources of financial of the project. These data are based on the pre-feasibility report for enhancement of Bus Rapid Transit (BRT) project from the Government of the city of Banda Aceh. The formula for calculating Financial Net Present Value is presented below:

$$FNPV = \sum_{t=0}^{n} a_t S_t = \frac{S_0}{(1+i)^0} + \frac{S_1}{(1+i)^1} + \cdots + \frac{S_n}{(1+i)^n}$$

Where : S_t is cash flow balance on time t, a_t is financial discount factor for calculating discounted cash flow on time t, and i is rate of return.

Furthermore, financial rate of return (FRR) are calculated to find a discount rate that makes NPV equal zero. FRR is calculate using:

$$0 = \sum \frac{S_t}{(1+FRR)^t}$$

The existing projects are compared and then sorted based on its calculation result. Project with the best FNPV and biggest FRR are chosen.

Economic Analysis also calculated by using NPV and IRR. The different is on the used of shadow price to calculate the cash flow. The main components from the shadow price are the cost of travel time, the operational cost of the vehicle, the cost of accident and pollution. These values add on the revenue or spending of the calculated current account. The result from this process can be called economic cash flow. Moreover, the next parameter to calculate the economic benefit is Benefit Cost Ratio (BCR). This ratio is calculated by comparing between the discounted economic benefit and economic cost. The bigger the ratio, it is more incentive to do the project.

RESULT AND DISCUSSION

There are 2 project options that analysed using CBA, in which both of these projects using feeder system. The different are:

1. Feeder function is done by using additional small buses that are serve Transkoetardla.
2. Feeder function done by existing Labi-Labi.

Table. 2
Financial analysis of proposed projects

ITEM FINANSIAL			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25
			Konstruksi			Operasional													
Perhitungan Biaya Investasi yang didiskon (DIC) (opsi 1)		NPV 12%																	
Biaya Investasi	Milyar Rp	663.6	276.0	276.0	276.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DIC/Aliran kas biaya investasi	Milyar Rp	663.58	276.0	276.0	276.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perhitungan Biaya pendapatan yang didiskon (DNR)		NPV 12%																	
Pedapatan (Tarif Rp 3000,-)	Milyar Rp	31.32	0.0	0.0	0.0	5.1	5.71	5.71	5.71	5.71	5.71	5.99	5.99	5.99	5.99	5.99	6.0	6.0	6.0
Biaya O&M	Milyar Rp	-225.5	0.0	0.0	0.0	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4
Residual Value	Milyar Rp	20.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	137.6
DNR/Net aliran kas pendapatan	Milyar Rp	-174.14	0.0	0.0	0.0	-36.3	-35.7	-35.7	-35.7	-35.7	-35.7	-35.4	-35.4	-35.4	-35.4	-35.4	-35.4	-35.4	102.2
Perhitungan Biaya pendapatan yang didiskon (DNR)		NPV 12%																	
Pedapatan (Tarif Rp 5000,-)	Milyar Rp	52.20	0.0	0.0	0.0	8.5	9.52	9.52	9.52	9.52	9.52	9.52	9.99	9.99	9.99	9.99	10.0	10.0	10.0
Biaya O&M	Milyar Rp	-225.5	0.0	0.0	0.0	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4
Residual Value	Milyar Rp	20.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	137.6
DNR/Net aliran kas pendapatan	Milyar Rp	-153.26	0.0	0.0	0.0	-32.9	-31.9	-31.9	-31.9	-31.9	-31.9	-31.9	-31.4	-31.4	-31.4	-31.4	-31.4	-31.4	106.2
Perhitungan Biaya Investasi yang didiskon (DIC) (opsi 2)		NPV 12%																	
Biaya Investasi	Milyar Rp	558.3	250.0	222.1	222.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DIC/Aliran kas biaya investasi	Milyar Rp	558.30	250.0	222.1	222.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perhitungan Biaya pendapatan yang didiskon (DNR)		NPV 12%																	
Pedapatan (Tarif ber skema)	Milyar Rp	105.50	0.0	0.0	0.0	17.2	19.24	19.24	19.24	19.24	19.24	19.24	20.2	20.2	20.2	20.2	20.2	20.2	20.2
Biaya O&M	Milyar Rp	-188.8	0.0	0.0	0.0	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7
Residual Value	Milyar Rp	15.66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.5
DNR/Net aliran kas pendapatan	Milyar Rp	-67.64	0.0	0.0	0.0	-17.5	-15.5	-15.5	-15.5	-15.5	-15.5	-15.5	-14.5	-14.5	-14.5	-14.5	-14.5	-14.5	-14.5

Source : Primary Data, 2018 (fixed)

NPV analysis is done for both. On this analysis, the cost estimation is done separately. The forecast for future traffic condition is identical for both projects. Second option is chosen because it has better NPV. However, it can be seen that both project generated negative NPV.

