CHAPTER6

FINANCIAL ANALYSIS

6.1 Introduction

Financial analysis is the process to determine whether the project is financially feasible and attractive to invest. Income and expenditure are the key in financial analysis. The main income of the bus transit operation is the fare and the expenditure can be determined through cost estimation process. Cost estimation is the process of predicting the investment cost for the project. Estimating capital cost and operation cost of transportation facilities and transportation services are the 2 most common cost estimation tasks in transportation planning.

Capital cost associates with the construction of facilities, such as bus stations, bus stops, garage, and the administration office, and the purchase of equipment. The operation often involves labor cost, fuel cost, and maintenance cost.

The outcome of this chapter is the financial analysis based on the 5 year financial forecast of the project. The outcome gives the sense of direction whether the project is going to be successful or not.

6.2 Income

The main income for any public transit service is the fare. However, there is another source of income in this proposed system, the income from advertisement. The fare structure and the advertisement conditions are discussed below.

6.2.1 Fare structure

Fare is the main income of the bus transit operation. According to Issarasena Na Ayuthaya, Sirisoponsil, and Naruepati (1999), to determine the fare, there are several issues to be considered. Those issues are:

Cost recovery: Although the fund of public transit operation is mainly supports by government, this fund has their limits. Therefore, setting up of the bus fare must

consider the operation cost. The fare should at least cover the operation cost to allow the continuous of the operation.

2. Social service: Bus transit is considered to be the social service provided by the government. Most benefits should fall with the people in the community not the investors. The fare must consider financial ability of the people in the community and reflects the social service characteristic.

3. Fairness: The bus fare must be reasonable with the quality of the service provide, and the usage of the service.

4. The convenience of fare collection: Most of the service providers choose to use the convenience way to collect the fare such as Flat rate and Distance-Based fare. These also help reduce the operation cost since complicated fare collection can cause delay in pick up time.

5. Attractiveness: The fare must be able to attract personal vehicle users to switch to public transit. To reduce the traffic congestion, the number of personal vehicle user must be reduced. Therefore the system must attract those users to switch to public transit. The fare and quality of service should not be far off the convenience of personal vehicle.

For this project the fare structure used is Flat rate of 15 Baht. From the interview with Mr. Panyapol, the government has recommended the bus fare of maximum 15 Baht. The bus fare is constant at any time of day. However, since the system is considered as the social service and the main customers are student, therefore the fare for children under the age of 18 and student not over 25 is slightly cheaper at 12 Baht per trip. Elders and disables are also received the cheaper rate than normal passengers. The flat rate is the most convenience way of fare collection. The only disadvantage if this system is the unfairness for those short distance passengers. However, this is not a big problem when comparing the bus fare to the minimum fare of minibus. The minimum minibus fare is 15 Baht which was recently increased during the fuel price crisis. This 15 Baht minibus fare only cover maximum distance of 2 kilometer. For those destinations further than 2 kilometer, the fare is totally up to negotiation skill.

To conclude the bus fare for the proposed bus transit project is charged at flat 15 Baht for adult and 12 Baht for child, student, elder, and disable person. The fare structure is summarized and presented in **Table 6.1** below.

Type of Passenger	Fare (Baht)
Adult (25-60 years old)	15
Child (5-25 years old)	12
Student (under 25 years old)	
Elder (above 60 years old)	
Disable person	

Table 6.1: Fare structure

6.2.2 Advertisement fee

There are two types of advertisement in this operation, on the actual bus and on the stops.

For the advertisement on an actual bus, the total charge is depending on the distance the buses run. The rate for advertisement on an actual bus is 0.5 Baht per kilometer. From **Equation 6.1, 6.2, and 6.3** the advertisement fee on the actual bus is equal to 303,862.5Baht per year.

