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Determining Strategy to Improve Tourism Transportation Services

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***Abstract*—In order to accelerate tourism development in Indonesia, the government has already running development program at 25 KSPN (Strategic Region of National Tourism Development), by huge investment on tourism transportation infrastructure. That investment causes the transportation cost become higher, meanwhile tourist want the transportation cost more accessible. In theoretical manner, tourism transportation will be more accessible if merged with public transport, whereas to unity both types are difficult causes they have different characteristic. For those need a sharp strategic to integrate both types. This research propose to find a simple method in determining strategy to improve public transportation services at once becoming more accessible tourism transportation. This research deed on public transportation at 6 KSPN, and analysis through inductive approach uses trajectory analysis, VOC, Crosstab analysis, and literatures. As result of this research, when will make public transport at once becoming tourism transport too, can be supported by: reduce waiting time at terminal or port, reduce VOC, reduce travel time, or other supported which can be converted base on travel time preference (Rp/hour) or distance travel preference (Rp/Km) to public transportation.**

Keywords: tourism transportation, public transport, trajectory, VOC, Crosstab, KSPN

I. INTRODUCTION

A. Background of the Research

The government regulation of Republic Indonesia, Number 50/2011 about National Tourist Masterplan Development for 2010-2025 has determined 25 KSPN (Kawasan Strategis Pariwisata Nasional/ Strategic Region of National Tourism Development) as regionalism reference for tourism development in Indonesia, and realized by supporting it with huge investment on transportation infrastructure [1]. Tourism activity almost depend on transportation availability, which can move many people, from one country to other countries, from an area to another, and from a location to other locations, and so on. Improving transportation services will push increasing tourism and in vice versa the growth of tourism industries will create new transportation demand to deserve tourism flow. Penelope said the tourist expenditure for transportation approximate to 21% as shown at figure 1 [2]. Decreasing tourism transportation cost as one of main key for tourism development [3]. It is in-line with 3 A Tourism Destination Development jargon (Attraction, Accessibility and Amenities), where the distance, time and cost factor are very influencing to the willingness of people to travelling [4]. It clearly that tourism activities interdependent with the Transportation System Infrastructure availability no Tourism without transportation [5]. Preparing especially tourism transportation need great investment, and the question: is the public transportation services network which has already available can be used too for tourism transportation? Even though that both type transportation have different characteristic.

B. Research Objectives

This research objective is to find a simple method which can be used to determine improvement strategy of the existing public transport at once as tourism transportation too, in order to decrease cost for providing especial tourism transportation.

Fig. 1. Percentages of the tourist expenditure.

C. Scope of Research

This research deed on public transportation at 6 KSPN, which potential to improve as tourism transportation operation. This research wished will become as considering material when will operate public transportation at once as tourism

transportation, which it will make tourist more accessible to reach tourism object, in short time and more accessible cost.

II. METHODOLOGY

A. *Basic Concept to Provide Tourist Transportation*

Base on the problem of tourist transportation services, Komain Kantawateera et al. said that provide special tourist transportation services is too expensive and not efficient [6]. So it will better to provide tourist transportation at once can be used by local people traveller for their daily activities, or improving existing public transportation [7], till proper to use as tourism transportation too, as shown at figure 2 Conceptual Framework of the Tourist Transportation Development.

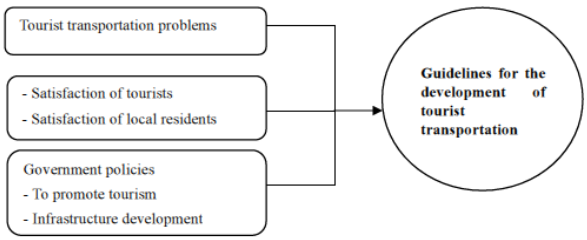

Fig. 2. Conceptual framework of the tourist transportation development [6].

B. *Steps of the Research*

In order to achieve this research objective, the method for research completion can be seen at figure 3.

