

## The Willingness To Pay Progressive Parking Rates In Controlling Parkingat Q Mall Banjarbaru

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**ABSTRACT :** Q Mall Banjarbaru was one of the shopping centers. Day after day, the number of Q Mall visitors had increased that affected the capacity of parking area because of the high demand of visitors on the parking facility. Furthermore, the enactment of progressive parking rates system was intended to minimize visitors' activities at Q Mall. Therefore, in order to find out progressive parking rates form that could be enacted, the study on the existing parking rates was needed. The research method used descriptive analysis method with data structuring to get the answers of the research problems. The research data analysis was analyzing the data of the parking users' perception on the parking rates using the analysis of Willingness to Pay with several research variables. Further analysis was analyzing Binomial Logit Model on the data of Willingness to Pay with the effect of research variables. Based on the analysis on the Willingness to Pay, it was found out that the parking rates of two-wheeled vehicles was IDR 1,600.00 per hour on weekdays and IDR 2,000.00 per hour on weekend. For the four-wheeled vehicles, it was IDR 2,250.00 per hour on weekdays and IDR 2,500.00 per hour on weekend. The probability value of the existing parking rates for two-wheeled and four-wheeled vehicles on weekdays was more than 0.50. The probability value of existing parking rates for two-wheeled and four-wheeled vehicles on weekend was still less than 0.50. At Q Mall Banjarbaru, the existing parking rates for two-wheeled and four-wheeled vehicles on weekdays on certain hours, there were still few of them that had more than the value of parking rates as expected by the visitors. For the existing parking rates for two-wheeled and four-wheeled vehicles on weekend for each hour, it was more than the value of parking rates as expected by the visitors. Therefore, the mark-up and markdown of parking rates were needed.

**KEYWORDS:** Mall progressive parking rates; Willingness to Pay; Binomial Logit Model.

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### I. INTRODUCTION

By taking into account the condition of the problem of the parking need that occurred at Q Mall, therefore the progressive parking rates system was enacted so that the visitors of Q Mall who had finished their activity or their main aim did not extended it at Q Mall because of the burden of parking rates. However, it should be noted that the existing parking rates had taken into account both the operators' interest (maintaining and improving the service of parking facility) and the purchasing power of the public (Anindia, 2003).

Parking rates was the rates that must be given or paid by the vehicle owners while parking their vehicle at a certain parking area. Parking was an area to stop the vehicle for a while (Poerwadarminta, 1976). Parking shall mean the condition where the vehicle stops or does not move for a while and is left by the driver (Law of Republic of Indonesia Number 22 Year 2009). According to Technical Guidelines for Parking Management, parking could be defined as an immovable state of a vehicle protractedly (Directorate General of Land Transportation, 1996). Parkir shall mean an immovable state of a vehicle protractedly and the driver leaves the vehicle including putting in and taking out people or stuff (Murwono, 1996). The calculation of parking rates at Q Mall Banjarbaru consisted of the visitors with two-wheeled vehicle on weekdays, the visitors with two-wheeled vehicle on weekend, the visitors with four-wheeled vehicle on weekdays, and the visitors with four-wheeled vehicle on weekend.

There were several previous studies that could be used as the references to derive the variables of the research. The research variables were family income, transportation costs, travel intensity, number of family members, products offered, quality and quantity of services, and user utilities (Parsaulin, 2014). Research

variables were the income of parking user, transportation costs, parking rates, visit frequency, parking duration, parking facilities, type of job, quality and quantity of service (Rigiar, 2012). Research variables were family income, transportation costs, travel intensity, number of family members, products offered, quality and quantity of services, user utilities and user income. Research variables were family income, transportation costs, travel intensity, number of family members, products offered, quality and quantity of services, user utilities and user income (Permata, 2012). The research variables were family income, transportation costs, travel intensity, products offered, quality and quantity of services, user utilities (Novita, 2016).