The buses are determined to run 111 trips per day and each trip is equal to 15 kilometers. Therefore, on each day buses run

$$111 \times 15 = \underline{1665 \text{ Kilometers}} \qquad \text{Equation 6.1}$$

As the result in one year the buses run

$$1665 \times 365 = \underline{607.725 \text{ kilometers}} \qquad \text{Equation 6.2}$$

With the advertisement fee of 0.5 Baht per kilometer, therefore, the advertisement fee on the actual buses for one year is equal to

$$607,725 \times 0.5 = \underline{303.862.5 \text{ Baht}} \qquad \text{Equation 6.3}$$

The advertisement on the bus stops, unlike the advertisement on an actual bus, does not depend on distance traveled. The advertisement fee is collected monthly and different type of stops have different rate. There are two types of stop, small stops (standing bus stop) and park and ride stop. There are 33 stops all together, 27 small stops and 6 park and ride stops. The advertisement fee for a small stop is 8,500 Baht per month and for the park and a ride stop is at 18,000 Baht a months. The determination of numbers of stop is discussed further later in this chapter.

From **Equation 6.5** the advertisement on bus stops is equal to..........

[(A x B)+(C x D)] x 12 = Yearly advertisement fee on bus stops   Equation 6.5

[(27 x 8,500) + (6 x 18,000)] x 12 = 4,050,000 Baht per Year

Where:

A is number of small stops

B is Advertisement fee on small stop

C is Number of park and ride stop

D is Advertisement fee on park and ride stop

6.3 Expenditure

Expenditure for this project can be estimated through cost estimation. There are 2 types of cost, the capital cost for fixed assets and operational cost during the operation.

6.3.1 Capital cost

Capital cost associates with the construction of facilities, such as bus stations, bus stops, garage, and the administration office, and the purchase of equipment. The number of buses needed for this operation, as well as the number of stops and the locations is discussed in the following paragraphs. Follow by the estimated capital costs.

6.3.2 Number of buses

The input data needed for the calculation of the total number of bus for smooth operation on the selected route are time to complete 1 trip and the headway (frequency of releasing the bus)

The research of ITSC Chiang Mai University on Chiang Mai's traffic shows that the peak periods are between 07:00am to 08:00 am and between 05:00pm to 06:00 pm. Other research from the same institute on the needs of transit passengers in study area shows 59% felt that waiting time of between 5to10 minutes is acceptable.

In the interview with Mr. Panyapol, the municipal layer, he stated that the experiment on trip time has been conducted by timing the test vehicle which ran through the city. The results of the experiment were, during the peak periods the bus can only run at the speed of 10 to 20 kilometer per hour through the city. When added the stoppage time for picking up and dropping off, the average speed of the bus was only 10 kilometer per hour. For non-peak time the bus can run at the speed up to 35 kilometer per hour, adding the stoppage time the average speed was 20 kilometer per hour.

The headway of the bus during each time interval is displayed in **Table 6.1** and **Table 6.2** below:

Headway (minute)	Time				
	5:30-6:30	6:30-8:30	8:30-15:30	15:30-18:30	18:30-22:00
	10	7	10	7	10

Table 6.2: Bus Headway for Monday to Saturday

Headway (minute)	Time
	6:00-21:00
	20

Table 6.3: Bus Headway for Sunday

The selected route 9 is 15 kilometers long, round trip, and the time to complete the trip is 1.5 hour or 90 minutes during peak hour and 1 hour or 60 minutes during non-peak hour.

The formula for calculation number of bus needed is:

$$N = \frac{T_r}{h}$$

Where N is the number of bus require.

T_r is time to complete the trip.

h is headway.

Therefore during the peak period the time to complete 15 kilometer trip is 1.5 hour or 90 minutes. The waiting time for passenger is set to be 7 minutes for the satisfaction of service. Therefore the total number of bus needed during peak hour is:

$$N = \frac{90 \ (minutes)}{7}$$

$$N = 13 \ Buses$$

During non-peak hour, route 9 can be completed in 1 hour or 60 minutes. The waiting time for passenger is 10 minutes for satisfaction. Therefore, the number of bus needed during non-peak periods are:

$$N = \frac{60 \text{ (minutes)}}{10}$$

$$N = 6 \text{ Buses}$$

Therefore, the total number of bus needed to serve the needs of transit passengers in route 9 is 13 buses.

