A Social Impact Assessment using a SWOT-Based Framework to Determine the Factors for Free Train Transportation in Thailand

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Abstract

The study analysed the social return on investment and the development of measures to reduce the cost of living of Thai rail passengers by providing free or reduced fares to various train transportation passenger segments. The study surveyed 1,768 individuals through use of a social impact assessment analysis as well as a SWOT model with the aim at reducing social exclusion of rail transportation passengers. Implementation problems included lack of government planning and budgeting in line with the actual conditions as well as lack of a social impact assessment and a social return on investment analysis. Educational performance and service quality also contributed to a moderate rating outcome regarding stakeholder satisfaction with the proposed measures. Data analysis from the Return on Investment and Social Return on Investment modeling suggested that both free, 3rd-class passenger transportation or a limited and selected passenger segment for free or reduced fares did not meet the criteria for government investment and subsidies as all factors were less than '1' as the present

free system had a ROI of -0.822 and a SROI of 0.1545. Free travel for a select group as well as 50% discounts had a ROI of -0.8184 and a SROI of 0.1136.

Keywords: Cost reduction; ROI; SROI; SRT; State Railway of Thailand

Introduction

Transportation planning revolves around the idea that the motivation for people to travel lies in the desire to reach a destination (Berke et al., 2006). Providing easy access to those destinations and improving how people get there dominate transportation planning theory which is best described by the dynamics of mobility and accessibility. Affordable transportation plays an important role in providing many low-income individuals with their means to reliably travel to work and other needed destinations. Transportation affordability can be interpreted in terms of its impact beyond the actual cost of a specific ride. These items can include accessibility, time savings, program administration costs, government subsidies and comfort also influence affordability. Unfortunately due to Bangkok's urban jungle, these components have become harder and more expensive to obtain.

During the 1980's Bangkok's population increased from 8 million to almost 16 million (including those who migrate from the other areas throughout the country, and are not registeredas Bangkok's citizens), a 50 percent increase that has produced some of the most severe traffic congestion and related air pollution problems of any city in the world (Therakomen, 2001).

This is consistent with the Dutch firm Tom Tom's 2016 study which concluded that Bangkok is now second only to Mexico City in overall traffic congestion with Bangkok's traffic moving 57% slower on average compared with a clear road situation. During morning peak hours, it slows to a further 85%, and a snail-like 114% in the evening. Also, according to the United Nations World Health Organization (UNWHO, 2015) Thailand in 2015 acquired the second-highest road-fatality rate in the world due to a lack of key safety standards and poor enforcement of laws already on the books.

Another component in the equation of societal and economic impact is the number of vehicles on Bangkok roads. On October 31, 2012 the Office of Transport and Traffic Policy and Planning stated that there were 7,384,934 registered vehicles in Greater Bangkok which were

growing at a rate of 1,536 vehicles per day along with 1,272 motorcycle registrations per day (The Nation, 2012). This subsequent traffic congestion and gridlock is therefore contributing to a loss in national GDP which according to an earlier 1996 study was responsible for a 2.1 percent drop in Gross Domestic Product (GDP) (ESCAP, 2007).

The Express and Rapid Transit Authority of Thailand also estimates that commute time now accounts for about one-quarter of the time spent at work with resulting negative effects on business efficiency and productivity (Therakomen, 2001). The economic impacts of congestion, when combined with the increasing health impacts from lead-related exhaust pollution, are increasingly showing that Bangkok needs to take specific actions to address its growing traffic congestion problems.

One possible solution is to study is how Thailand's aged state railway system can be brought into the modern era while serving the stated social objectives of the state run enterprise. Today, according to the State Railway of Thailand's (SRT) most recent, publicly available action plan, the SRT indicates that railway transport services should be used in 'social action' and exists for the common good of the people and the country and should have 'low prices' combined with 'efficient government' (SRT, 2013).