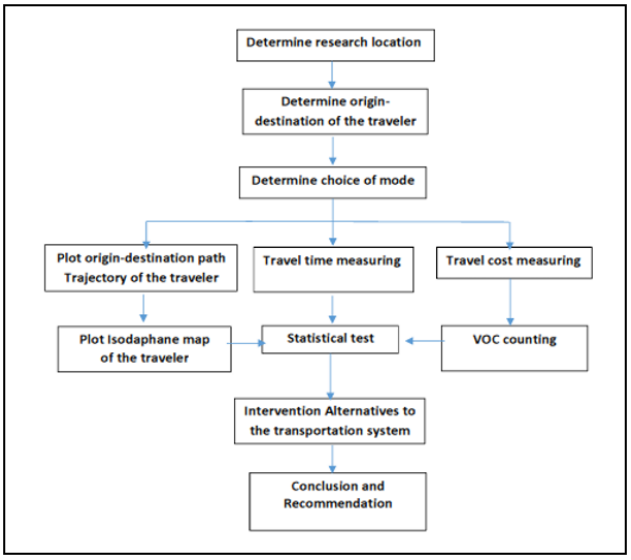

Fig. 3. Research completion steps.

III. RESULTS AND DISCUSSION

In this paper only showing 1 of 6 KSPN location have been researched, that is KSPN Lake Toba as an example. Next discussion suitable with the steps of research completion as showed at figure 3.

A. *Determine Research Location*

In this case will be delivered research result at KSPN Lake Toba in North Sumatera. There are 6 routes of public transport which can be used to reach KSPN Lake Toba, that are:

TABLE I. ROUTES OF PUBLIC TRANSPORT WHICH CAN BE USED TO REACH KSPN LAKE TOBA

No	Route	Time (Hour)	Cost (IDR)
1	Medan – Tebing Tinggi – Pematang Siantar- Parapat	5	80,000
2	Kutacane (Provinsi Aceh)- Kabanjahe – Tongging	5	60,000
3	Kutacane (Provinsi Aceh) – Sidikalang - Pangururan	4	45,000
4	Rantau Prapat - Kisaran – Tebing Tinggi – Pematang Siantar – Parapat	4	45,000
5	Rantau Prapat - Balige	3	60,000
6	Sibolga – Tarutung - Balige	3	60,000

Other than that, air transportation also available to use, that is Jakarta (Soekarno Hatta) – Medan (Kualanamu) route with flight time approximately 1 hour and 50 minutes and fare between Rp. 700.000,- - Rp. 1.100.000,-, or Jakarta (Halim Perdanakusumah) – Silangit, with flight time around 2 hours, and fare between Rp. 750.000,- - Rp. 1.100.000,-. Tourist average expenditure at Toba is Rp. 2.000.000, - with average spending time 3 Days and 2 Nights.

B. *Determine Origin – Destination of the Tourist*

In this case, all of the traveller head to KSPN Lake Toba, as like Parapat, Merek, Tongging, Pangururan etc. The matrix of distance, cost, mode among point at KSPN Toba Lake can be saw at figure 2, meanwhile the ideal condition can be saw at figure 4, and the ideal condition can be saw at figure 4.

C. *Determine Modal Choice (Public Transportation)*

In this case, the mode will be used is public land transportation. The data as result of the research can be saw at figure 4 Matrix of the traveller at KSPN Lake Toba. It consist distance, availability of public transportation, travel time and travel cost, right for existing condition or for ideal condition.

Place	Indicator	Kualanamu	Silangit	Berastagi	Merek	Tongging	Pangururan	Parapat
Kualanamu	Distance (Km)		246	95	137	137	236	170
	Mode		Airplane	Small Bus	Small Bus	Minibus	Minibus	Bus
	Cost (Rp/Pax)		400.000	60.000	60.000	60.000	85.000	80.000
	Travel Time (Minutes)		45	180	240	240	360	300
	Avg.Speed (Km/Hour)		328	32	34	34	39	34
Silangit	Distance (Km)	246		188	163	156	96	77
	Mode	Airplane		Minibus	Minibus	Minibus	Small Bus	Small Bus
	Cost (Rp/Pax)	400.000		80.000	80.000	80.000	60.000	60.000
	Travel Time (Minutes)	45		360	300	330	180	150
	Avg.Speed (Km/Hour)	328		31	33	28	32	31
Berastagi	Distance (Km)	95	188		45	46	145	149
	Mode	Small Bus	Minibus		Minibus	Minibus	Minibus	Minibus
	Cost (Rp/Pax)	60.000	80.000		15.000	20.000	60.000	60.000
	Travel Time (Minutes)	180	360		60	75	240	240
	Avg.Speed (Km/Hour)	32	31		45	37	36	37
Merek	Distance (Km)	137	163	45		16	119	102
	Mode	Small Bus	Minibus	Minibus		Minibus	Minibus	Minibus
	Cost (Rp/Pax)	60.000	80.000	15.000		15.000	30.000	30.000
	Travel Time (Minutes)	240	300	60		30	180	150
	Avg.Speed (Km/Hour)	34	33	45		32	40	41
Tongging	Distance (Km)	137	156	46	16		112	118
	Mode	Minibus	Minibus	Minibus	Minibus		Minibus	Minibus
	Cost (Rp/Pax)	60.000	80.000	20.000	15.000		45.000	45.000
	Travel Time (Minutes)	240	330	75	30		210	180
	Avg.Speed (Km/Hour)	34	28	37	32		32	39
Pangururan	Distance (Km)	236	96	145	119	112		56
	Mode	Minibus	Small Bus	Minibus	Minibus	Minibus		Ferry+Minibus
	Cost (Rp/Pax)	85.000	60.000	60.000	30.000	45000		22.000
	Travel Time (Minutes)	360	180	240	180	210		120
	Avg.Speed (Km/Hour)	39	32	36	40	32		28
Parapat	Distance (Km)	170	77	149	102	118	56	
	Mode	Bus	Small Bus	Minibus	Minibus	Minibus	Ferry+Minibus	
	Cost (Rp/Pax)	80.000	60.000	60.000	30.000	45000	22.000	
	Travel Time (Minutes)	300	150	240	150	180	120	
	Avg.Speed (Km/Hour)	34	31	37	41	39	28	