6.3.3 Stops allocation

There are 3 types of location suitable for setting up bus stops which are Near Side Stop, Far Side Stop, and Midblock Stop.

Near Side Stop, a bus stop is located before the cross which maximizes the time utilization and decrease the associated accident rate.

Far Side Stop, a bus stop locates after the cross which is suitable for crowded streets. It also reduces the risk of traffic cause by bus blockage. Since the stop is after the cross, it is easier and faster to cut in during the stop of traffic.

Midblock Stop is no advise, however if needed the stop should be build along side the pedestrian crossing.

Allocation of bus stop should consider the following issues:

- The coverage area
- The traffic condition
- The direction of traffic flow
- The distance between stops
- The closeness to active points
- The risk of creating traffic
- The visibility of the sign

The recommendation on distance between each stops cited in ITSC research states that in the central business district, highly populated area, or city center the stop should be 150 to 200 meters apart. Within the city area but not the center, the stops should be 200 to 400 meters apart and 400 to 800 meters apart is recommended for outside the city area.

By considering these issues and recognizing the 3 types of stops, there are 33 stops which are allocated along the selected route 9 as shown in **Figure 6.2** below.
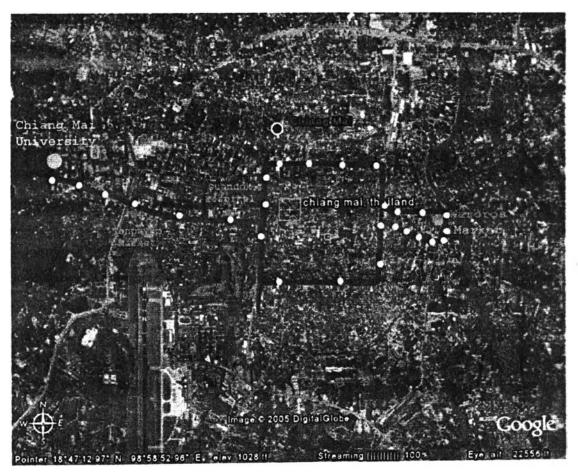

Figure 6.1: Bust Stops on Route 9

The capital costs can be summarized as represented below:

1. Buses: Each of the new bus cost 2 million and 13 of them are needed. Therefore the total cost for the buses is 26 million.

2. Land for bus garage: The size of the land is determined to be 5 Rai which is equivalent to 8000 square meters which cost roughly 5 million.

3. Land development: Land development cost mainly concerned with the improvement of the road condition and the stops area. The budget of 3 million for land development is provided where it can be divided as, the improvement cost for the stop areas are 10,000 for 27 small stops and 50,000 for 6 park and ride stops, and the rest is for road condition improvement.

4. Ticket machine: Automatic ticket selling machines will be put on 6 most crowded stops. The machine cost 15,000 Baht each, The fore the total cost is 90 thousand.

5. Stops construction: The cost of small stops construction is 15,000 and 17 of them are needed. Where the cost for park and ride stops is 150,000and 6 of them are needed which equal to 1.305 million.

6. Building: The construction cost of office and bus garage and its equipments for bus maintenance is determined to be 2 million baht. The garage and its equipment cost 1 million and the office for administration task cost 1 million.

7. Office equipment: Office equipments such as computers, software, and other office accessories are estimated to cost approximately 1million.

8. Spare parts: Spare parts for the bus such as engine parts as well as the interior of the bus like seats for example, must be stocked in the inventory in case of emergency. The cost estimated for the inventory of spare parts is 100,000 Baht

The summary of capital cost is presented in **Table 6.4** below.

Expenses	Cost (Million Baht)
Bus	26
Land	5
Land development	3
Ticket machine	0.09
Bus Stops	1.035
Buildings	2
Office equipment	1
Spare parts inventory	0.1
Total	**38.225**

Table 6.4: Summary of capital cost

Concluded from interviews with Mr. Panyapol, the municipal government is able to provide the 13 buses needed for this project and taking care of bus stops construction. The land for construction of garage along with the land development cost is provided by the government. The community development budget is enough to cover all these costs. The amount of money provides by the government is equal to 40 million Baht.