'Low prices' or transportation affordability has been defined in Canada as costing low- and medium-income families less than 20 percent of household budgets and less than 45 percent of housing and transportation costs combined (Litman, 2010). An American study stated that low-wage earners spent an average of 57 percent of income on combined housing and transportation costs, with the average amount spent on transportation slightly higher than that spent on housing (29% vs. 28%) (Lipman, 2006).

In Thailand, there are presently 44 million passengers annually who use the State Railway of Thailand (SRT) (Ganjanakhundee, 2016) which is estimated to be 5.72% of the total Thai public transportation users (Tansawat et al., 2015). These same SRT rail users have been reported to have an average monthly income of 7,240 THB ($US 206) (Tansawat

et al., 2015). Compared to the current Thai minimum wage of 300 THB a day ($US 8.55), one can quickly see that the rich are not traveling by train in Thailand. These numbers however are a huge drop from the peak of 88 million per year reported in 1994 (Ganjanakhundee, 2016) with SRT still experiencing declining passenger numbers due to its life expired infrastructure and equipment which means that with the necessary widespread safety speed restrictions, it is uncompetitive against other modes (ADB, 2014). As the SRT generates 65 percent of its revenue from passenger traffic, this could be a significant problem moving forward with year to year declines in total passenger numbers (ADB, 2014).

In Thailand, a free train policy was implemented by the Thai government and the State Railway of Thailand (SRT) on August 1, 2008 to provide an alternative form of public transportation for low-incomecitizens as well as to promote train transportation (Tansawat et al., 2015). Today, there are a total of 164 PSO (Public Service Organization) trains that offer "free" tickets as well as 8 commercial trains that also have coaches that offer "free" tickets (ADB, 2014). This is a six-month program of offering free travel that has regularly been extended for a further six-month period. The free train policy covers 30 lines to the north, 36 to the north-east, 30 to the east, 42 Maeklong-local lines, and 34 lines to the south and the west (Tansawat, 2015).

In the following year, on January 20th2009,the Thai Cabinet resolved to implement several tax measures for economic stimulus including cost-of-living measures that were intended to increase the Thai people's income including support to SME (Small Medium Enterprises) operators as well as community enterprises (Fiscal Policy Office, 2009).Later in the same year, the Thai National Economic and Social Development Board (NESDB) confirmed extending the earlier government's cost of living measures to commuters and passengers and continued offering free train transportation for third-class rail transport because it was deemed more beneficial than the alternatively proposed free tap water and free consumer electricity (NNN-TNA, 2009).

Moving quickly forward to 2016, the idea of free bus and train rides continues living by 6-month extension to 6-month extension with officials in 2016 still discussing what constitutes 'low income earners' (ThaiPBS, 2015c). Current discussions still anticipate free bus and free train ridership but restrictions will apply. Participants will be limited to senior citizens (60 years or older), war veterans, monks, nuns, and the handicapped as well as children and students under 14 years old.Half price fares will be available for students over 14 years old, the unemployed, and low-income earners, whose definition and income level has increased from the proposed 2,422 baht a month in 2011 to a higher 3,632 baht a month in 2015 (ThaiPBS, 2015b).

The cost of free bus and rail passenger programs started in 2008 by Prime MinisterSamak Sundaravejhas been estimated by the Thai government at over 24 billion THB ($US 684 million). In 2015, 2.1 billion THB ($US 60 million) a year was budgeted into 2016, which breaks down to 1.58 billion THB for free commuter bus transportation and 524 million THB ($US 15 million) for free, 3rd class train service for 44 million passengers a year on 172 trains a day running on both suburban and long haul routes (ThaiPBS, 2015c).

As with any populist, long running program serving the poor and disadvantaged, 'pulling the plug' is hard to do as witnessed by the years of extensions from stated cancellation dates. The program and its surrounding issues are sensitive and include (but not limited to) traffic management problems, service quality, educational performance, mounting financial losses, and operational transparency. There has also been considerable debate about the programs worth from academics, government officials and the public.

