Measuring Readiness and Willingness to Pay (WTP) of Surabaya Mass Rapid Transit (SMART), Monorail and Tram: A Survey

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Abstrak— **Mass Rapid Transit (MRT) is popular options selected for transportation publics in the big city. It is believed that can improve service life quality by reducing congestion, transportation pollutants, and fuel consumption for private vehicles. The social understanding of new transportation mode "SMART" that will be built in Surabaya City, Indonesia, several studies were conducted. This study presents social readiness, willingness to shift (WTS), and willingness to pay (WTP) that consists of Monorail and Tram. The adopted readiness is built on the pro-environmental attitude behavior. Along several motives are offered into WTS. WTP concerns into two models, option and price. Random Utility Model (RUM) is introduced to measure and to analyze three options of SMART designs. The model is calibrated by using the collected data from questionnaire in which user makes choice among alternatives choice representing willingness motives and MRT service for monorail and tram that will be implemented. A direct survey was collected to 384 respondents representing the 31 regions in Surabaya City. The results indicate the majority are ready to use monorail and tram, with high level for environmental impact. Several motives of WTS show the preferable service quality with small distance, cost, and inter-arrival choice. The calibration of three options WTP indicates Option 1 is the selected for tram and others for monorail whether Option 2 and Option 3. Furthermore, for the chosen attributes, the willingness price is range 10000 IDR up to 125000 IDR considered by MRT specification.**

Keyword— **Public transportation, Random utility model, Readiness, SMART, Willingness to shift, Willingness to pay**

I. INTRODUCTION

THE existence of public transportation cannot be denied its benefits, especially from the customer's loyalty in terms of cost efficiency [1]. Commonly, public transportion is demanded to be affordable in term of price [2]. For example, problem in Indonesia is lack of public transportation service which is safe, convenient, fast, and integrated, so people prefer to use their private transportation compared with public transportation. Consequently, numbers of private vehicle have been growing rapidly in Indonesia, particularly in Surabaya City. Increasing of private transportation can raise the volume of vehicles in Surabaya road and can cause problems of congestion, during peak hour. Such the highest increasing point is experienced by motorcycle in 2013 which has eight times of total motorcycle in 2008 [3]. It needs an effort to provide mass transit which has a sustainable transportation. MRT (Mass Rapid Transit) is an urban transportation system which has 3 main criteria, mass (large haulage), rapid (faster travel time and high frequency), and transit (stop at many

stations in the urban main point) [4]. Willingness to pay is the one tool to understand the total users think the product or service will be worth in other side of spending cost. This approach believed can measure the project or product before launching. By this way, Surabaya will build Surabaya Mass Rapid Transit5 (SMART) as new transportation mode, which aims to reduce congestion, pollutions, and fuels consumption for private vehicles.

In 2013, government had planned subsidized BBM arround 199.90 trillion rupiahs. The realization had consumed more than what had been planned before [5]. Indonesian government had planned subsidized BBM consumption up to 199.80 trillion rupiahs in last year. That number is allocated to premium 32.32 million kiloliter and solar 14.14 million kiloliter [6]. The objective of this study is to measure social readiness and willingness to pay (WTP) for mass rapid transit, monorail and tram attribute that support public transportation service. The other objective is recommending the cost of monorail and tram. To fulfill this objective, a choice experiment survey was observed to Surabaya society. Random Utility models are employed to analyze the survey data. To our knowledge, no study has addressed the problem of implementing new transportation mode from perspective of the general public's WTP services that enhance the quality of transportation facility.

II. LITERATURE REVIEW

Transportation is the movement of things from a certain initial point to end-point [7], which aims to reduce traffic congestion, travel times, and air pollution, also to provide economic opportunities, and to improve efficiency of road system [8]. SMART will be built to improve transportation service. Several MRT researches are related to factors based on behavior theory. It concerns to environment, value orientation, and relationship to a pro-environmental attitude [9],[10]. Nilson and Kuller believe that social pro-environmental attitudes can cause them willing to choose MRT than their private transportation.