6.3.4 Operation expense

Operation expenses are the costs which associate with fuel price, labor cost, and maintenance, and overhead cost which associates with office overhead, management and administration officers' salary, marketing expenses, and tax and insurance cost.

Operation cost is based on assumption that the Diesel price is 27 Baht per liter, the driver wage 205 Baht per day, and 175 Baht per day for bus hostess. Maintenance fee is assumed based on the total running distance per bus per year of not exceed 35,000 kilometers. The result for operation cost operation is shown in **Table 6.3, Table 6.4,** and **Table 6.5** below:

gas usage (km/Lt)	Fuel Cost (Baht/Km)						
	Diesel Cost (Baht/Lt)						
	24	25	26	27	28	29	30
6	4.000	4.167	4.333	4.500	4.667	4.833	5.000
7	3.429	3.571	3.714	**3.857**	4.000	4.143	4.286
8	3.000	3.125	3.250	3.375	3.500	3.625	3.750

Table 6.5: Fuel Cost per Kilometer

Expected salary (Baht/day)	Salary for driver and hostess (Baht/Km)							
	Distance per day							
	90	100	110	120	130	140	150	160
205+175x2=760	8.444	7.600	6.909	6.333	**5.846**	5.429	5.067	4.750
215+185x2=800	8.889	8.000	7.273	6.667	6.154	5.714	5.333	5.000
225+195x2=840	9.333	8.400	7.636	7.000	6.462	6.000	5.600	5.250

Table 6.6: Labor Cost per Kilometer

Expected salary (Baht/day)	Fuel Cost (Baht/Lt.)	Total Operation Cost (Baht/Km/Bus)							
		Distance Travel (Km/Day)							
		90	100	110	120	130	140	150	160
760	26	12.158	11.314	10.623	10.047	9.560	9.143	8.781	8.464
	27	12.301	11.457	10.766	10.190	**9.703**	9.286	8.924	8.607
	28	12.444	11.600	10.909	10.333	9.846	9.429	9.067	8.750
800	26	12.603	11.714	10.987	10.381	9.868	9.428	9.047	8.714
	27	12.746	11.857	11.130	10.524	10.011	9.571	9.190	8.857
	28	12.889	12.000	11.273	10.667	10.154	9.714	9.333	9.000
840	26	13.047	12.114	11.350	10.714	10.176	9.714	9.314	8.964
	27	13.190	12.257	11.493	10.857	10.319	9.857	9.457	9.107
	28	13.333	12.400	11.636	11.000	10.462	10.000	9.600	9.250

Table 6.7: Total Operation Cost per Kilometer

The operation costs are summarized into each categories as represents on the following paragraphs below:

1. Fuel cost: For this research, the diesel cost is assumed to be 27 Baht per liter. The consumption rate of a bus is equal to 7 kilometers per liter. The calculated expense per kilometer of a bus on fuel cost is 3.857 Baht per kilometer. According to the schedule set from the headway of the bus in each period, the total number of trip per day for the operation on route 9 is 111 trips on Monday to Saturday. For Sunday, the headway is changed to 20 minutes throughout the day. Therefore, there are only 45 trips in total. Total distance running per day is 1,665 kilometers, which is equivalent to approximately 128 kilometers per bus per day on Monday to Saturday. For Sunday, total running distance is 675 kilometers per day. Therefore:

On Monday to Saturday

Total trip per day is 111 trips.

Fuel per kilometer per bus is 3.857 Baht

Total distance running per day is 1665 Kilometers

Total fuel cost per day (from Monday to Saturday) is 6422 Baht

On Sunday

Total trip per day is 45 trips.

Total distance running per day is 675 Kilometers

Total fuel cost per day is 2603.50 Baht

Total fuel cost per year is **2,145,438** Baht

2. Insurance: The cost of insurance is approximately 23,000 per bus per year. The cost is divided into 20,000 for insurance and 3,000 for license duty. The total expense is 299,000 Baht per year.

