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Research Article

Activity and Time Value of Public Passenger Transportation Users During the Covid-19 Pandemic in 2020 (Bus of Batik Solo Trans Corridor 4 in Surakarta)

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ABSTRACT

The Covid-19 pandemic in 2020 has a significant impact on all countries' social and economic conditions, including Indonesia. It is fitting that social and economic changes also affect the transportation sector. The value of economic benefits in one public facility operation also depreciated due to the economic recession. One of the variables that can be reviewed is the time value of public passenger transportation users (AUP) to measure how much depreciation has occurred. This study specifically for travel is learning, using the bus mode Batik Solo Trans (BST) Corridor 4. Development of scenarios for questionnaires with stated preference methods, using the choice mode between motorbikes and AUP as an option, and the mode utility is approached with the equation multiple linear regression. The results of the analysis show that the time value of the user in the fleet is IDR 274.67 / hour for a distance of 8.35 km and the Time Value for a distance of 13.0 km = IDR 240.82 / hour with a Value of Activity (VoA) which is close to zero because the activity in the fleet has no financial value. This time value is considerably smaller than the AUP time value with the same intention of trip, studying, which was analyzed in 2015, which was IDR 4,708 / hour.

Keywords: In Vehicle Travel Time Value, Public Transport, Mode Choice, Stated Preference, Multiple Linear Regression

Background

Sustainable transportation is the basis for transportation planning and development in various countries today, including Indonesia. The Directorate General of Land Transportation has carried out various transportation policy developments to support sustainable transportation programs, including Passenger Public Transportation (AUP) which is referred to as the Bus Rapid Transit system. Various kinds of subsidies are distributed to attract the public's interest to use the AUP to travel. However, all AUP development scenarios experience problems when the Covid-19 pandemic occurs. The setting of health protocols to maintain distance between all people causes the whole community to worry about using AUP, in which interactions with plural communities are one of

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the causes of concern about contracting COVID-19.

To find out how much influence the Covid-19 pandemic has, investment for AUP implementation needs attention. The determination of tariffs and subsidies from the government needs attention. A tariff is one of the variables considered to have a major influence on passenger public transport's attractiveness. This is the basis for providing very large subsidies to attract AUP users' demand, namely the application of IDR 0 tariffs for users of Batik Solo Trans (BST) Corridors 1, 2, 3, and 4 in Surakarta. The IDR 0 tariff policy for AUP in Surakarta, Batik Solo Trans (BST), will take effect from July 2020 to December 2020, hoping to increase the busload factor. However, after several weeks of implementation, there was no significant increase in passengers. It could be a consideration for the low BST load factor even though a tariff of IDR 0 was applied; there was a Covid-19 pandemic which was sufficient reason for government leaders to implement a Large-Scale Social Restriction (PSBB) policy which was translated into real terms with Work From Home (WFH) and Study From Home (SFH) which would definitely reduce the mobility of the community.

Decreased mobility due to the Covid-19 pandemic impacts the need to review the benefits of the number of AUP subsidies. The decreasing number of users and user variables that can be quantified to assess the usefulness of subsidies is the value of passenger time on the trip (In-Vehicle Travel Time Value, TTV), representing how much subsidy benefits decrease.

The development of internet technology supports AUP users to carry out useful activities during their travels. If the activity has a productive value, it is believed that it can reduce the TTV value. This decrease is expressed in the Value of Activity (VoA) variable. As an initial identification of VoA, this study will examine the composition/ distribution of AUP BST Corridor 4 user activities.

Methods

The calculation of travel time value is carried out using the model selection approach between BST buses and motorbikes used to create design scenarios in Stated Preference. The scenario design was based on 4 variables (travel time for BST K4 and motorbikes, costs for BST K4 and motorbikes) and 2 levels, respectively. The scenarios asked of the respondents were designed using the orthogonal array method (Loviere et al., 2000) (Barad, 2014) so that there were 8 scenarios (Loviere et al., 2000) with the following compositions in Table 1.

Table 1. Orthogonal Array for 4 attributes and 2 levels, respectively

Scenario	Attribute 1	Attribute 2	Attribute 3	Attribute 4
I	1	0	0	1
II	1	1	0	0
III	1	1	1	0
IV	0	1	1	1
V	1	0	1	1
VI	0	1	0	1
VII	0	0	1	0
VIII	0	0	0	0

The variable value is determined based on the primary survey (travel time) and secondary data (BST K4 Tariff, Motorcycle Vehicle Operating Costs). The BST K 4 route's length is approximately 19 km with 46 stops with the same return and return routes. Travel design speed for BST 15 km/h - 20 km/h, motorbikes 30 km/h - 40 km/h. For the BST rate in accordance with the existing one, namely IDR 0.00 - IDR 4,500.00, while the cost of motorbike travel is based on the BOK of motorbikes from existing study papers at a value of IDR 400.00/km - IDR 800.00/km. The TTV study is based on 2 distance designs, namely 8.35 km and 13.00 km.