In this light, the researchers would like to note the following table compiled by the Organisation for Economic Co-operation and Development (OECD) concerning Thailand's household expenditures for student education and transportation (OECD, 2009). What one is immediately struck by in the table is the transport cost for public school students. For lower and upper secondary public school students (junior

and senior high school) we see that transport costs represent the majority of a student's educational cost. Even in private schools, it represents a significant percentage of the total costs.

Table 1: Thai Household Education Expenditure by Education Levels and School Type (2009) (Average THB per head per year).

	Private School				Public School			
	Tultion Fees	**Uniform**	**Books and equipment**	**Transport**	**Tultion Fees**	**Uniform**	**Books and equipment**	**Transport**
Pre-primary	8703	980	823	3612	1546	708	456	2317
Primary	11031	1315	1454	4794	1976	880	761	2837
Lower Secondary	10894	1507	1600	5022	2562	1139	1122	3580
Upper Secaondary	23643	1430	1809	5898	4615	1238	1416	3927
Vocational	12604	1770	2303	6578	4565	1443	1528	4645
Tertiar	37683	1978	3346	8510	14461	1636	2459	6231
Informal Education	2426	692	559	2418	-	-	-	-
Total	**13824**	**1272**	**1500**	**5052**	**5120**	**970**	**973**	**3533**

Source: OECD, 2009-Development Centre`s calculation based on Socio-Economic Survey (SES) data and National Statistical Office (NSO).

The Thai Ministry of Transport understands meeting government objectives while discussing possible solutions to continuing losses is a sensitive issue. It is also an issue with significant societal implications as stated above, as total riders and trips per month are measured in the millions. Therefore, the researchers understanding the importance this issue to Thailand's capital train commuters and passengers and have undertaken the following study to measure the economic impact of a program in which rider's cost of living is reduced by allowing free rail transportation.

Research Purpose

The goal of this research was to develop a strategic assessment framework, so different strategic planning methods were considered as a

foundation for the framework. From the research it was determined that a SWOT analysis is an accepted and commonly used tool for strategic planning (Barrella, 2012). SWOT was therefore selected for the SRT study as the framework's foundation in part because of the familiarity that SRT staff have with SWOT and the intuitiveness of the conceptual framework.

Population and Sample

Simple random sampling was used to select the study's 1,768 survey respondents as it is the most appropriate form of sampling when the entire population from which the sample is taken is homogeneous (Moore and McCabe, 2006). From the 1,768 total, 1,262 were 3rd class, free train passengers, 64 were SRT staff and the remaining 442 were individuals who had never ridden the train but were tax paying Thai citizens.

SRT commuters/passengers assessing barriers to implementation of support measures to reduce the cost of living and travel by train for free was accomplished via a SWOT Analysis to highlight the strengths and weaknesses or what the problem is in the implementation which was adopted so it covered internal and external situations/environments (Kotler, 2003). Furthermore, a social impact assessment (SIA) and social return on investment (SROI) was conducted (MacDonald, 2013).

Data Collection

The exploratory study analyzed the issues concerning lowering the cost of living of Thai commuters/passengers and their satisfaction on the measures to reduce or even eliminate consumer transportation expenses, thus reducing the cost of living. Additionally, barriers to free transportation was studied through use of a SWOT Analysis by the Ministry of Transport to highlight strengths and weaknesses, opportunities and threats or anything else that might hinder the program's operation (Sputnic, n.d). Academics, service providers and administrators participated in the SWOT analyses which can be used in a multitude of situations and based on different data sets.

Furthermore, the data synthesis was developed in a comprehensive manner which ensured inclusion of significant knowledge and the available information assembled from numerous sources, including a number of public transportation agencies, both foreign and domestic.

A topic panel of seven experts in the subject area was established to guide the researchers in organizing and evaluating the collected data, and to review the final synthesis report which included experts in transportation system design, engineering and business manage mentor economics. This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation.

Research Instruments

1. In depth Interviews

In depth interviews were divided into three groups of comments:

Group 1: This group thought it best to cancel the idea of providing free SRT rail services.

Group 2: This group felt appropriate measures should be implemented.

Group 3: This group felt the SRT's directors should implement free rail service measures and add even more basic services.