3. Marketing: The marketing budget is 1 million Baht per year. It can be divided into 0.75 million on pure advertising activities such as radio and cable advertises, and billboard on populated areas both along route9 and other places. Another 0.25 million is for other activities such as promotion activities, events, and etc.

4. Depreciation: Depreciation of a bus is estimated to be 5% per year. For the building is expected to be 5% per year, for ticket machine, stops, and office equipment are at the same rate of 20%.

5. The maintenance cost is 25,000 Baht per vehicle. Therefore the total cost of maintenance is 325,000 Baht per year.

6. The drivers and hostesses: There are 20 bus drivers and 20 hostesses needed for the operation. The driver and hostess will be divided into 3 different group, A, B, and C. Group A has 6 drivers and 6 hostesses, they are working from 5:30am to 8:30 am and again in the evening from 3:30pm to 6:30 pm. In group B, there are 7 drivers and 7 hostesses. They are working form 6:30am to 3:30pm everyday. For group C, there are 7 drivers and 7 hostesses, working from 3:30pm to 10:00pm everyday. The drivers and hostesses would rotate through 3 different groups to make it fair for everyone. The salary for a bus driver and a hostess is equal to 205 and 175 accordingly which equal to 2,774,000 Baht per year.

7. Personnel's salary: The personnel involve in the project's operation activities are administration personnel, finance and marketing personnel, and mechanic personnel. There are 2 administration personnel who are also acting as human resource personnel who receive average salary of 15,000 per months. There are 2 people altogether in finance and marketing departments who receive average salary of 25,000 Baht per month. There are 2 mechanics who receive salary of 9,000 per months. The total expense on personnel and labor cost is 1,176,000 Baht per year.

8. Management and executives: There are only one management personnel, Operation Manager, who is responsible for ensuring the smoothness of the operation. The salary for the operation manager is set to be 45,000 Baht. The total expense on management salary is 540,000 Baht per year.

9. Director: There is only one director for this bus project. The salary for the director is set to be 70,000 Baht per month. The total director's salary is 840,000 Baht per year.

10. Audit: The fee to hire an independent audit company is determined to be 100,000 per year.

11. Training: Training for continuous improvement in both office tasks and bus service tasks must be done annually. The budget for training is estimated to be 100,000 Baht per year.

12. Overhead Cost: The overhead cost for office and garage is estimated to be 25,000 Baht per months which would be equivalent to 300,000 Baht per year.

The operational costs are summarized and shown in **Table 6.8** below.

Expenses	Cost per year (Million Baht)
Fuel	2.145438
Insurance	0.299
Marketing	1
Depreciation	According to the rate
Maintenance	0.325
Driver and hostess's salary	2.774
Personnel's salary	1.176
Management's salary	0.54
Director's salary	0.84
Audit	0.1
Training	0.1
Overhead	0.3
Total	**9.599438**

Table 6.8: Summary of operation cost

6.4 **Investment condition**

There are several conditions to be considered in this proposed project. Those conditions are presented below:

1. The spare parts worth 100,000 Baht is bought in year 3, for maintenance of buses.

2. The maintenance fee is expected to rise as the buses are used. In the first 2 years the maintenance is expected to be 325,000 Baht. It would increased to 350,000 Baht in year 3 to year 5, and increase to 375,000 and 4250,000 in year 6 to 10 and year 11 to 15 accordingly.

3. The salary for drivers, bus hostess, office personnel, management and executives, as well as for the board is expected to rise by 5% every year.

4. The depreciation of the buses, equipments, and building would be paid to the government.

6.5 Sensitivity analysis

In this part of sensitivity analysis four factors are used to determine whether the project could survive if these factors had been changed. The four factors are the capital cost, operation cost, total income, and number of passenger per day.