## II. LITERATURE REVIEW

Longitudinal data was used as sample data. Longitudinal data was the type of data used for SP that was the data which compared the changes in research subjects. Longitudinal data defined independent variables into causal factors related to dependent variables (Radam, 2017). Specifically, testing the minimum sample size that could be used from the selection of 10,000 respondents against 12 sets of options-it was found out that the same results obtained for the sample size as few as 100 respondents (Bliemer et al, 2009).

Questionnaire for respondents aimed to find out data characteristics and Willingness to Pay parking rates of the parking facility users. Willingness to Pay (WTP) was an amount of rates that paid by the people as a payment for a service that was used and could be defined as the service users' WTP the compensation for an item or service used. The WTP analysis was based on the users' perception on the rates of parking service. Factors affected the drivers' willingness to use the parking area were the availability of the area, entry and exit access, security, lighting, the officers' work performance and parking shade (Sari and Radam, 2019). Each determination of each factor must be considered because these factors were not only identified objectively but it must be noted that the subjective factors were difficult to identified (Radam et al, 2016). Factors that affected the WTP in the problem of parking rates were the users' perceptions of the quantity and quality of services, facilities provided by parking providers, parking users' utilities, and users' income. WTP value from the hourly WTP value was obtained by using the following formula (Walpole, 1997):

$$WTP = \frac{1}{n} \sum_{i=1}^n W_i$$

Analysis of parking mode choice model was used to see whether people choose to park or not against the parking rates. The binomial-logit model was based on the assumption that there were 2 alternative cases of parking modes used as the destinations. To decide the best choice of respondents, it was determined with a measure called as utility. The utility function was to calculate the utility level of a parking mode based on users' rating. The utility equation for choosing parking modes could be seen as follow (Ortuzar and Willumsen, 1994):

$$U_i = V_i + \epsilon$$

To find out the probability of a mode choice, people chose to park or not, the binomial-logit model was used based on the assumption that there were 2 alternative cases of parking mode used as the destination. The simplified form of binomial logit could be seen as follow (Ortuzar and Willumsen, 1994):

$$P_i = \frac{e^{U_i}}{e^{U_i} + 1}$$

The suitability of the model could be evaluated by taking into account various Goodness of Fit criteria, one of them was the Chi-Square compatibility test.

**Table 1. Interpretation of pseudo-R<sup>2</sup> Value Based on the Correlation Coefficient (Radam et al, 2015)**

pseudo-R <sup>2</sup> Value	R <sup>2</sup> Value	Correlation Coefficient ( r )	Interpretation
< 0.014	< 0.04	0.00 – 0.199	Highly Weak Correlation
0.014	0.04	0.20 – 0.399	Weak Correlation
0.050	0.16	0.40 – 0.699	Medium Correlation
0.210	0.49	0.70 – 0.899	Strong Correlation
0.403	0.81	0.90 – 1.000	Highly Strong Correlation

Based on Table 1, pseudo-R<sup>2</sup> value should be  $\geq 0.21$  to show a significant correlation with strong correlation in the model obtained. In general, the probability value used was close to 0 ( $\alpha < 0.05$ ) indicating that the independent variables that were studied were valid to be used. For the estimated correlation coefficient parameters generated using the NLOGIT program.

### III. DATA AND ANALYSIS

- **Research Data**

There were two kinds of the data research that were used-that were primary and secondary data; the primary data was obtained by distributing questionnaires in the field with 100 questionnaires, while the secondary data was obtained from the parking manager of Q Mall Banjarbaru. The object of the research was conducted at Q Mall Banjarbaru for two-wheeled and four-wheeled vehicles.

- **Analysis Of Willingness To Pay**

The data was analyzed with descriptive analysis method and probability analysis with WTP and logit model. WTP was intended to get the rates as expected by the respondents. Logit model was intended to get the choice model of parking mode whether park or not for the two-wheeled and four-wheeled vehicles on weekdays and on weekend. The survey questionnaire form was designed using SPSS program.