2. Qualitative Research-Focus Group Input

As early as the 1920s, focus groups were used in qualitative research, experiencing up and downs in use during WWII and afterwards. It wasn't until 1987 however, that the first full length focus group text book for marketers was published (Goldman and MacDonald, 1987). With this recognition, focus groups became an increasingly well-known method for collecting qualitative data in all fields of research. Therefore, the researchers also conducted focus groups along with a brainstorming seminar from all the relevant study's sectors.

3. SWOT Analysis

SWOT analysis is an acronym for *strengths, weaknesses, opportunities* and *strengths* which is a powerful strategic management and planning tool. The technique is credited to Albert Humphrey who led a group at the Stanford Research Institute in the 1960s and 1970s using data from Fortune 500 companies (Humphrey, 2005) to:

3.1 help an organization to identify its core competencies;

3.2 help an organization to focus on the future given its past and present condition;

3.3 enable an organization to make a U-turn from its weaknesses;

3.4 help an organization build its strengths;

3.5 points to the opportunities that an organization can maximize to reap maximum gains;

3.6 Be used as a source of strategic planning as well as marketing; and

3.7 Help the organization to redefine and set its overall objectives.

4. Social Return on Investment (SROI)

SROI is a method developed to measure the social and environmental impact of activities, projects, programs and policies and put a monetary value on them. SROI was developed from social accounting and cost-benefit analysis and measures change in ways that are relevant to the people or organizations that experience or contribute to it by measuring social, environmental and economic outcomes by use of monetary values to represent them. It also tends to look at the wider benefits to society such as a scheme aimed at helping the unemployed back into work might consider the gain to the individual (net salary minus any reduction in benefits) and to the state (gain in taxes and reduced expenditure on benefits) (MacDonald, 2013).

This enables a ratio of benefits to costs to be calculated. For example, a ratio of 3:1 indicates that an investment of $1 delivers $3 of social value. In the same way that a business plan contains much more information than the financial projections, SROI is much more than just a number.

It is a story about change, on which to base decisions, that includes case studies, qualitative, quantitative and financial information. SROI was developed from social accounting and cost-benefit analysis and is based on seven principles (Nicholls et al., 2012):

4.1 Involve the Stakeholders

4.2 Understand implementation changes

4.3 Value the things that matter

4.4 Only include what is material

4.5 Do not over-claim

4.6 Transparency

4.7 Results verification

There are two types of SROI; evaluative, which is conducted retrospectively and based on actual outcomes that have already taken place and forecast, which predicts how much social value will be created if the activities meet their intended outcomes.

As the SRT has been running for some time it was decided that this SRT analysis should be an evaluative one. It has been undertaken both as in internal exercise but also to demonstrate to current and potential funders the value that investment in SRT gives, and to enable them to put a financial figure against some of the crucial but hard-to-measure "soft" indicators.

It should be noted, however, that in a retrospective study when the need for gaining certain baseline information was not known at the beginning of the project, not all the information that you might wish for is available. For example, there is no written record of what people actually felt like before the service was introduced, or the impact that the lack of service had on their families. A key learning action from this process is that it is essential to keep good monitoring and evaluation records to enable future SROIs or other evaluations to be carried out as effectively as possible. However, in the case of SRT there is significant anecdotal information and other extensive material gathered by SRT to help with the SROI which can give confidence that the assessments are valid and valuable.

5. NPV (net present value)

Comparing the value of money now with the value of money in the future is done through the process of net present value (NPV) with the two most-used measures for evaluating an investment being the net present value and the internal rate of return(IRR) (Gallo, 2014), where NPV represents the relationship between a project's expected cash flow and the cost of capital (Griff, 2014).

NPV also compares the value of a unit of money today versus the value of the same unit in the future, after taking inflation and return into account. NPV is primarily used to analyze the profitability of an investment or project and is sensitive to the reliability of future cash inflows that an investment or project will yield. NPV and cost of capital can help assess potential external investments which represent the present value of the cash flows at the required rate of return of a project compared to an initial investment (Berman et al., 2013).

