The 5th International Conference on
Sustainable Future for Human Security (SUSTAIN) 2014
Sanur Paradise Plaza Hotel & Suites, Bali, INDONESIA
Bali, November 19 – 21, 2014

BE02:

A PRELIMINARY STUDY OF SUSTAINABLE TRANSPORT INDICATORS IN MALAYSIA:

The Case Study of Klang Valley Public Transportation.

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RESEARCH BACKGROUND

SUSTAINABLE PUBLIC TRANSPORT INDICATORS

- public transport share in developed countries has increased [22,3,28,15].
- i.e: Seoul (65.1% mode share of bus and rail in 2011 compared to 60.3% in 2010)
- single authority to plan, develop, construct, manage and oversee the operations [25].
- However, very limited review on the measures of sustainability of these systems

RESEARCH OBJECTIVES

1. To explore and investigate the current public transportation system and services provided in Klang Valley
2. To identify and select the most suited indicators of public transport sustainability in Klang Valley

INTRODUCTION
Sustainable Transportation

- measures of sustainability have been adopted and implemented on various landuses or centre of population's activity [1,26,4,31]

Country	Sustainable Transport Measure
UK	Modal share, ridership[17].
Germany, France, Austria, Switzerland	Level of Service (LOS), travel demand, ridership[5].
USA	Transit accessibility, transit affordability[30].
Japan	Transport policies framework under Ministry of Land, Infrastructure, Transport and Tourism (MLIT) [9].
Other Asian Nations	Sustainable Urban Mobility in Asia (SUMA) : access, safety, environment/clean air, economics and social . 75 have been formally short-listed to be adopted in Bangkok Declaration 2020 [29].