The estimated capital cost of the proposed project is 38.225 million Baht. The major capital cost is the purchase of buses which cost as high as 26 million Baht. The changes can be occurred to the capital cost if there are changes in the route, the time of operation, and the construction cost. If there is a change in capital cost, still the capital cost will be paid by the government since they try to attract the private investor to invest in this project. The municipal government takes the money from the city development budget to pay for the capital cost. The capital cost is hardly changed. In case of changes in time of operation, and route to operate, the number of bus needed will be changed. The changes in route, time of operation, or waiting time interval, usually cause by the increase in number of passenger. The increase in number of passenger means the increase of income. The increase in income will help coping with the increase of capital expense paid by government.

The operational cost can be varied due to many factors. The major factors that should cause the change are the fuel cost and the salary. The estimated operation cost per year is about 9.6 million Baht. The estimated income per year is equal to 21 million Baht. The operation cost is all paid by the private investor. Therefore if the operation cost is increase more than twice as much as the estimated amount the proposed project would be in bankruptcy stage. However, it is quite impossible that the capital cost would increase as much. For example, the fuel cost and the salary must be increased more than double to cause the bankruptcy. The fuel cost can increase in two ways, the increase in diesel price and the increase in number of running Kilometer per day. In the life time of the project, if the fuel cost double the current rate, economically, the income of the passenger must also increase hence the fare can be increased also. The salary is increased by 5% every year, it would take more than the life time of the project to double the current estimated salary. Therefore within the life time of the project the capital cost would not reach the limit that could cause the bankruptcy.

The estimated capital cost is about 9.6 million Baht per year, which would be responsible solely by the private investor. Currently the estimated total income is about 21 million Baht. The income must be decreased by more than half for the project to go into bankruptcy. When observing the number of estimated passenger, it is not possible for the proposed project to have only half of the estimated income. The number of passenger per day that would cause the bankruptcy is presented and discussed in the following paragraph.

In this part the number of passenger per day that would create a loss for the proposed project will be determined and compared to the current number of passenger per day of one of the two CMB routes to determine whether it is possible or not that such a case could occur.

Income of the operation is from two main sources, the bus fare and the advertisement fee. For the expense in this sensitivity analysis, it would only consider only operation expense since the capital cost is paid by the government. The operation expense is increasing yearly due to the 5% increase in wages and the increase in maintenance fee. Therefore to find out the number of passenger per day that could cause the bankruptcy, those numbers should be compared to the operation expense. If it could not generate profit in the first year it could never generate any profit in any other year.

The operation expense in the first year is equal to 11,651,771 Baht (referring to the financial analysis on the following part).

The advertisement fee on the first year is expect to be only 70% of the potential since the customers could still have doubt in the route and efficiency in the operation. Therefore the advertisement in the first year would be 2,835,000 Baht.

The amount of money from the bus fare should be over:

$$11,651,771 - 2,835,000 = \underline{\textbf{8,816,771 Baht per year}}$$

In the worst case scenario, if all passengers happen to be those who pay the fee of 12 Baht, then the minimum number of the passenger per day that would ensure the survival of the project must be:

$$8,816,771 / (12 \times 365) = \underline{\textbf{2013 passengers per day}}$$

Therefore, if the number of passenger per day was lower than 2013 passengers per day the proposed project would be in danger of bankruptcy.

Looking at the figure of the passenger per day of CMB route 2 which is equal to 3,000 passengers per day on average. Comparing these numbers to the predicted demand of CMB route 2 from program Tranplan, which is equivalent to the ITSC design of route 5 and route 13 combine. The predicted demand of CMB route 2 is equivalent to 60,483passengers per day. Comparing the predicted demand of CMB route 2 to the selected route9 of the propose project of 78,001 passengers per day. As the result, it is found that the selected route 9 has higher estimated demand of passenger, therefore if the buses operated on the route, the number of passengers per day must be higher than 3,000 passengers per day. Hence, with the passengers higher than 3,000 per day, it could guarantee the profitability of the proposed project.

However, there are several reasons support the belief that the number of passengers per day of the selected route9 would be higher than 3,000 of CMB route2. Those reasons are:

1. The estimated demand of route9 from program Tranplan is higher.
2. The propose bus operation would operate more frequent, as every 7 minutes during peak hour and 10 minutes during non peak hour, comparing to every 15 minutes all day of the CMB project.
3. The selected route9 passes through way more active points and important business district than CMB route 2.