In practical terms, it's a method of calculating a return on investment (ROI), for a project or expenditure. When a manager needs to compare projects and decide which ones to pursue, there are generally three options available: internal rate of return, payback method, and net present value.

NPV is the tool of choice for most financial analysts for two main reasons which is; NPV considers the time value of money, translating future cash flows into today's money units and two, it provides a concrete number that managers can use to easily compare an initial outlay of cash against the present value of the return (Berman et al., 2013).

Using an organization's cost of capital; the net present value is the sum of the discounted cash flows minus the original investment. Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. NPV is used by organization's capital budgeting to analyze the profitability of a projected investment or project.

The following is one formula for calculating NPV: $NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_o$

where; Ct = net cash inflow during the period t, Co = total initial investment costs, r = discount rate and t = number of time periods.

A positive net present value indicates that the projected earnings generated by a project or investment (in present dollars) exceed the anticipated costs (also in present dollars). Generally, an investment with a positive NPV will be a profitable one and one with a negative NPV will result in a net loss. This concept is the basis for the Net Present Value Rate, which dictates that the only investments that should be made are those with positive NPV values.

Data and Content Analysis

The ROI and SROI formulas below were used for content analysis and stakeholder satisfaction analysis with the stated objective of reducing the cost of living of SRT rail passengers.

$$\text{ROI} = \frac{\text{gains from investment - investment costs}}{\text{cost of investments}}$$

$$\text{SROI} = \frac{\text{the present value of all benefits}}{\text{the present value of the total investment}}$$

Results

1. The study has identified the following problems and obstacles in the implementation of the proposed measures:

1.1. Education issues and the difficulties in the implementation of the support measures.

1.2. The cost of living and free train travel period.

1.3. The lack of planning and budgeting in line with the actual conditions.

1.4. Lack of education performance.

1.5. Lack of social impact assessment (SIA).

1.6. Lack of an analysis of social returns on the proposed investments (SROI).

1.7. Lack of service quality.

2. The study‘s research concerning project stakeholder satisfaction with the proposed measures was deemed as ‘moderate’. Table 2 below shows the SWOT analysis of the proposed measures.

Table 2: SWOT analysis of measures to reduce Thai rail passenger's cost of living

Strength	Weakness
- The Thai government has both the authority and mechanism to support the implementation of measures to meet SRT goals and provide financial support. - The SRT is a state enterprise which specializes in transportation systems. - The SRT operates in cooperation with other government agencies including the Ministry of Transport, the Ministry of Finance, theDepartment of Energy, the National Economic and Social Development Board (NESDB) and others.	- The agency responsible for the operation lacks the motivation to do the job which may be due to the uncertainty of the project, the period of operation, or the delay of the budget, all making it difficult to plan for those involved. - SRT lacks an effective monitoring, evaluation and implementation system for projects. Past projects lacked research and development and proper analysis of the project. Additionally, there has been a lack of Social Impact Assessments (SIA), return on investment (ROI) analysis of social rewards (SROI) and the study of measures used in foreign countries. - Increasing service and administrative staff is difficult due to policy staffing limitations. New hires cannot exceed 5 percent of those who retire which contributes to the inability of SRT to check passengers for tickets leading to inaccurate passenger counts. - As passenger usage has increased, new and modern passenger cars have been added slowly not meeting passenger demands for comfort.
Opportunity	**Threat**
- Public policy is a political opportunity for the government. - Creating a policy where all Thai citizens have access to the service. - By reducing the cost of living, consumers will have greater buying opportunity creating economic stimulus and a cause-driven economy. - Creating policies that help alleviate traffic congestion while also helping eliminate environmental issues.	- Thailand's budget is limited and the government may lose the opportunity to develop the country's infrastructure.