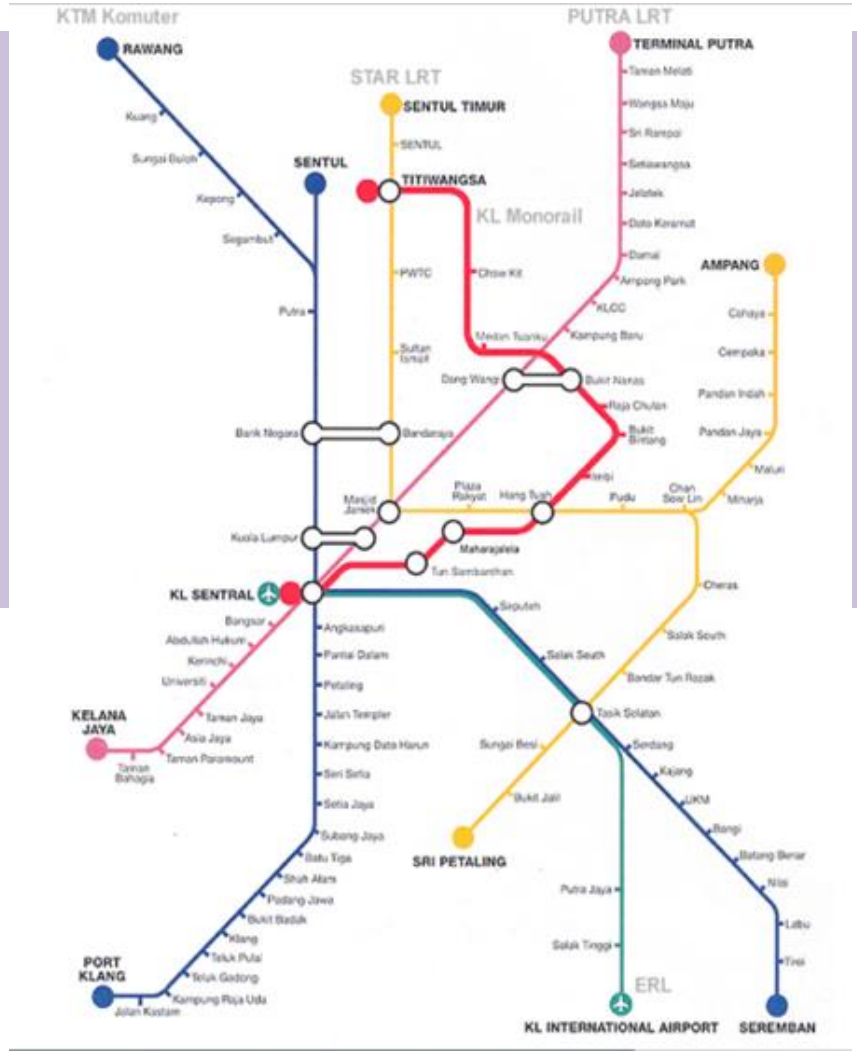
Table 1: Shortlisted Indicators

No	Indicator	No	Indicator	No	Indicator
1	% of bus passenger	11	CO2 emissions from road transport	21	Total expenditure on pollution prevention and clean-up
2	% of all trains passenger	12	N2O emissions from road transport	22	R&D expenditure on “eco-vehicles”
3	Total percapita transport expenditure	13	Use of renewable energy sources in transport (1000 tons/GDP)	23	R&D expenditure on clean transport fuels
4	Motor vehicle fuel prices	14	Average age of vehicle fleet (years)	24	Direct subsidies to transport
5	Excise duty on road transport fuel (petrol, diesel per 1000 litres)	15	Average commute travel time	25	Relative taxation of vehicles and vehicle use
6	% GDP contributed by transport	16	Mode split: portion of travel made by walking, cycling, rideshare, public transit and telework	26	Annual transit ridership per capita
7	Total length roads (railways, motorways) (km of infrastructure per 1000 inhabitants)	17	% of Single Occupancy Vehicle (SOV) Entering City Centre During Morning Peak Hour Period.	27	Miles of fixed-route bus service
8	Density of infrastructure (km of infrastructure per 1000 km² of surface area)	18	Ratio of Road Accident Cases Per 10,000 Populations.	28	Number of minutes between buses on scheduled routes
9	Employment in road and rail transport sector	19	Capital expenditure by mode	29	% who perceive public transit unsafe
10	PM10 emissions from road transport	20	Rail network length and density	30	Cost per transit-rider trip, inflation adjusted

Source: [6,20,16].

KLANG VALLEY PUBLIC TRANSPORTATION

Source: [8].
Figure 1: Klang Valley Region



Source: [14].
Figure 2: Kuala Lumpur Mass Transit rail-based network

CURRENT PUBLIC BUS SERVICES IN SELANGOR

Figure 3: The catchment area of public bus routes in Selangor State

Table 2: Bus Operators and Respective Fleet (if applicable) in Selangor, 2012.

Company/Operator	Fleet (Bus)	Operating Status
Ambang Jernih Sdn. Bhd.	1	Ceased operation
Pinggir Bandar Bus Line (M) Sdn. Bhd.	1	Ceased operation
Abdullah bin Nadi dan Rakan T/A Syarikat Kenderaan Lima Sepakat	2	Ceased operation
Airport Coach Sdn. Bhd.	2	Active
Sri Indah Jaya Sdn. Bhd.	27	Active
Tg Karang Transportation Sdn. Bhd.	-	Consolidated under Kenderaan Kelang Banting Berhad (KKBB)
Triton Commuter Sdn. Bhd.	40	Active
Permata Kiara Sdn.Bhd.	1	Ceased operation
The Kuala Selangor Omnibus Co Bhd	-	Consolidated under (KKBB)
Sri Theven Travel & Tours Sdn. Bhd.	6	Active
Bas Bakti Sdn. Bhd.	6	Operational as Syarikat Faro
Uptownace (M) Sdn.Bhd.	13	Active
GPB Corporation Sdn. Bhd.	20	Active
Gito Translink Travel Sdn. Bhd.	23	Active
Sepang Omnibus Co Sdn. Bhd.	7	Active
Syarikat Prasarana Negara Bhd. (RapidKL)	1632	Active
Seranas Sdn. Bhd.	30	Active
Wawasan Sutera Travel & Tours Sdn. Bhd.	32	Active
Kenderaan Klang Banting Berhad	176	Active
Metrobus Nationwide Sdn. Bhd.	327	Active
Total	2,346	

Source: [23].

RESEARCH METHODOLOGY AND PROCEDURE

SAMPLING UNIT

- Snowball-sampling
- The list of population: authorities related to transportation operators, managers, economists, planners, engineers, academician & related professionals.
- 500 samples
- very poor responses, with only 20% of rate of return.
- prominence, knowledge, experiences and expertise levels demonstrated by respondents.

SURVEY QUESTIONNAIRE

The survey form contained three sections:

Section A: respondent background
Section B: possible sustainable public transport indicator for Klang Valley
Section C: factor of developing sustainable public transport indicator

PROCEDURE

- First round of focus group survey
- List of population collected (address, phone no., email address)
- Face-to-face survey conducted (time constraint, limited enumerators, 15% from total responses)
- Snail-mail survey (costly, low rate of return, 20% from total response)
- E-survey at https://docs.google.com/forms/d/1nEIsCszP4GegWG8u3t3p_LYMvFX3C0rD6D-2RfyDQ9I/edit (low cost, easy,65% from total responses)

PASSENGER'S PROFILE DISTRIBUTION

	Variables	Frequency	Percentage (%)
1	Field of Expertise		
	Economic	11	11
	Road Engineering	7	7
	Environmental Planning	4	4
	Intelligent GIS/Transport System	8	8
	Medical Fitness for Road Safety	4	4
	Environmental Science and Natural Resource Planning	7	7
	Public Transport	4	4
	Railway Engineering	4	4
	Town Planning	28	28
	Traffic and Transport Engineering	8	8
	Transport Planning	15	15
2	Years of Experience		
	1-10 years	84	84
	11- 20 years	8	8
	21-30 years	8	8
3	Profession		
	Environmentalist	4	4
	Economist	15	15
	Socialist	7	7
	Planner	43	43
	Engineer	31	31