Demand Analysis is done both for without the project as well as the chosen project. Basically this analysis is done to diagnose and predict the growth rate of traffic congestion on the city of Banda Aceh. The data used on the demand analysis are based on Banda Aceh BRT report .The congestion forecast is started on the 4th year, the year that is assumed the project first fully functional, year 10th, year 15th and year 25th. When needed, the year in between these chosen years can be calculated by using linear interpolation. Nonetheless, this report is using only the specified years.

Table.3
Estimated passenger (million) and passenger-hours (million)

	Tahun 1 (Tahun pembangunan dimulai)	Tahun 4 (Tahun pertama operasi dimulai)	Tahun 10	Tahun 15	Tahun 25
Skenario Tanpa Proyek					
Penumpang					
Transkoetaradja	0.69	1.62	1.91	3.9	3.9
Labi-Labi	6.23	5.18	2.6	1.3	0.0
Motor	97.8	102.4	115.7	122	122
Mobil Pribadi	62.4	65.3	73.8	78.1	78.1
Penumpang-Jam					
Transkoetaradja	0.31	0.72	0.85	1.02	1.02
Labi-Labi	2.04	2.27	1.14	0.58	0
Motor	32	44.9	50.6	53.5	53.5
Mobil Pribadi	20.4	28.6	32.3	34.2	34.2
Skenario dengan Proyek					
Penumpang					
Transkoetaradja	0.69	7.0	7.85	8.79	8.79
Labi-Labi	6.23	-	-	-	-
Motor	97.8	100.7	112.8	118.5	118.5
Mobil Pribadi	62.4	64.3	72.0	75.6	75.6
Penumpang-Jam					
Transkoetaradja	0.31	3.57	4.0	4.2	4.2
Labi-Labi	2.04	-	-	-	-
Motor	32	43.4	49.5	52.0	52.0
Mobil Pribadi	20.4	28.2	31.6	33.2	33.2

Source : Primary Data, 2018 (fixed)

Cost Analysis And Project Revenue.

Cost every bus stops are derived from Banda Aceh BRT report. The financing assumptions are also derived for the same report.

Table.4
Analysis and Project Revenue

		Total Biaya Proyek (Koridor 1)	Total Biaya Proyek (Koridor 2 - 4)
Pekerjaan jalan	Milyar Rp	47.30	189.0
Akses pejalan kaki	Milyar Rp	20.60	82.4
penghijauan	Milyar Rp	0.13	0.52
lampu jalan	Milyar Rp	0.17	0.68
drainase	Milyar Rp	1.73	6.9
Road marking ad traffic signal	Milyar Rp	1.80	7.2
stasiun BRT	Milyar Rp	27.80	55.6
Sumber listrik dn pengcahayaan Stasiun BRT	Milyar Rp	2.44	4.9
Drainase dan damkar stasiun BRT	Milyar Rp	0.08	0.17
Ventilasi dan AC	Milyar Rp	0.10	0.2
ITS Sistem Stasiun BRT	Milyar Rp	23.50	46.9
Sistem informasi penumpang	Milyar Rp	1.44	5.7
Rekayasa lalu lintas masa konstruksi	Milyar Rp	1.90	7.6
Traffic surveillance control	Milyar Rp	9.20	37.0
Project indirect cost and expense	Milyar Rp	27.60	110.5
Total	**Milyar Rp**	**165.75**	**555.3**

Source : Primary Data, 2018 (fixed)

The main source of revenue assumed from ticket sales. The ticket has several schemes: monthly, student, elderly, daily and 2-hours ticket.

Table.5
Ticket Sales

		Tahun 4 (tahun pertama operasi)	Tahun 10	Tahun 15	Tahun 25
Lalu lintas yang dialihkan dari jalan	Milyar Rp	10.96	12.28	12.9	12.9
Lalu lintas yang dihasilkan	Milyar Rp	3.19	3.58	3.76	3.76
total	**Milyar Rp**	**14.15**	**15.86**	**16.66**	**16.66**

Source : Primary Data, 2018 (fixed)

Table.6
Financial and Economic Analysis

ITEM FINANSIAL		NPV 12%	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25
			Konstruksi			Operasional													
Perhitungan Biaya Investasi yang didiskon (DIC) (opsi 2)		NPV 12%																	
Biaya Investasi	Milyar Rp	-558.3	-250.0	-222.1	-222.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedapatan Tarif	Milyar Rp	105.50	0.0	0.0	0.0	17.2	19.24	19.24	19.24	19.24	19.24	19.24	20.2	20.2	20.2	20.2	20.2	20.2	20.2
Residual Value	Milyar Rp	6.33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.5
Biaya O&M	Milyar Rp	-188.8	0.0	0.0	0.0	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7	-34.7
DNR/NPV aliran dana	Milyar Rp	-641.6	-250.0	-222.1	-222.1	-17.5	-15.5	-15.5	-15.5	-15.5	-15.5	-15.5	-14.5	-14.5	-14.5	-14.5	-14.5	-14.5	93.0

FRR	-18%

Source : Primary Data, 2018 (fixed)

It can be seen that NPV and FRR form the project is negative. This is common on majority, if not all, a government project on the public transportation.