Therefore, with these reasons it should be able to guarantee that the number of passengers per day of route 9 would be more than 3,000 passengers per day. This figure comparing to the minimum number of passenger per day that would cause the bankruptcy of 2,013 passengers per day is much higher. Therefore it means that the proposed could generate enough profit to survive and might as well attract private investor with its amount of profit.

6.6 Income estimation

Stated earlier that income of the bus operation is from 2 sources, the fare and the advertisement fee. The advertisement is easy to predict. At full efficiency the advertisement fee would be equal to 4,050,000 Baht per year. However the advertisement fee would not reach its full efficiency at the first years due to many factors such as the uncertainty of the customers on the operation and the route. The advertisement on the park and ride stops may be full from the beginning since these stops are located in the busy streets already. However, for the advertisements on small stops and on the actual buses may not be fully filled. The clients may not be certain that it would be worth the money that they pay for the advertisement in the first couple years while there are still number of uncertainties. Therefore, the estimated income form advertisement fees are expected to follow the similar pattern of 70% of total income in the first year and 85% in the second year. In year 3, the advertisement fees are expected to reach 100%.

On the other hand fare is not easy to predict as the advertisement fare. The fare of the operation is set to be flat rate of 15 Baht for adult and 12 Baht for child, senior citizen and student.

The predicted demand from the program Tranplan suggested that Route9 would have 78,001 passengers per day. However, the number of bus may not be able to cope with the demand. Therefore the amount of fare will be collected from the operation may not be predicted very accurately. But the prediction of whether the proposed bus operation would survive or not could be predicted by comparing Route 9 to one of the route of CMB.

From the interview with Mr. Panyapol, Head of CMB project, after 4 months of operation, the average number of passenger per day for CMB Route2 is 3,000 passengers. Looking back on the demand prediction from Tranplan, the CMB Route6 is the same as Route5 and Route13 of ITSC design combined, which has the predicted demand of 60,483 passengers per day. The average number of passenger of CMB Route2 is only 5% of the predicted demand from Tranplan. The selected Route9 has the predicted demand of 78,001 passengers per day. Assuming that the demand of the passenger of Route9 follows the same trend as demand of the CMB Route2, the average number of passenger of the selected Route9 should not be lower than 3,000 passengers per day since it has higher demand potential predicted by Tranplan program. Therefore, it is safe to assume that the minimum number of average passenger per day for Route9 would be 3,000 passengers. To be more precise, if it

should follow the same trend the actual number of passenger on Route9 would be 5% of the predicted demand which is equal to 3,870 passengers per day on average.

Since the CMB project has only been operated for 4 months, it is difficult to predict the future number of passengers per day for the operation. In the worst case scenario, the number of passenger may not be increased in the future. Therefore in the following part of financial analysis, the fare income is estimated based on the worst case scenario stated above. The number of passenger would be 3,870 people per day. The minimum amount of fare could be collected is 46,440 Baht, assuming every passenger pay only 12 Baht. Therefore, the income from fare would be equal to 16,950,600 Baht per year.

6.7 Financial analysis

In this part, Income Statement, Balance Sheet, and Cash Flow Statement of each year for 5 years are presented. In the end, the figures from these tables are analyzed for financial attractiveness of the proposed project.

Income Statement

	Year					
	0	1	2	3	4	5
Revenues						
Fare	0	16,950,600	16,950,600	16,950,600	16,950,600	16,950,600
Advertisement Fee	0	2,835,000	3,442,500	4,050,000	4,050,000	4,050,000
Total Revenues	0	19,785,600	20,393,100	21,000,600	21,000,600	21,000,600
Operation Expenses						
Expenses	0	11,651,771	11,918,271	12,230,546	12,524,736	12,833,635
Profit (Lost)	0	8,133,829	8,474,829	8,770,054	8,475,864	8,166,965
Interest	0	0	0	0	0	0
Account Payable	0	0	0	0	0	0
Net Profit (Lost)	0	8,133,829	8,474,829	8,770,054	8,475,864	8,166,965