The parking characteristics of respondents in this study were studied from several variables that were considered affected parking rates, parking duration, age, gender, last education, employment, private transportation, average visit, visit duration, intention and aim, income, parking facility, parking location convenience, parking location security, and parking attendant courtesy and politeness.

The calculation of the amount of WTP was by accumulating or adding up each parking rates choice based on the parking duration based on the respondents' perceptions. The cumulation results of respondents' WTP could be seen in Table 2 and Table 3.

**Table 2. Cumulation of Respondents' WTP of Two-Wheeled Vehicles**

WILLINGNESS TO PAY OF TWO-WHEELED VEHICLES					
Weekdays			Weekend		
Rates/Hour (IDR)	Cumulation of Respondent (Person)	Cumulation Percentage (%)	Rates/Hour (IDR)	Cumulation of Respondent (Person)	Cumulation Percentage (%)
1,200.00	684	100.00	1,000.00	692	100.00
1,250.00	643	94.01	1,142.86	635	91.76
1,333.33	596	87.13	1,666.67	582	84.10
1,428.57	529	77.34	1,750.00	538	77.75
1,500.00	483	70.61	2,000.00	531	76.73
1,600.00	346	50.58	2,285.71	268	38.73
1,714.29	305	44.59	2,400.00	253	36.56
2,000.00	273	39.91	2,500.00	225	32.51
2,333.33	60	8.77	3,000.00	161	23.27
2,666.67	52	7.60	3,333.33	48	6.94
2,800.00	32	4.68	4,000.00	38	5.49
3,000.00	29	4.24	6,000.00	6	0.87
3,200.00	7	1.02			
3,500.00	2	0.29			
4,666.67	1	0.15			
5,000.00	1	0.15			

**Table 3. Cumulation of Respondents' WTP of Four-Wheeled Vehicles**

WILLINGNESS TO PAY OF FOUR-WHEELED VEHICLES					
Weekdays			Weekend		
Rates/Hour (IDR)	Cumulation of Respondent (Person)	Cumulation Percentage (%)	Rates/Hour (IDR)	Cumulation of Respondent (Person)	Cumulation Percentage (%)
1,500.00	654	100.00	1,500.00	653	100.00
1,800.00	607	92.81	1,714.29	515	78.87
1,875.00	555	84.86	2,000.00	447	68.45
2,000.00	511	78.13	2,500.00	366	56.05
2,142.86	442	67.58	2,625.00	321	49.16
2,250.00	391	59.79	3,000.00	317	48.55
2,400.00	311	47.55	3,428.57	214	32.77
2,571.43	280	42.81	3,500.00	205	31.39

3,000.00	254	38.84	3,600.00	144	22.05
3,500.00	28	4.28	3,750.00	126	19.30
4,000.00	23	3.52	4,000.00	113	17.30
4,200.00	11	1.68	4,500.00	60	9.19
4,800.00	7	1.07	5,000.00	37	5.67
5,250.00	4	0.61	6,000.00	2	0.31
6,000.00	1	0.15			

**Analysis Of Parking Choice Model**

Analysis of the parking choice model with the NLOGIT application was carried out with trial error, the best formula of 15 variables were found, there were 2 variables that affected the parking rates and duration. The results of model analysis on the condition of two-wheeled vehicles on weekdays, two-wheeled vehicles on weekend, four-wheeled vehicles on weekdays and four-wheeled vehicles on weekend could be seen in Table 4.