Other approach, willingness to pay (WTP) is the reflection of the total consumer or user maximum think that the product or service will be worth [11]. WTP measurement may be influenced by one or more socioeconomics characteristics, such as age, gender, income, household [12]. Some researches of measuring WTP have been done in reducing air pollution,

congestion, and noisy, reducing accident occurrence, reducing travel time, improving transportation information services, lost private license. The decision maker weights remaining alternatives by a compensative decision process considering their different attributes [13].

Table 1. Readiness Factors of Monorel dan Tram

Factor	Author	Sub Factor	Question
1. Switch to Monoraill and Tram	(Hiscock et al., 2002)	1.1 Reduce private transportation[14]	Do you willing to switch to use Monorail and Tram?
	(Nasrudin, 2013)	1.2 Station distance[15]	Do you willing if the station has maximum distance 1 km from living place/home?
2. Travel Motives[16]	(Minderhoud, 2005)		2.1 Do you willing if the station is located near to government center?
			2.2 Do you willing if the station is located near to education facilities (school/university)?
			2.3 Do you willing if the station is located near to vacation place?
			2.4 Do you willing if the station is located near to shopping center?
3. Environment effects	(Istamto et al.,2014)	3.1 Congestion[17]	Do you willing to change into using Monorail and Tram to reduce congestion?
	(Tarmizi et al., 2014)	3.2 Pollution[18]	Do you willing to change into using Monorail and Tram to reduce pollution?
	(Anable, 2005)	3.3 Accident[19]	Do you willing to change into using Monorail and Tram to reduce accident occurrence?

When someone is wanted willing to pay, there are some support attributes becoming as willingness potentials or motives. It is related to willingness to shift (WTS) used to analyze the potential factors influencing to switch. Rastogi had been done research about WTS which has purpose to promote walking and bicycling in area of rail access India [20].

III. METHODS

In achieving the study's objective, a direct survey was distributed to 31 Regions in Surabaya City. The five areas become the detail focus of socio-demography characteristics.

A. Survey Design

Questionnaire design used to measure readiness, willingness to pay of monorail and tram is divided into several parts, such as (1) respondent private data: socio-demographic questions aims to serve the subjectivity probability, (2) readiness to use monorail and tram: respondent will chose the readiness ranking among 1 until 5 scales, (3) willingness to shift monorail and tram: questions with "Yes" or "No" answer, (4) willingness to pay: consists of several options and respondent ability to pay the MRT tariff. The survey design of this research was approved by BAPPEKO Surabaya [21].

B. Choice Scenario Design

In WTP, the decision maker chooses the best one among avSailable alternatives, taking into account a non-compensative decision process, in which any attribute is compared with the relative threshold (cut-off). This choice experiment will show the coefficient value of each attribute. It is used to evaluate the positive WTP for transportation attribute.

Table 2. Choice Alternative of Willingness to Pay

Attributes	Option 1	Option 2	Option 3
Operation Days	Monday-Friday	Seven days	Seven days
Inter-arrival time	More than 15 minutes	Every 15 minutes	Every 10 minutes
Schedule	Free (no schedule)	Scheduled	Scheduled
Operation Hours	5 morning – 6 evening	5 morning – 10 night	5 morning – 12 night
Monorail and Tram Facilities			
Cleanness	Enough	Keep cleaned	Keep cleaned
Information Service	Journey map, no schedule, delay announcement	Journey map, schedule, delay announcement	Journey map, schedule, delay announcement, operator
Choice box	☐	☐	☐

C. Random Utility Model

A popular method, the maximum likelihood estimation method used for the calibration of Logit Models provides asymptotically distributed multivariate normal parameters [22]. Logit Models approach or discrete choice models which uses to find the probability transformation from $-\infty$ to $+\infty$ with limited value of 0 to 1. It analyzes the probability of each attributes in different area, and then will be searched the result of comparison in each attribute levels [23].

$$U_{int}(x_{int}, w_{it}) = z_{int}, \beta + \varepsilon_{int} = x_{int}, \delta + w_{it}, \gamma + \varepsilon_{int} \quad (1)$$

where β, δ, and γ are vectors of parameter to be estimated, and the error term is denoted as ε_{int}. The RUM assumes utility maximization by using regression such that decision maker i will choose alternative m over n in the choice scenario t, if and only if.

$$U_{imt}(x_{imt}, w_{it}) > U_{int}(x_{int}, w_{it}) \quad (2)$$

The made assumptions come from the distribution disturbance and whether the coefficients are fixed or varying across individuals in RUM model led the use of various qualitative models to estimate RUM [24].