Fig. 4. Ideal condition transportation matrix of KSPN Lake Toba.

D. Trajectory Origin – Destination of the Tourist

Base on the data at figure 4, can be plotted trajectory path of the traveller (tourist) from the origin to the destination. For example can be saw figure 5 Trajectory path for the traveller from Belawan to Tomok using combination land transportation and water (lake) transportation.

E. Origin-Destination Isodaphane Map of the Tourist

Isodaphane is lines which draw point to point connection with the same value from a certain point, such as time, cost etc. The Isodaphane map of the tourist travel times from Pangururan point and Parapat point at KSPN Lake Toba can be saw at figure 6.

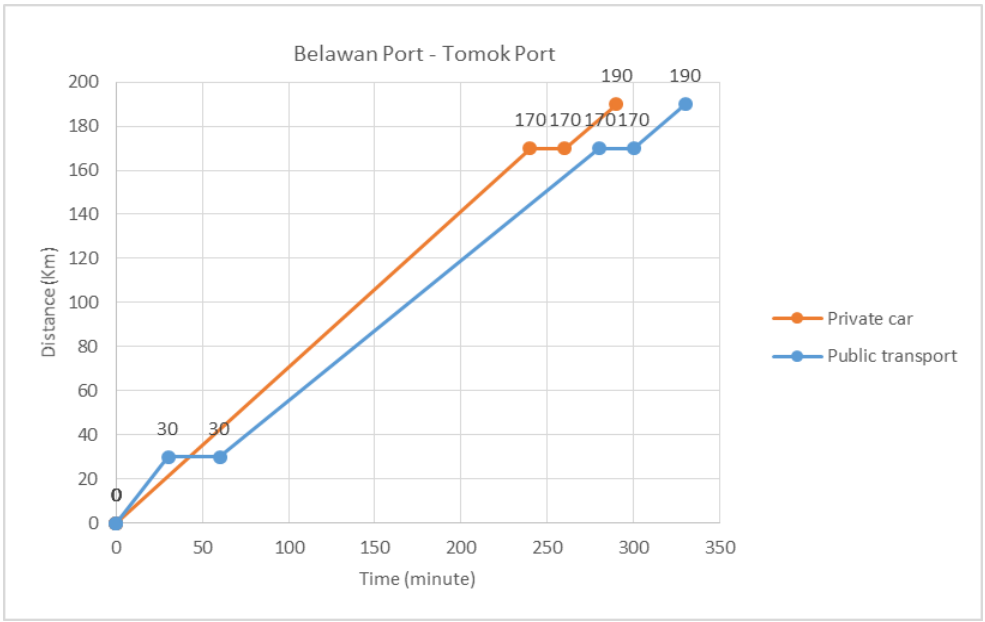

Fig. 5. Final analysist for the tourist travel trajectory.