**Table 4. The Results of Model Analysis**

No.	Condition	Variables	Parameter Estimation	Sig.	P-value	pseudo-R <sup>2</sup>
1	Two-Wheeled Vehicles on Weekdays	Fare	-0.000587949	0.000	0.000	0.313
		Time	0.733582090	0.000	0.000	0.313
2	Two-Wheeled Vehicles on Weekend	Fare	-0.000565694	0.000	0.000	0.206
		Time	0.761837711	0.000	0.000	0.206
3	Four-Wheeled Vehicles on Weekdays	Fare	0.000409378	0.000	0.000	0.332
		Time	0.682081971	0.000	0.000	0.332
4	Four-Wheeled Vehicles on Weekend	Fare	0.000348223	0.000	0.000	0.264
		Time	0.664739043	0.000	0.000	0.264

Based on Table 4, it could be seen that p-value on the variables fare and time of four conditions  $0.00 < 0.05$  showed that the independent variables were valid to be used. For the value of pseudo-R<sup>2</sup>, it was close and more than 0.21, it meant the correlation was strong and clear. Therefore, the utility of mode choice for the four conditions were as follow:

$$U_{\text{Two-Wheeled Vehicles on Weekdays}} = 1.337695517 - (0.000587949 \times \text{fare}) + (0.733582090 \times \text{time})$$

$$U_{\text{Two-Wheeled Vehicles on Weekend}} = 1.796557019 - (0.000565694 \times \text{fare}) + (0.761837711 \times \text{time})$$

$$U_{\text{Four-Wheeled Vehicles on Weekdays}} = 1.692849934 - (0.000409378 \times \text{fare}) + (0.682081971 \times \text{time})$$

$$U_{\text{Four-Wheeled Vehicles on Weekend}} = 1.259768956 - (0.000348223 \times \text{fare}) + (0.664739043 \times \text{time})$$

**Analysis Of Sensitivity And Elasticity Of Parking Choice Probability Of Existing Rates**

Based on the calculation analysis on the existing parking rates, the probability value was found out as could be seen on Table 5 and Table 6.

**Table 5. Probability Value of Two-Wheeled Vehicles**

Existing Rates of Two-Wheeled Vehicles					
Weekdays			Weekend		
X <sub>1</sub> (IDR)	X <sub>2</sub> (Hour)	P	X <sub>1</sub> (IDR)	X <sub>2</sub> (Hour)	P
2,000.00	1	0.710	3,000.00	1	0.703
3,000.00	2	0.739	5,000.00	2	0.621
4,000.00	3	0.766	7,000.00	3	0.531
5,000.00	4	0.791	9,000.00	4	0.438
6,000.00	5	0.814	11,000.00	5	0.350
7,000.00	6	0.835	13,000.00	6	0.272
8,000.00	7	0.854	15,000.00	7	0.205
9,000.00	8	0.872	17,000.00	8	0.151

Based on Table 5, it was found out that the existing rates of two-wheeled vehicles on weekdays had probability value of more than 0.50 which meant the parking users would prefer to park. While the two-wheeled vehicles on weekend had the probability value of more than 0.50 for the parking duration of 1 to 3 hours, it meant the parking users would prefer to park and for the parking duration of 4 to 8 hours, the probability value was less than 0.50, it meant the parking users would prefer to not park.

**Table 6. Probability Value of Four-Wheeled Vehicles**

Existing Rates of Four-Wheeled Vehicles					
Weekdays			Weekend		
X <sub>1</sub> (IDR)	X <sub>2</sub> (Hour)	P	X <sub>1</sub> (IDR)	X <sub>2</sub> (Hour)	P
3,000.00	1	0.759	4,000.00	1	0.630
5,000.00	2	0.733	7,000.00	2	0.538
7,000.00	3	0.705	10,000.00	3	0.443
9,000.00	4	0.676	13,000.00	4	0.352
11,000.00	5	0.646	16,000.00	5	0.271
13,000.00	6	0.614	19,000.00	6	0.203
15,000.00	7	0.581	22,000.00	7	0.148
15,000.00	8	0.733	25,000.00	8	0.106

Based on Table 6, it was found out that the existing rates of four-wheeled vehicles on weekdays had probability value of more than 0.50 which meant the parking users would prefer to park. While for the four-wheeled vehicles on weekend had probability value of more than 0.50 for the parking duration of 1 to 2 hours which meant the parking users would prefer to park and for the parking duration of 3 to 8 hours, the probability value was less than 0.50 which meant the parking users would prefer to not park.