Logistic regression is a method to process two values of choice. According to Mubarok [25], Logistic regression models the mean p in terms of an explanatory variable x. The statistical model for logistic regression is

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 \quad (3)$$

$$odds = \frac{p}{1-p} \quad (4)$$

Where p is a binomial proportion and x is the explanatory variable. The parameters of the logistic model are β_0 and β_1. Logistic regression works with odds rather than proportions [26]. The odds are the ratio of the proportions for the two possible outcomes. If p is the probability of a success, then $1 - p$ is the probability of a failure. The estimated coefficient based on random utility model associated with the estimated tariff of MRT transportation be β_s and estimated mean parameter for transportation attribute k be β_k. The value of β_s is constant and β_k is assumed to vary among individuals. The assumptions allow WTP to take on the same distribution as normal distribution. WTP for transportation attribute k comes from:

$$WTP_k = -\frac{\beta_k}{\beta_s} \quad (5)$$

The value of individual having a positive WTP for transportation attribute is:

$$percent = (1 - \varphi(WTP_k)) x\, 100 = \left(1 - \varphi\left(-\frac{\beta_k}{\beta_s}\right)\right).100 \qquad (6)$$

where $\varphi\left(-\frac{\beta_k}{\beta_s}\right)$ represents the normal cumulative distribution function evaluated at $-\frac{\beta_k}{\beta_s}$.

D. Sample Characteristics Description

The survey focuses in those areas because the plan route of MRT was through over five areas of Surabaya, with 264 questionnaires were distributed. From economics sight, Surabaya population is mostly located in low-medium income, up to 7.5 millions. But, few of them are located in high income, east and west Surabaya.