Table 6.9: Income Statement

Cash Flow

Cash Flow		Year					
		0	1	2	3	4	5
Cash		0	1,605,000	11,791,162	22,318,324	33,140,711	43,668,
Loan		0	0	0	0	0	0
Common Stock		40,000,000	0	0	0	0	0
Income	Fare	0	16,950,600	16,950,600	16,950,600	16,950,600	16,950,
	Advertisement Fee	0	2,835,000	3,442,500	4,050,000	4,050,000	4,050,0
Total Income		40,000,000	21,390,600	32,184,262	43,318,924	54,141,311	64,669,
Expenses on Fixed Assets		38,395,000	0	0	0	0	0
Operation Expenses		0	9,599,438	9,865,938	10,178,213	10,472,403	10,781.
Loan Return		0	0	0	0	0	0
Interest		0	0	0	0	0	0
Total Expense		38,395,000	9,599,438	9,865,938	10,178,213	10,472,403	10,781,
Net Cash		1,605,000	11,791,162	22,318,324	33,140,711	43,668,908	53,888,

Table 6.10: Cash Flow

Balance Sheet

	Year					
	0	**1**	**2**	**3**	**4**	**5**
Assets						
Cash	1,605,000	11,791,162	22,318,324	33,140,711	43,668,908	53,888,206
Vehicles	26,000,000	24,526,667	23,053,334	21,580,001	20,106,668	18,633,335
Machines	1,395,000	1,116,000	837,000	558,000	279,000	0
Office Equipments	1,000,000	800,000	600,000	400,000	200,000	0
Building	2,000,000	1,900,000	1,800,000	1,700,000	1,600,000	1,500,000
Land	8,000,000	8,000,000	8,000,000	8,000,000	8,000,000	8,000,000
Total Asset	40.000.000	48.133.829	56.608.658	65.378.712	73.854.576	82.021.541
Liabilities						
Loan	0	0	0	0	0	0
Capital	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000
Accumulated Profit (Lost)	0	8,133,829	16,608,658	25,378,712	33,854,576	42,021,541
Total Liabilities	40.000.000	48.133.829	56.608.658	65.378.712	73.854.576	82.021.541

Table 6.11: Balance Sheet

6.8 Conclusion

For the proposed bus transit service project, the incomes are from 2 major sources which are bus fare and advertisement fees. The cost of the project can be divided into fixed cost and variable cost. For fixed costs, the major expense is the purchase of the bus which 13 of them are needed. Other fixed costs are land, building, machines, equipment and etc. The major variable costs are those associate with the salary of all personnel involve in this operation. Other variable costs are such as fuel cost, maintenance cost, training cost, insurance, overhead costs, and etc.

Sensitivity analysis is conducted to determine the minimum number of passenger per day that would guarantee the survival of the project. The result shows that if there were less than 2,013 passengers per day the operation would go into bankruptcy. However, it is not likely that the number of passenger per day would be less than 2,013 passengers. Currently the CMB route2 has, on average, 3,000 passengers per day. Observing the estimated demand from program Tranplan, the selected route9 has higher estimated demand than the CMB route2. Therefore, if the bus actually operates on route9, the number of passenger per day should be higher than 3,000 passengers. Another two reasons to support the claim are that the bus operation on route9 runs more frequent and route9 passes through more active points and important business districts than the CMB route2.

The income estimation of the proposed project is determined by find the percentage of actual number of passenger per day to the estimated demand from Saowapol and Therarattanaket of the CMB route2. Assuming that the number of passenger would follow the same trend, therefore the percentage is used to determine the proposed project's estimated number of passengers per day. However, the financial analysis is only used to show that the proposed project is feasible with number of passenger of just over 3,000 per day.

The number from financial analysis shows that not only the proposed bus project would survive, but it also generates good sum of profit. Whether or not that amount of profit would attract the private investor is depending on their judgment.