- **The Review Of The Willingness To Pay And The Parking Mode Choice On The Existing Rates**

The existing parking rates would be reviewed with the results of WTP and the results of parking mode choice factorthat could be seen on Table 7, Table 8, Table 9 and Table 10.

**Table 7. The Review of Existing Parking Rates of Two-Wheeled Vehicles on Weekdays**

Two-Wheeled Vehicles on Weekdays			
Parking Duration (Hour)	Existing Parking Rates (IDR)	Level of Acceptance	
		Willingness to Pay (%)	Parking Mode Choice
1	2,000.00	39.91	0.71
2	3,000.00	100.00	0.74
3	4,000.00	100.00	0.77
4	5,000.00	100.00	0.79
5	6,000.00	100.00	0.81
6	7,000.00	100.00	0.84
7	8,000.00	100.00	0.85
8	9,000.00	100.00	0.87

Based on Table 7, we could see that the existing parking rates based on the level of acceptance of WTP with the parking duration of 1 hour was 39.91% and for the parking duration of 2 to 8 hours was 100%. For the existing parking rates, the level of acceptance based on the parking mode choice with the parking duration of 1 to 8 hours was more than 0.50.

**Table 8. The Review of Existing Parking Rates of Two-Wheeled Vehicles on Weekend**

Two-Wheeled Vehicles on Weekend			
Parking Duration (Hour)	Existing Parking Rates (IDR)	Level of Acceptance	
		Willingness to Pay (%)	Parking Mode Choice
1	3,000.00	23.27	0.70
2	5,000.00	76.73	0.62
3	7,000.00	76.73	0.53
4	9,000.00	76.73	0.44
5	11,000.00	76.73	0.35
6	13,000.00	76.73	0.27

7	15,000.00	76.73	0.20
8	17,000.00	76.73	0.15

Based on Table 8, we could see that the existing parking rates based on the level acceptance of WTP with the parking duration of 1 hour was 23.27% and the parking duration of 2 to 8 hours was 76.73%. For the existing parking rates, the level of acceptance based on the parking mode choice with the parking duration of 1 to 3 hours was more than 0.50 and for the parking duration of 4 to 8 hours was less than 0.50.

**Table 9 The Review of Existing Parking Rates of Four-Wheeled Vehicles on Weekdays**

Four-Wheeled Vehicles on Weekdays			
Parking Duration (Hour)	Existing Parking Rates (IDR)	Level of Acceptance	
		Willingness to Pay (%)	Parking Mode Choice
1	3,000.00	38.84	0.76
2	5,000.00	78.13	0.73
3	7,000.00	78.13	0.71
4	9,000.00	78.13	0.68
5	11,000.00	78.13	0.65
6	13,000.00	78.13	0.61
7	15,000.00	78.13	0.58
8	15,000.00	100.00	0.73

Based on Table 9, we could see that the existing parking rates according to the level of acceptance of WTP with the parking duration of 1 hour was 38.84%, with the parking duration of 2 to 7 hours was 78.13% and for the parking duration of 8 hours was 100%. For the existing parking rates, the level of acceptance based on the parking mode choice with the parking duration of 1 to 8 hours was more than 0.50.