Table 3. Sample Characteristics Description of Surabaya City

Attributes	Center Surabaya		East Surabaya		West Surabaya		North Surabaya		South Surabaya	
	Survey	Proportion	Survey	Proportion	Survey	Proportion	Survey	Proportion	Survey	Proportion
Occupation										
Stated Employees	4	1,5%	8	3,0%	9	3,4%	4	1,5%	7	2,7%
Enterprise	4	1,5%	17	6,4%	15	5,7%	16	6,1%	17	6,4%
Students	10	3,8%	22	8,3%	20	7,6%	24	9,1%	23	8,7%
Household	6	2,3%	20	7,6%	13	4,9%	6	2,3%	19	7,2%
Gender										
Male	11	4,2%	28	10,6%	30	11,4%	29	11,0%	31	11,7%
Female	13	4,9%	39	14,8%	27	10,2%	21	8,0%	35	13,3%
Income										
Low (< 3 millions)	19	7,2%	50	18,9%	31	11,7%	42	15,9%	47	17,8%
Medium (3 - 7.5 millions)	5	1,9%	14	5,3%	19	7,2%	8	3,0%	18	6,8%
High (7.5 - 15 millions)			2	0,8%	6	2,3%				
Very high (> 15 millions)			1	0,4%	1	0,4%			1	0,4%
Owned Car Number										
0	23	8,7%	50	18,9%	41	15,5%	47	17,8%	55	20,8%
1	1	0,4%	14	5,3%	16	6,1%	3	1,1%	10	3,8%
2			2	0,8%						
3			1	0,4%					1	0,4%
Owned Motorcycle Number										
0					11	4,2%	3	1,1%	8	3,0%
1	20	7,6%	52	19,7%	33	12,5%	44	16,7%	48	18,2%
2	4	1,5%	9	3,4%	12	4,5%	2	0,8%	9	3,4%
3			6	2,3%			1	0,4%	1	0,4%
Frequency										
Every day	21	8,0%	55	20,8%	50	18,9%	42	15,9%	56	21,2%
3-4 times/ week	2	0,8%	6	2,3%	6	2,3%	8	3,0%	7	2,7%
Once a week	1	0,4%	4	1,5%	1	0,4%			2	0,8%
< once a week			2	0,8%					1	0,4%
Purpose of trip										
Working	12	4,5%	29	11,0%	28	10,6%	18	6,8%	28	10,6%
Study	9	3,4%	20	7,6%	18	6,8%	23	8,7%	24	9,1%
Shopping	3	1,1%	15	5,7%	11	4,2%	9	3,4%	10	3,8%
Lifestyle/ Vacation			3	1,1%					4	1,5%
Daily Transportation Type										
Car			11	4,2%	10	3,8%	2	0,8%	5	1,9%
Motorcylce	22	8,3%	56	21,2%	44	16,7%	45	17,0%	55	20,8%
Public Transportation	2	0,8%			3	1,1%	3	1,1%		
Bike/walking									6	2,3%
Fuels Consumption										
< 2 liter/week	5	1,9%	12	4,5%	5	1,9%	6	2,3%	3	1,1%
2 liter- 10 liter/week	16	6,1%	40	15,2%	43	16,3%	38	14,4%	52	19,7%
11-25 liter/week	3	1,1%	8	3,0%	7	2,7%	3	1,1%	4	1,5%
> 25 liter/week			6	2,3%					2	0,8%
Type of BBM Consumption										
Premium	20	7,6%	52	19,7%	45	17,0%	38	14,4%	50	18,9%
Pertamax	4	1,5%	11	4,2%	8	3,0%	9	3,4%	11	4,2%
Solar			4	1,5%	4	1,5%				
Daily Transporting Distance										
< 10 km	12	4,5%	24	9,1%	10	3,8%	15	5,7%	18	6,8%
10- 29.9 km	11	4,2%	26	9,8%	30	11,4%	26	9,8%	34	12,9%
30 - 60 km	1	0,4%	12	4,5%	17	6,4%	9	3,4%	13	4,9%
> 60 km			3	1,1%						
N	**24**		67		57		50		66	264

It shows that the condition of both areas have faster socioeconomics acceleration than other areas, a lot of residence, mall, enterprise, and etc. East Surabaya has high number of owned car than other areas because mostly areas have preferred to invest motorcycle type as private transportation. Surabaya society is dominant to use motorcycle as daily transportation because of efficient in BBM consumption, small space, and easy to go anywhere. As result, the Surabaya society mostly consumes BBM only between 2-10 liters per week. It indicates that motorcycle user is higher than car user. Most of people who consume BBM higher than 10 liters per week are car user. Based on BBM type, the subsidized BBM (premium, pertamax, and solar) still becomes the priority choice of Surabaya society, so no one consumes BBG type. The using of transportation is mainly for working and schooling which has high travel frequency for everyday. In daily transporting distance sight, all areas have travel distance ranges between 10 and 29.99 km. It means that most of Surabaya people have destination location over their living area. For example, there are several people that live in South Surabaya have worked or studied in Center Surabaya.

IV. RESULTS

A. Readiness to Use

It shows the percentage of individuals who willing to use
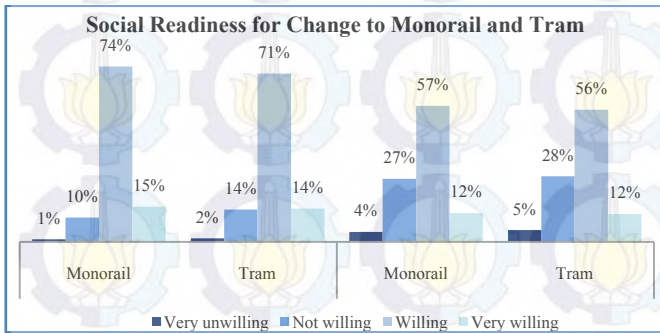
monorail and tram.