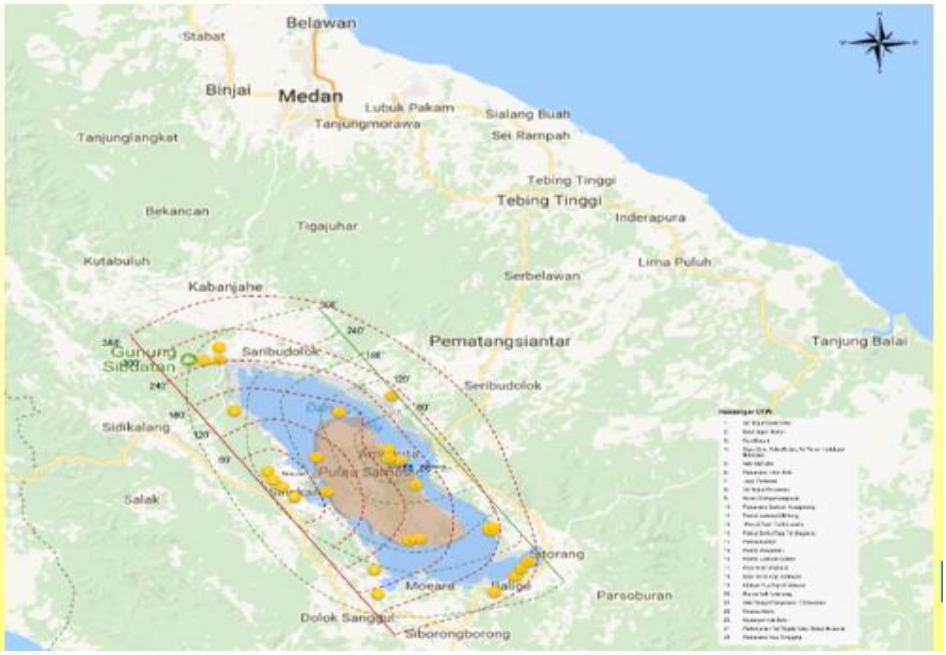

Fig. 6. Isodaphane map of tourist travel times at KSPN Lake Toba.

F. Vehicle Operating Cost Investigation (VOC)

Vehicle Operating Cost (VOC) commonly used as determination base for transportation services tariff. Transportation tariff level based on services cost consist direct cost and indirect cost. Vehicle Operating Cost is expenditure cost to operate vehicle. Vehicle Operating Cost influenced by various conditions as like: physical road, geometric, pavement type, operating speed, and various vehicle type. Important variable which influencing calculation result of Vehicle Operating Cost is direct cost, indirect cost, overhead cost, unpredictable expenditure, and profit for vehicle owner.

TABLE II. VOC CALCULATION

No	Details of Cost Component	Cost Component /Year	Length of way (Km)	Way length/year (312 work days) (Km)	Way length/ 5 years (1.560 work days) (Km)	Cost detail/Km (5 years) (Rp/Km)	Percentage (%)
	Direct cost						
1	Depreciation cost of vehicle	90.000.000	174	54.288	271.440	331,56	20,307
2	Crew cost of vehicle	50.402.796	174	54.288	271.440	185,69	11,373
3	Fuel cost	34.947.900	174	54.288	271.440	128,75	7,886
4	Tyre cost	26.838.948	174	54.288	271.440	98,88	6,056
5	Maintenance cost /year	2.500.000	174	54.288	271.440	9,21	0,564
6	Great Services/ year	25.449.400	174	54.288	271.440	93,76	5,742
7	Little Services/ year	1.523.321	174	54.288	271.440	5,61	0,344
8	Machine sparepart & Body repair/ year	73.214.755	174	54.288	271.440	269,73	16,520
9	Cost of vehicle washes/ year	9.360.000	174	54.288	271.440	34,48	2,112
10	Terminal retribution/ year	6.240.000	174	54.288	271.440	22,99	1,408
11	Vehicle tax	1.800.000	174	54.288	271.440	6,63	0,406
12	Business permit	7.123	174	54.288	271.440	0,03	0,002
13	Route permit	9.863	174	54.288	271.440	0,04	0,002
	Indirect cost						
14	Overhead cost (Employees)/ year	112.167.504	174	54.288	271.440	413,23	25,309
15	Management cost/ year	8.730.000	174	54.288	271.440	32,16	1,970
	Total	**443.191.610**	174	54.288	271.440	**1.632,74**	**100,00**

Source: Analysis result, 2018.

G. Intervention to the Public Transportation System

Base on the above trajectory analysis and VOC analysis, can be decided what kind subsidies can be gave to the public transportation for improving to become tourist transportation. That alternatives subsidies will influences to reduce direct cost and /or indirect cost, and that subsidies can be used to improve public transportation at once proper as tourism transportation. For example, can be seen at figure 7, impact subsidies to public transportation, such as:

- Subsidies for vehicle depreciation (influencing 20,307% of cost)
- Subsidies for sparepart (influencing 16,520% of cost)
- Subsidies for overhead/ year (influencing 25,309% of cost)
- Etc.