**Table 10 The Review of Existing Parking Rates of Four-Wheeled Vehicles on Weekend**

Four-Wheeled Vehicles on Weekend			
Parking Duration (Hour)	Existing Parking Rates (IDR)	Level of Acceptance	
		Willingness to Pay (%)	Parking Mode Choice
1	4,000.00	17.30	0.63
2	7,000.00	48.55	0.54
3	10,000.00	48.55	0.44
4	13,000.00	48.55	0.35
5	16,000.00	48.55	0.27
6	19,000.00	48.55	0.20
7	22,000.00	48.55	0.15
8	25,000.00	48.55	0.11

Based on Table 10, we could see that the existing Parking rates based on the level of acceptance of WTP with the parking duration of 1 hour was 17.30% and for the parking duration of 2 to 8 hours was 48.55%. For the existing parking rates of level of acceptance based on the parking mode choice with the parking duration of 1 to 2 hours was more than 0.50 and for the parking duration of 3 to 8 hours was less than 0.50.

#### IV. DISCUSSION

Taking into account the existing rates of two-wheeled vehicles on weekdays with the starting point of IDR 2,000.00, it was found out that based on the level of acceptance of WTP, not all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, the strong factor was found out, it meant the people had WTP the parking rates. Along with the progressive parking rates with the progress of IDR 1,000.00 per hour, it was found out that based on the level of acceptance of WTP, all of the people had WTP while based on the level of acceptance of parking mode choice, strong factor was found out, it meant the people had WTP the parking rates.

Taking into account the existing rates of two-wheeled vehicles on weekend with starting point of IDR 3,000.00 it was found out that based on the level of acceptance of WTP, not all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, strong factor was found out, it meant the people had WTP the parking rates. Along with the progressive parking rates with the progress of IDR 2,000.00 per hour, it was found out that based on the level of acceptance of WTP, not all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, strong factor was found out for the parking duration of 3 hours, it meant the people had WTP the parking rates and for the parking duration of 4 to 8 hours, weak factor was found out, it meant the people did not have WTP the parking rates.

Taking into account the existing parking rates of four-wheeled vehicles on weekdays with the starting point of IDR 3,000.00, it was found out that based on the level of acceptance of WTP, not all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, strong factor was found out, it meant the people had WTP the parking rates. Along with the progressive parking rates with the progress of IDR 2,000.00 per hour it was found out that based on the level of acceptance of WTP, not all of the people had WTP the parking rates for the parking duration of 7 hours and 8 hours, all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, strong factor was found out, it meant the people had WTP the parking rates.

Taking into account the existing rates of four-wheeled vehicles on weekend with the starting point of IDR 4,000.00, it was found out that based on the level of acceptance of WTP, not all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, strong factor was found out, it meant the people had WTP the parking rates. Along with the progressive parking rates with the progress of IDR 3,000.00 per hour, the level of acceptance of WTP, not all of the people had WTP the parking rates while based on the level of acceptance of parking mode choice, strong factor was found out for the parking duration of 2 hours, it meant the people had WTP the parking rates and for the parking duration of 3 to 8 hours, weak factor was found out, it meant the people did not have WTP parking rates.

## V. CONCLUSION

Based on the results of analysis and discussion, this study can be concluded parking rates probability of Q Mall visitors with two-wheeled vehicles for the parking and not on weekdays is IDR 1,245.00 per hour and on weekend is IDR 1,345.00 per hour. When there is no choice, the parking rates on weekdays is IDR 1,600.00 per hour and on weekdays it is IDR 2,000.00 per hour. Parking rates probability of Q Mall visitors with four-wheeled vehicles for the parking or not on weekdays is IDR 1,660.00 per hour and on weekend is IDR 1,900.00 per hour. When there is no choice, the parking rates of visitors on weekdays is IDR 2,250.00 per hour and on weekdays it is IDR 2,500.00 per hour. The form of mark-up of progressive parking rates that can be enacted at Q Mall Banjarbaru is for the two-wheeled vehicles on weekdays, the mark-up is less than IDR 1,245.00 per hour. For the two-wheeled vehicles on weekend, the mark-up is less than IDR 1,345.00 per hour. For the four-wheeled vehicles on weekdays, the mark-up is less than IDR 1,660.00 per hour. And for the four-wheeled on weekend, the mark-up is less than IDR 1,900.00 per hour..

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