Figure 1. Social Readiness level (Change to Monorail and Tram). The readiness level for station distance 1 km sub factor has lower value than reducing private transportation. For monorail, there are totally 31% refusing to walk 1km into station and 32 % for tram.
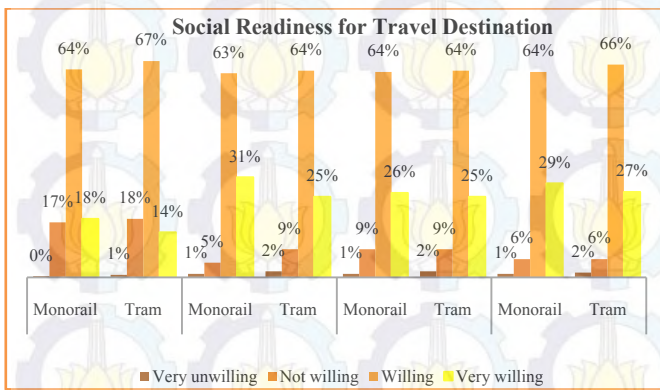

Figure 2. Social Readiness level (Travel Distance). The highest readiness level for travel distance factor is education center destination by using monorail, which totally reaches 94 % willing.
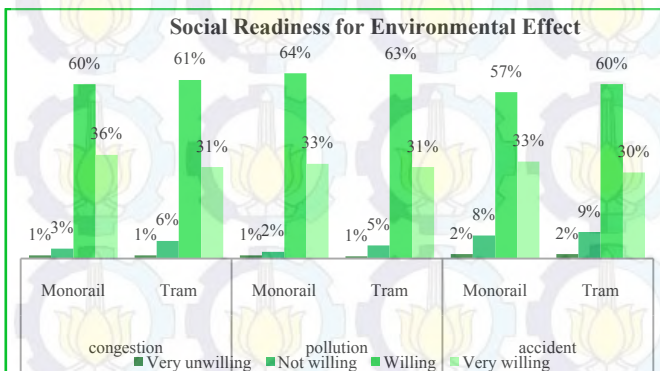

Figure 3. Social Readiness level (Environmental Effect). The highest readiness level for environmental effect factor is pollution effect by monorail, which totally reaches 97 % willing.

B. Willingness to Pay

Before calculating the estimated coefficient of WTP, the model specification of variables used by Logits Model is be determined.

Table 3. Specification of Variables used in the Logit Models

Name	Description
Fee	Maximum price of willingness to pay
0-1 Transportation attribute qualitative variables	
Days of Operation	
M-F	1 if transportation operates Monday through Friday; 0 otherwise
Seven Days	1 if transportation operates Monday through Sunday; 0 otherwise
Hours of Operation	
5 AM - 6 PM	1 if transportation operates 5 morning through 6 evening; 0 otherwise
5 AM - 10 PM	1 if transportation operates 5 morning through 10 night; 0 otherwise
5AM - 12 AM	1 if transportation operates 5 morning through 12 midnight; 0 otherwise
Inter-arrival Time	
> 15 min	1 if transportation operates at inter-arrival time > 15 min; 0 otherwise
15 min	1 if transportation operates at inter-arrival time every 15 min; 0 otherwise
10 min	1 if transportation operates at inter-arrival time every 10 min; 0 otherwise
Schedule of Operation	
Free	1 if transportation operates on free schedule; 0 otherwise
Scheduled	1 if transportation operates on time scheduled; 0 otherwise
Cleaness Service	
Enough	1 if transportation serves clean enough; 0 otherwise
Cleaned	1 if transportation always serves cleaned; 0 otherwise
Information Service	
Journey Map	1 if transportation serves journey map information; 0 otherwise
Delay Announcement	1 if transportation serves delay announcement information; 0 otherwise
Operator	1 if transportation serves an operator; 0 otherwise
Socio-demographic 0-1 qualitative	
Choose	1 if respondent chose a transportation option (Option 2 or Option 3) and 0 if respondent chose Option 1
Male	1 if the respondent was a male; 0 otherwise
Female	1 if the respondent was a female; 0 otherwise
Employees	1 if the respondent was an employee; 0 otherwise
Students	1 if the respondent was a student; 0 otherwise
Socio-demographic continuous variables	
Income_A	The respondent's income was below 3 millions (Rp/month)
Income_B	The respondent's income was between 3 - 7.499 millions (Rp/month)
Income_C	The respondent's income was between 7.5 -15 millions (Rp/month)
Income_D	The respondent's income was above 15 millions (Rp/month)

The binary variables are transportation attributes and socio-demography qualitative value. The quantitative variables are fee and socio-demography continuous variables.