Then, to make more applicable the subsidies pattern to decrease the tariff, can be given base on Time travel preference (Rp/hour) or distance travel preference (Rp/Km).

	Characteristic			Existing Fare			vehicle depreciation scheme		New Fare		
Route	Distance (Km)	Mode	Travel Time (Minutes)	Fare (Rp/Pax)	Rp/Km	Rp/Hour	Influencing to cost (%)	Subsidies (%)	Fare (Rp/Pax)	Rp/Km	Rp/Hour
Kualanamu - Silangit	246	Airplane	45	400.000	1.626	533.333	20,307%	10,00%	391.877,200	1.593,00	522.503
Kualanamu - Berastagi	95	Small Bus	180	60.000	632	20.000	20,307%	10,00%	58.781,580	618,75	19.594
Kualanamu - Merek	137	Small Bus	240	60.000	438	15.000	20,307%	10,00%	58.781,580	429,06	14.695
Kualanamu - Tongging	137	Minibus	240	60.000	438	15.000	20,307%	10,00%	58.781,580	429,06	14.695
Kualanamu - Pangururan	236	Minibus	360	85.000	360	14.167	20,307%	10,00%	83.273,905	352,86	13.879
Kualanamu - Parapat	170	Bus	300	80.000	471	16.000	20,307%	10,00%	78.375,440	461,03	15.675

	Characteristic			Existing Fare			Sparepart scheme		New Fare		
Route	Distance (Km)	Mode	Travel Time (Minutes)	Fare (Rp/Pax)	Rp/Km	Rp/Hour	Influencing to cost (%)	Subsidies (%)	Fare (Rp/Pax)	Rp/Km	Rp/Hour
Kualanamu - Silangit	246	Airplane	45	400.000	1.626	533.333	16,520%	10,00%	393.392,000	1.599,15	524.523
Kualanamu - Berastagi	95	Small Bus	180	60.000	632	20.000	16,520%	10,00%	59.008,800	621,15	19.670
Kualanamu - Merek	137	Small Bus	240	60.000	438	15.000	16,520%	10,00%	59.008,800	430,72	14.752
Kualanamu - Tongging	137	Minibus	240	60.000	438	15.000	16,520%	10,00%	59.008,800	430,72	14.752
Kualanamu - Pangururan	236	Minibus	360	85.000	360	14.167	16,520%	10,00%	83.595,800	354,22	13.933
Kualanamu - Parapat	170	Bus	300	80.000	471	16.000	16,520%	10,00%	78.678,400	462,81	15.736

	Characteristic			Existing Fare			Overhead/year scheme		New Fare		
Route	Distance (Km)	Mode	Travel Time (Minutes)	Fare (Rp/Pax)	Rp/Km	Rp/Hour	Influencing to cost (%)	Subsidies (%)	Fare (Rp/Pax)	Rp/Km	Rp/Hour
Kualanamu - Silangit	246	Airplane	45	400.000	1.626	533.333	25,309%	10,00%	389.876,400	1.584,86	519.835
Kualanamu - Berastagi	95	Small Bus	180	60.000	632	20.000	25,309%	10,00%	58.481,460	615,59	19.494
Kualanamu - Merek	137	Small Bus	240	60.000	438	15.000	25,309%	10,00%	58.481,460	426,87	14.620
Kualanamu - Tongging	137	Minibus	240	60.000	438	15.000	25,309%	10,00%	58.481,460	426,87	14.620
Kualanamu - Pangururan	236	Minibus	360	85.000	360	14.167	25,309%	10,00%	82.848,735	351,05	13.808
Kualanamu - Parapat	170	Bus	300	80.000	471	16.000	25,309%	10,00%	77.975,280	458,68	15.595

Source: Analysis result, 2018.

Fig. 7. Alternatives intervention to the public transportation.

IV. Conclusion and Recommendation

- Base on the above discussion, can be concluded that the supporting services for tourist transportation can be gave by improving the public transportation in the form: reducing waiting time at terminal/ port/ airport, Vehicle Operating Cost (VOC) reduction as like subsidies on vehicle depreciation, subsidies on spare part, subsidies on overhead/year etc., reduction on travel time etc. That all can be converted to time travel preference (Rp/hour) or travel distance preference (Rp/Km) to improve tourist transportation satisfaction.
- Base on the discussion has been done, the recommended method for Determining Strategy to improve tourism Transportation Services can be drawn as like flow diagram at figure 3 Research Completion Steps.

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