3. Table 3 shows the analysis of the return on investment (ROI) of the proposed measures.

Table 3: ROI calculations for free rail transportation for all passengers with no restrictions

Fiscal year	Government budgetary support (Benefit investment) (THB)	Investment (THB)	ROI [(Benefit - cost) / cost]
2009	978,925,333.33	5,091,323,329.64	- 0.808
2010	1,026,083,000.00	5,421,719,877.83	- 0.811
2011	1,032,013,461.54	5,892,989,675.73	- 0.825
2012	923,481,538.46	5,897,658,134.39	- 0.843
Total	3,960,503,333.33	22,303,691,017.59	- 0.822 (Average)

$$\text{ROI} = \frac{\text{gaints from invesment - investment costs}}{\text{cost of investments}}$$

$$= \frac{3{,}960{,}503{,}333.33 - 22{,}303{,}691{,}017.59}{22{,}303{,}691{,}017.59}$$

$$= -0.822$$

The study's ROI for the years 2009-2012 was indicated at - 0.822 which is less than the 'one'. If the ROI is positive, the benefits exceed the costs and the investment should be considered. A negative ROI means that the costs outweigh the benefits which are therefore not a good investment.

4. Table 4 shows the analysis of the social return on investment (SROI) of the proposed measures.

Table 4: SROI calculations for free rail transportation for all passengers with no restrictions

Stakeholders	Total Annual X (1+Drop-off)	Total value 1-5 years	NPV
Primary, secondary and university students	140,903,774	704,518,868	645,298,025
Independent contractors	351,374,243	1,756,871,214	1,609,191,145
Enterprise/company employees and civil servants	101,279,240	506,396,202	463,829,265
Entrepreneurs and small business owners	54,102,158	270,510,792	247,772,043
Unemployed	47,717,490	238,587,449	218,532,131
Domestic servants	15,148,604	75,743,022	69,376,172
Disabled	4,760,990	23,804,950	21,803,940
interest			3,275,802,721
investment		29,603,331,169	21,200,696,494

NPV- See above discussion.

$$\text{SROI} = \frac{\text{The present calue of all benefits}}{\text{The present value of the totai investment}}$$

$$= \frac{3,275,802,721}{21,200,696,494}$$

$$= 0.1545$$

The study's SROI for the years 2009-2012 as calculated by NPV was indicated at 0.1545. An SROI less than '1' indicates that free rail travel has minimum societal value and therefore should not be supported by government subsidies. Table 5 therefore shows the calculations for specific groups who have been targeted for free or reduced rail transportation fares.

Table 5: ROI calculations for free and reduced fare rail transportation for selected passenger segments

Group	Stakeholders	Interest	Investment
Free transportation	Disabled	86,256.24	474,886.68
	Senior citizens (60 years or older)	97,162.20	534,929.83
	Children	67,914.40	373,905.03
	Veterans, monks, and nuns	1,982.90	10,916.94
50% discount	Students	465,982.00	2,565,479.79
	Passengers with low income	1,562,774.73	8,603,909.61
	Unemployed	55,769.12	307,038.80
No discounts	Passengers earning more than the minimum daily wage	0	0
Total	Interest		2,337,841.59
	Investment		12,871,066.68

$$\text{ROI} = \frac{\text{gains from investment - investment costs}}{\text{cost of investments}}$$

$$= \frac{2{,}337{,}841.59 - 12{,}871{,}066.68}{12{,}871{,}066.68}$$

$$= -0.8184$$

The study's ROI for the years 2009-2012 was indicated in Table 4 at -0.8184 which is less than the 'one'. If the ROI is positive, the benefits exceed the costs and the investment should be considered. A negative ROI indicates that the costs outweigh the benefits, which is therefore not perceived as a good investment. Table 6 below continues the analysis of the same group from Table 5 but calculated for SROI.