Table 4.
Estimated Logit Coefficients for Two MRT Transportation

Attributes	Monorail		Tram	
	Coeff.	Std. Error	Coeff.	Std. Error
Fee	0,472255**	0,370037	0,522941**	0,344544
Operation Days				
Monday-Friday	-1,3873898	1,404833717	-1,30103	1,322219295
Seven Days	1,4048337	-1,404833717	1,3222193	-1,322219295
Operation Hours				
05.00 - 18.00	-1,4048337	1,404833717	-1,3222193	1,322219295
05.00 - 22.00	-0,1732434	0,200914843	-0,1962946	0,228882012
05.00 - 24.00	0,1732434	-0,132625565	0,1962946	-0,146128036
Inter-arrival				
> 15 min	0,0409836	-1,387389826	-1,30103	1,322219295
15 min	0,6710526	-0,173243416	-0,1962946	0,228882012
10 min	1,4901961	0,173243416	0,1962946	-0,146128036
Schedule				
Free	-1,3873898	1,404833717	-1,30103	1,322219295
Scheduled	1,4048337	-1,404833717	1,3222193	-1,322219295
Cleaness				
Enough	-1,3873898	1,404833717	-1,30103	1,322219295
Cleaned	1,4048337	-1,404833717	1,3222193	-1,322219295
Information Service				
Schedule	1,4048337	-0,132625565	1,3222193	-0,146128036
Operator	0,1732434	-1,404833717	0,146128	-1,322219295
Socio-demographic 0-1 qualitative				
Choose*Male	1,8027737	2,117271296	1,49485	0,031484794
Choose*Female	1,2007137	1,505149978	1,200714	0,061111111
Choose*Employees	0,1349957	-1,292809665	1,238882	0,078159364
Choose*Students	0,416309	-1,685741739	1,50515	0,030651341
Socio-demographic continuous variables				
Choose*Income_A	1,4149733**	-1,564835083	1,30103**	0,04929972
Choose*Income_B	1,3082086**	-1,30820858	0,148402**	0,047413793
Choose*Income_C	0,0001184*	1,505149978	-1,50515*	1,505149978
Choose*Income_D	4,354E-05*	1,939519253	-1,93952*	1,939519253

** Significant at the 5% level
* Significant at the 1% level

The result shows that there is no significant value among transportation attributes. The positive WTP estimation can be calculated by dividing the parameter of each attributes by cost

parameter.

$$WTP_k = -\frac{\beta_k}{\beta_s} = -\left(\frac{-1.3873898}{0.472225}\right) = 2.937798$$

$$percent = \left(1 - \varphi\left(-\frac{\beta_k}{\beta_s}\right)\right).100 = (1 - \varphi(2.937798)).100 = 0.2\%$$

The determining whether coefficients within transportation option each MRT used hypothesis test.

Table 4.
Chi-squared Hypothesis Test of Coefficients Associated with Transportation Variables