MEAN VALUE OF RATING ON SUSTAINABLE PUBLIC TRANSPORT INDICATOR FOR KLANG VALLEY

Relevant as Sustainable Public Transport Indicator for Klang Valley (4.00 to 4.99)			
No	Indicator	Mean	Rank
1	Mode split: portion of travel made by walking, cycling, rideshare, public transit and telework	4.5700	1
2	% of bus passengers	4.5400	2
3	Cost per transit-rider trip, inflation adjusted	4.4700	3
4	% of all trains passenger	4.3600	4
5	Number of minutes between buses on scheduled routes	4.3200	5
6	Miles of fixed-route bus service	4.2800	6
7	Motor vehicle fuel prices	4.2400	7
8	% of Single Occupancy Vehicle (SOV) Entering City Centre During Morning Peak Hour Period	4.2300	8
9	Average age of vehicle fleet (years)	4.2100	9
10	Total percapita transport expenditure	4.1500	10
11	Average commute travel time	4.1300	11
12	N2O emissions from road transport	4.1300	12
13	Total length of roads (railways, motorways) (km of infrastructure per 1000 inhabitants)	4.0900	13
14	Use of renewable energy sources in transport (1000 tons/GDP)	4.0700	14
15	% who perceive public transit unsafe	4.0600	15
16	CO2 emissions from road transport	4.0300	16
17	Capital expenditure by mode	4.0200	17

5	4	3	2	1
Most relevant	Relevant	Moderate	Irrelevant	Not Applicable

*Rating value given in the survey form

MEAN VALUE OF RATING ON SUSTAINABLE PUBLIC TRANSPORT INDICATOR FOR KLANG VALLEY (CONT.)

Moderate as Sustainable Public Transport Indicator for Klang Valley (3.00 to 3.99)			
No	Indicator	Mean	Rank
18	Annual transit ridership per capita	3.9700	18
19	Rail network length and density	3.9600	19
20	Density of infrastructure (km of infrastructure per 1000 km² of surface area)	3.9400	20
21	% GDP contributed by transport	3.9200	21
22	PM10 emissions from road transport	3.9100	22
23	R&D expenditure on "eco-vehicles"	3.8900	23
24	Direct subsidies to transport	3.8900	24
25	Total expenditure on pollution prevention and clean-up	3.8600	25
26	Employment in road and rail transport sector	3.8200	26
27	Ratio of Road Accident Cases Per 10,000 Populations.	3.6600	27
28	R&D expenditure on clean transport fuels	3.5000	28
29	Relative taxation of vehicles and vehicle use	3.4000	29
30	Excise duty on road transport fuel (petrol, diesel per 1000 litres)	3.3400	30

5	4	3	2	1
Most relevant	Relevant	Moderate	Irrelevant	Not Applicable

FACTOR INFLUENCING IN FORMULATION AND DEVELOPMENT OF SUSTAINABLE PUBLIC TRANSPORT INDICATOR FOR KLANG VALLEY

Factor	Mean Value
1. Health and Safety	4.5700
2. Travel Demand and Supply	4.5700
3. Finance and Economy	4.4600
4. Environmental Impact andPollution Prevention	4.3800
5. Physical Development	4.3800
6. Education and Public Participation	4.3700
7. New Technology and R&D	4.3400
8. Stakeholder Responsibility	4.1100
9. Land and Resources Used	4.0600

5	4	3	2	1
Most relevant	Relevant	Moderate	Irrelevant	Not Applicable

DISCUSSIONS AND CONCLUSION

ISSUES

- difficult to measure in implementation stage
- impractical in implementation stage
- require long timeframe of data collection in implementation stage
- require data obtained from more than one agencies in implementation stage
- indicators were deemed unsuitable and irrelevant to represent the measurement of sustainability of transportation in the country, generally, and Klang Valley, specifically

DISCUSSIONS AND CONCLUSION (CONT.)

SUMMARY OF FINDINGS

- The highest mean value for possible indicator is “Mode split: portion of travel made by walking, cycling, rideshare, public transit and telework”
- The lowest mean value for possible indicator is “Excise duty on road transport fuel (petrol, diesel per 1000 litres)”
- The highest mean value for factor of formulation and development of indicator is “health and safety”
- The lowest mean value for factor of formulation and development of indicator is “land and resources used”
- Mean value for indicators selection is between 3.3400 to 4.5700 (moderate to relevant)
- Mean value for factor of formulation and development of indicator is between 4.0600 to 4.5700 (relevant)

RECOMMENDATIONS

- the preliminary findings of the research are disseminated through another set of focus group discussion
- a pilot study conducted for validation and verification.
- to update the list of indicators with current development of sustainable public transport system
- evaluation of selected indicators should be continuously implemented
- the city region public transportation operation, management and structure must be supported with the mature and appropriate of sustainable public transport guidelines and standards, indicators and its evaluation process.

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THANK YOU