Table 6: SROI calculations for free and reduced fare rail transportation for selected passenger segments

Group	Stakeholders	Total Annual X (1+Drop-off)	Total value 1-5 year	NPV
Free transportation	Disabled	13,455,974	67,279,869	61,624,420
	Senior citizens 60 years or older)	15,157,304	75,786,519	69,416,013
	Children	10,594,646	52,973,230	48,520,376
	Veterans, monks, and nuns	309,333	1,546,664	1,416,653
50% discount	Students	72,606,981	363,034,905	332,518,712
	Passengers with low income	243,792,857	1,218,964,287	1,116,499,901
	Unemployed	87,185,415	435,927,074	399,283,671
No discounts	Passengers earning more than the minimum daily wage	0	0	0
Total	interest			2,029,279,746
	Investment		24,941,997,977	17,862,440,075

NPV- See above discussion.

$$\text{SROI} = \frac{\text{The value of all benefits}}{\text{The value of the total investment}}$$

$$= \frac{2,029,279,746}{17,862,440,075}$$

$$= 0.1136$$

The study's ROI for the years 2009-2012 was indicated in Table 5 at 0.1136 which is less than the 'one'. If the ROI is positive, the benefits exceed the costs and the investment should be considered. A negative ROI indicates that the costs outweigh the benefits, which is therefore not perceived as a good investment.

Discussion

The feasibility study on the implementation of support measures to provide free or limited subsidized passenger rail services within the State Railway of Thailand system and thus reduce the cost of living by Thai rail

passengers determined that numerous hurdles needed to be overcome for a successfully implemented plan.

1. SRT Cost of Living Reduction Measure Implementation Hurdles

These obstacles included (but were not limited to) educational performance of the management and staff, implementation difficulty and politics, and lack of government planning and budgeting in line with actual conditions. One factor that was considered for what might be considered 'apathy' is the fact that since the program's inception in 2008, it has been up for renewal every six months, leaving the impression with many of its 'unimportance'.

According to a 2015 report by the Thai Public Service Grants Committee, the SRT was also stated to need to urgently improve its basic structure and service quality; especially cleanness, safety and punctuality of its services (The Nation, 2015).

Furthermore, customer satisfaction concerning SRT services was below the stated goal of 14.9 percent with the main negative expressed in an ADB SRT station survey indicating train punctuality and delays being the largest factor in customer satisfaction (ADB, 2014). These external findings are consistent with this study's conclusions and the 'moderate' customer satisfaction rating from the surveyed stakeholders. This is also consistent with Kotler (2003) which defined satisfaction as: "a person's feelings of pleasure or disappointment resulting from comparing a product perceived performance (or outcome) in relation to his or her expectations".

2. SRT PSO Reimbursement Problems

The current SRT PSO reimbursement procedure works very much as a subsidy mechanism requiring SRT to apply for support based on forecast financial information and traffic statistics. The procedure requires very detailed financial data by service, which to a great extent is beyond the accounting system of SRT to provide (ADB, 2014). This system is not satisfactory to either SRT or the MOF (Ministry of Finance) as it provides SRT with less than full reimbursement for losses incurred causing

further internal cross subsidies within SRT to cover these losses as show in Table 7 below.

Table 7: PSO Mechanism – Requests and Payments (million baht) (ADB, 2014)

	2010	2011	2012	2013	2014
Requested PSO	3,717.41	3,795.70	4,159.23	4,530.54	4,851.30
Thai Government Agreed	2,355.00	2,285.42	2,350.00	2,497.00	2,436.00
Variance	1,362.41	1,510.28	1,809.23	2,033.54	2,415.30
Percentage	63.35	40.21	56.50	55.11	50.21

Source: SRT of Thailand.

According to SRT the PSO system does not fully cover the losses incurred in running the ordinary, Bangkok Commuter, local commuter and mixed PSO services. From the perspective of MOF however, the PSO system may not be achieving their social objective of increasing people's mobility as many of the PSO services are operating with few passengers as in 2012, 65 out of 164 PSO trains being operated had less than a 40% load factor, with ridership declining each year. This is at a time when PSO services are presently offered free to the public as part of the Thai Government's free train policy (ADB, 2014).