Null Hypothesis		X^2	$P > \|X^2\|$
Monorail			
Two options			
	$\beta_{M-F} = \beta_{Seven\ days}$	4,48019	0,034
	$\beta_{Enough} = \beta_{Cleaned}$	11,3199	0,001
	$\beta_{Free} = \beta_{Scheduled}$	7,41915	0,006
	$\beta_{Schedule} = \beta_{Operator}$	6,06061	0,014
Three options			
Inter-arrival	$\beta_{>15\ min} = \beta_{15\ min}$	5,66793	0,017
	$\beta_{>15\ min} = \beta_{10\ min}$	9,81818	0,002
	$\beta_{15\ min} = \beta_{10\ min}$	1,72841	0,189*
	$\beta_{5AM-6PM} = \beta_{5AM-10PM}$	2,22893	0,135*
Operation hours	$\beta_{5AM-6PM} = \beta_{5AM-12PM}$	3,8029	0,051*
	$\beta_{5AM-10PM} = \beta_{5AM-12PM}$	9,84252	0,002
Tram			
Two options			
	$\beta_{M-F} = \beta_{Seven\ days}$	11,5227	0,001
	$\beta_{Enough} = \beta_{Cleaned}$	6,6000	0,010
	$\beta_{Free} = \beta_{Scheduled}$	6,23743	0,013
	$\beta_{Schedule} = \beta_{Operator}$	7,33333	0,007
Three options			
Inter-arrival	$\beta_{>15\ min} = \beta_{15\ min}$	1,76534	0,184*
	$\beta_{>15\ min} = \beta_{10\ min}$	3,28996	0,070
	$\beta_{15\ min} = \beta_{10\ min}$	1,87315	0,171*
	$\beta_{5AM-6PM} = \beta_{5AM-10PM}$	1,60655	0,205*
Operation hours	$\beta_{5AM-6PM} = \beta_{5AM-12PM}$	5,51357	0,019
	$\beta_{5AM-10PM} = \beta_{5AM-12PM}$	4,55983	0,033

*Higher than 5% P-value, meaning to reject Null Hypothesis

There are some significant attributes such, (1) inter-arrival and (2) operation hours in both monorail and tram. Those attributes are $\beta_{15\ min} = \beta_{10\ min}$ in inter-arrival and $\beta_{5AM-6PM} = \beta_{5AM-10PM}$ in operation hours. For no significant hypothesis, the policy maker does not need consider the effect of those attributes. But, significant hypothesis should be considered by policy maker in determining whether which one the preferable transportation attributes.
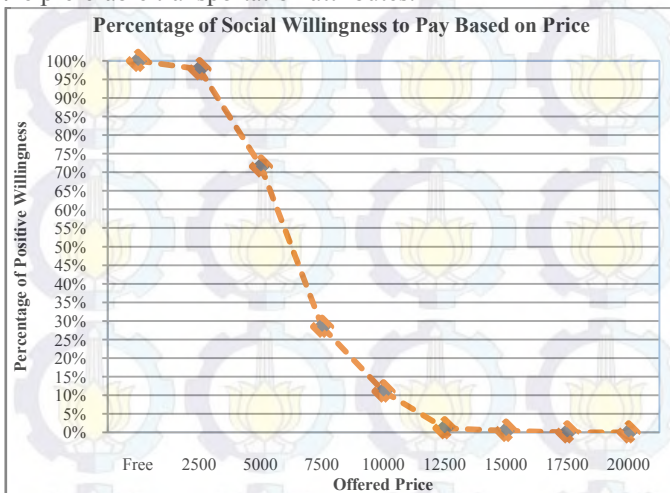

Figure 4. Positive Willingness to Pay Based on Price

For WTP price shows ninety-eight percent, people choose MRT price located in 2500 IDR. Seventy-two percent, people willing to pay MRT price in 5000 IDR. People unwilling to pay MRT price range among 15000 IDR up to 20000 IDR. This condition shows the maximum MRT price reached by Surabaya society is 12500 IDR which is only 1%.