Table.7
Ekonomic Analysis and Cost/Benefit Rasio

ITEM EKONOMI			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25
			Konstruksi			Operasional													
Perhitungan Biaya Investasi yang didiskon (DIC) (opsi 1)		NPV 13%																	
Biaya Investasi	Milyar Rp	-519.5	-225.0	-199.8	-199.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tarif	Milyar Rp	90.73	0.0	0.0	0.0	17.2	19.24	19.24	19.24	19.24	19.24	19.24	20.2	20.2	20.2	20.2	20.2	20.2	20.2
Biaya O&M	Milyar Rp	-194.4	0.0	0.0	0.0	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5
Residual value	Milyar Rp	6.33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.5
Total Biaya Ekonomi	Milyar RP	-616.84	-225.00	-199.80	-199.80	-12.30	-10.26	-10.26	-10.26	-10.26	-10.26	-10.26	-9.30	-9.30	-9.30	-9.30	-9.30	-9.30	98.20
Perhitungan Keuntungan Ekonomi		NPV 13%																	
Value of time	Milyar Rp	IDR154.14	0	0	0	25.7	30.4	30.4	30.4	30.4	30.4	30.4	33.5	33.5	33.5	33.5	33.5	33.5	33.5
Biaya Operasional Kendaraan	Milyar Rp	IDR23.38	0	0	0	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.75	4.75	4.75	4.75	4.75	5.3	5.3
Tarif	Milyar Rp	-IDR 90.7	0.0	0.0	0.0	-17.2	-19.24	-19.24	-19.24	-19.24	-19.24	-19.24	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2
Eksternalitas:																			
Kecelakaan	Milyar Rp	IDR9.66	0	0	0	1.66	1.905	1.905	1.905	1.905	1.905	1.905	2.0775	2.0775	2.0775	2.0775	2.0775	2.105	2.105
Polusi	Milyar Rp	IDR15.68	0	0	0	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Keuntungan Ekonomi	Milyar Rp	IDR112.13	0	0	0	17.66	20.765	20.765	20.765	20.765	20.765	20.765	23.4275	23.4275	23.4275	23.4275	23.4275	24.01	24.005
ENPV	Milyar Rp	-IDR504.71	-225.00	-199.80	-199.80	5.36	10.51	10.51	10.51	10.51	10.51	10.51	14.13	14.13	14.13	14.13	14.13	14.71	122.21

EIRR	-7%
B/C Ratio	0.81

Source : Primary Data, 2018 (fixed)

From the table can be derived that the value of ENPV and EIRR are also negative. From this, it can be conclude that the project is not profitable form the capital owners, in this case government, perspective. The Benefit-Cost ratio is also below 1. However, the economic benefits for the society, it can be derived from the table, is positive.

CONCLUSION AND SUGGESTION

Conclusion

1. The development of public transportation in the city of Banda Aceh affects the rate of traffic density in the city of Banda Aceh.
2. The financial impact of the public transportation investment is negative for the government as the sole capital owners. This shows that the investment is not profitable financially for the government.
3. The impact of the government investment on public transportation on the total of economic benefits is positive. This shows that for the city resident, the investment bring various benefit.

Suggestion

1. This research can be use as the base for conducting financial and economic valuation on the public transportation area. Most drawbacks from this research can be fix by using more high quality data to do evaluation.

2. This research using a lot of assumptions as proxies for the real field data. Primary data can be used to add accuration on the Cash flow calculation and tariff valuation. The accuracy of valuation of city of Banda Aceh government's financial capability is also can be increase by using up-to-date data.

3. The forecast for the number of total passenger and the yearly rate of motorisation needed to be predict on higher accuracy.

4. The investment rate of return for Net Present value calculation need to use mark to market value. The mark to market value is also need to be used for the economic rate of return. Furthermore, the amount of externalities that are included on economic valuation can be increase.

5. The accuracy of the research also can be increased by using sensitivity test. This test can be done on financial and economic items that have biggest influence on the total value of the financial and economic cost and benefit.

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