3. Congestion vs Productivity

Free or subsidized rail service however can help offset the drain on a nation's production efficiency and GDP by relieving traffic congestion which can be a significant drain on a metropolitan area's economy as goods and people are held in gridlock with little production (other than petrol consumption) being achieved. According to a 1996 study, traffic congestion in Bangkok contributed to a 2.1 percent drop in Gross Domestic Product (GDP) (ESCAP, 2007) but with the dramatic growth in Bangkok passenger cars in recent years, newer World Bank studies indicate this has increased to six percent (Willoughby, 2000) with 36.07% of an average

driver's travel time in Bangkok spent in idling mode (ThaiPBS, 2015a). This could be a powerful justification for moving people from private transport to public transport such as rail transportation to revitalize a stalled economy.

4. SRT ROI and SROI Analysis

As part of the study's research it was discovered that passengers travel predominately in 3rd class trains, making up 82% of the total passengers (ADB, 2014) with the primary objective of travel stated to be to return 'home'. As the SRT obtains 65 percent of its revenue from paying passengers, the end result is that 18 percent of SRT's total passengers shoulder the burden of supporting the majority of SRT's revenue stream, as freight services represents only 35 percent of the total, excluding the PSO government reimbursements and subsidies.

In this environment ROI and SROI calculations were used to develop criteria to access whether government investment and subsidies were justified. Data analysis from the Return on Investment and Social Return on Investment modeling suggested that both free, 3rd-class passenger transportation or a limited and selected passenger segment for free or reduced fares did not meet the criteria for government investment and subsidies as all factors were less than '1' as the present free system which has existed since 2008 had a ROI of -0.822 and a SROI of 0.1545. For the proposed future measures of limiting free travel to a select group as well as 50% discounts, had a ROI of -0.8184 and a SROI of 0.1136.

The proposed new measures included participants who are senior citizens (60 years or older), war veterans, monks, nuns, and the handicapped as well as children and students under 14 years old. Half price fares are reserved for students over 14 years old, the unemployed, and low-income earners, whose definition and income level has increased from the proposed 2,422 baht a month in 2011 to a higher 3,632 baht a month in 2015 (ThaiPBS, 2015b).

5. Thai SRT SWOT and SAI Analysis

At the time of this study there was a lack of a social impact assessment which could help SRT and government officials determine the social returns of the proposed measures for either free 3rd class rail passenger travel or the impact of a hybrid, free/discounted fare program, which included a plan detailing the overall investment and benefits. This study therefore undertook several methodologies to analyze the problems and obstacles in the implementation of the proposed support measures to reduce the government mandated objective of reducing the cost of living by providing either free or discounted passenger rail service.

A scan of the internal and external environment is an important part of any strategic planning process with environmental factors internal to the enterprise usually classified as strengths (*S*) or weaknesses (*W*), and those external to the enterprise classified as opportunities (*O*) or threats (*T*) (Babatunde and Adebisi, 2012). Such an analysis of the strategic environment is referred to as a SWOT analysis.

The results of the SRT SWOT analysis found that providing free or reduced fares as a mechanism to reduce passenger cost of living expenses had major strengths such as existing mechanisms for implementation, agencies and expertise to support the implementation of the measures as well as an existing network of cooperation with the relevant authorities.

Weaknesses however included SRT's lack of motivation to do the job which may be due to the uncertainty and period of operation of the project (6-month renewal periods since program inception), lengthy delays in the reimbursement process and the significant difference between requested funds and those that are received (50 percent of higher). All these crucial components make it very difficult to plan for those involved.

Increasing service and administrative staff is also difficult due to policy staffing limitations wherein new hires cannot exceed 5 percent of those who retire which contributes to the inability of SRT to check

passengers for tickets leading to inaccurate passenger counts, and thus a further revenue reimbursement increase for the free services provided to 85 percent of SRT's total passengers.

Recommendations

1. According to the 2014 Asian Development Bank study, the SRT should "provide rail passenger services in Thailand on specified routes meeting the standards of service mandated by the government and the market, consistent with safety and operational efficiency within the levels of the PSO subsidy" (ADB, 2014).

2. Further research needs to be collected from foreign transportation systems to be used as a comparative tool to evaluate SRT's strategic planning mechanisms and implementation policies.

3. Investigation should be given to the SRT's management measures of quality.

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