V. DISCUSSION

People prefer to use monorail because they think that tram has possibility to add road congestion. But, the willing respondents because of reducing pollution are still high. The eco-green concept of new transportation type becomes the reason to support society willing to use monorail and tram. As result, among three factors, the highest readiness level is environmental effect factor. The average readiness levels are 93 % for environmental factor, 89 % for travel destination factor, and 78 % for change to monorail and tram factor. Respondents want a change to reduce the increasing of pollution and congestion by developing green technology with renewable energy or no BBM. Overall, based on socioeconomics classifications, the significant refusing level also comes from reducing private transportation and walking distance 1km to the station. Government should propose the policy to limit the number of owned private transportation to reduce the booming of road capacity.
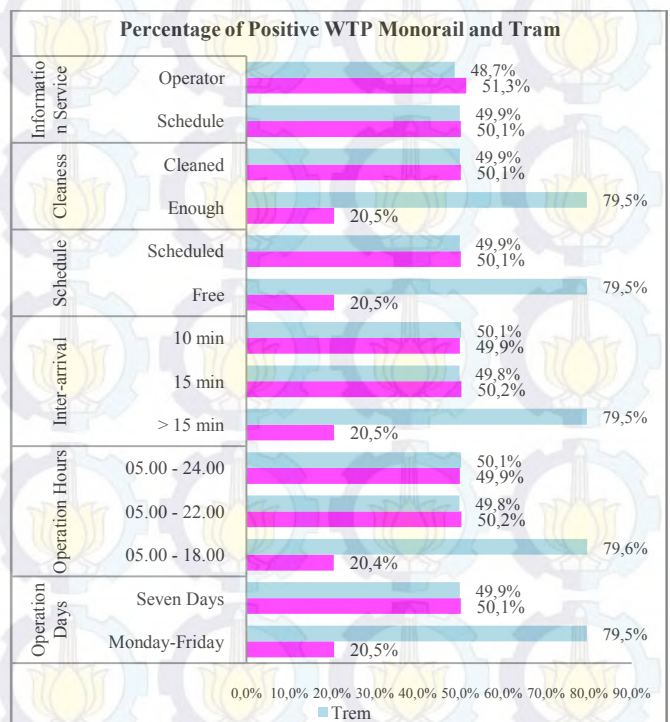

Figure 5. Percentage of Positive WTP Boyorail and Surotram

By several motives consideration, most of people willing to walk to monorail and tram station with less than 1 km. By this condition, the maker policy must be attention in determining the station distance and bus feeder stops from the living place of society. In the same way, the highest tolerance for bus feeder inter-arrival time is around 5 until 10 minutes. In parking service, people are willing to pay cost is less than 5000 IDR per hour and less than 25000 IDR per day. The determination of parking cost can influence the total parking

capacity, which directly affects the space area to build up parking area.

For WTP result, some transportation attributes are significantly different between Boyorail and Surotram, (1) enough alternative in cleanness attribute, (2) free alternative in schedule attribute, (3) > 15 minutes in inter-arrival attribute, (4) 5 AM- 6 PM in operation hours attribute, (5) Monday-Friday in operation days attribute. All of those attributes are located in option 1. The differences service qualities of both transportations need more attention to fulfill the preferred respondent. Basically, most of respondents choose option 1 for tram and option 2 or option 3 for monorail. But, the determination of transportation service should be considered by the amount of investment cost and the payback value from its tariff.

VI.　CONCLUSION

This study indicates that the social based on (1) gender, (2) income, (3) daily transportation user are ready to use monorail and tram in all factors, especially environmental impact. The more attention of policy maker consideration are walking distance 1km to station and reducing private transportation. Meanwhile, WTS results indicates several motives are proposes, such as (1) walking distance, mostly prefer less than 1 km, (2) bus feeder tolerance with maximum waiting 10 minutes, (3) parking lot, mostly prefer to get the cheaper cost, (4) transportation attribute based on WTP results.

WTP option results indicate most of people have no different priority in one mode depended on the station location from living and destination place. Respondents prefer to choose Option 1 as the tram attributes and Option 2 and Option 3 as the monorail attributes. On the other hand, WTP price by considering MRT specification, the percentages of WTP price are located in 5.72% for monorail and 5.10% for tram, which have specific nominal 11337 IDR for monorail and 11495 IDR for tram. But, the implementation of monorail and tram tariff is totally depended on several considerations, such as (1) the WTP price considering the MRT specification, (2) the adjusted percentage of WTP price of the most respondents willing, (3) the preferable transportation service from WTP option. For the future research, the study should conduct with more applicable method, such as combining WTP option and WTP price and other research scopes, such as measuring subsidized BBM and reducing private transportation.

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