Table 2. Scenarios for questionnaire design

Distance 8.35 km				
Scenario	TT BST K4 (Minute)	Cost BST K4 (IDR)	TT MC (Minute)	Cost MC (IDR)
I	25	4500	17	3500
II	25	0	17	7000
III	25	0	13	7000
IV	35	0	13	3500
V	25	4500	13	3500
VI	35	0	17	3500
VII	35	4500	13	7000
VIII	35	4500	17	7000
Distance 8.35 km				
Scenario	TT BST K4 (Minute)	Cost BST K4 (IDR)	TT MC (Minute)	Cost MC (IDR)
I	40	4500	25	5000
II	40	0	25	10000
III	40	0	20	10000
IV	55	0	20	5000
V	40	4500	20	5000
VI	55	0	25	5000
VII	55	4500	20	10000
VIII	55	4500	25	10000

Note:
TT = Travel Time
MC = Motorcycle

Figure 1. Route and interior of BST Corridor 4

Responses from respondents are presented in quantitative data, namely a Likert scale, which contains 4 options: definitely not; probably not; probably; and definitely. Answers may not be included in the options to avoid choosing the easiest one, namely the middle answer (doubtful). Thus, to reduce the tendency to choose the easy one, namely doubt.

Responses to user activities and the purpose of carrying out activities refer to the results of research Yosritzal, 2014 (Yosritzal, et al., 2014). Activities include:

1. Read/send short messages for social and fun;
2. Read/send short messages with financial benefits (selling online);
3. Read/view/post on other social media, such as Facebook, Instagram, YouTube etc.;
4. Make a call;
5. Read books;
6. Chat with seatmates; and others.

The purposes of carrying out activities include:

1. To make not to get bored;
2. To make the trip feel shorter;
3. To add insight;
4. To make time not wasted;
5. To complete pending work; and others.

Result and Discussion

The respondents were Civil Engineering students of UNS who were still active and randomly selected from both the socio-economic characteristics and the place of residence and the year of entering college.

Respondent and travel characteristics

Based on gender, 42.6% of respondents were female, and 57.4% were male. All respondents traveled to campus using motorbikes. Most of the respondents made trips to campus 7-8 times/week as much as 36.2%, and the lowest was 1-2 times/week as much as 17.0%.

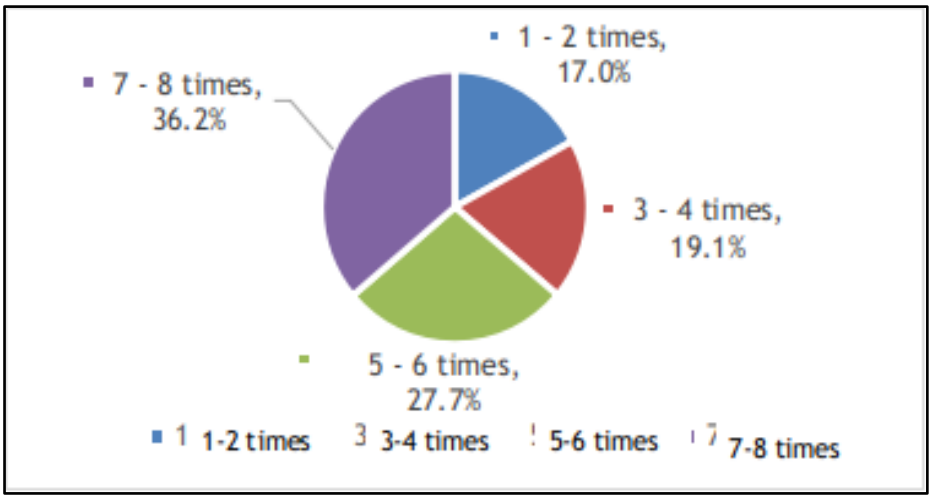

Figure 2. The Frequencies of Trips to Campus/Week

Most of the respondents, 33.0%, allocate costs to campus for one trip of IDR 2,501-IDR 7,500, and the purpose of traveling to campus is mostly for consultations.

Figure 3. Travel costs and Purpose of Travel to Campus

Activities during BST K 4 fleet

Table 3. Percentage of User Activity in Fleet

User Activity in Fleet	Distance 8.35 km	Distance 13.0 km
Read / send short messages for social and fun	74,5%	66,0%
Read / send short messages with financial gain (selling online)	12,8%	19,1%
Read / view / post on other social media, such as Facebook, Instagram, YouTube etc.	76,6%	85,1%
Make a call	4,3%	10,6%
Read the book	10,6%	17,0%
Chat with seatmates	48,9%	51,1%
Others	14,8%	12,7%

Table 4. Purpose of Performing Activities

Purpose of Doing Activities	Distance 8.35 km	Distance 13.0 km
To make not to get bored	89,4%	83,0%
To make the trip feel shorter	63,8%	68,1%
To add insight	29,8%	38,3%
To make time not wasted	29,8%	38,3%
To complete pending work	10,6%	10,6%
Others	0%	4,2%

From several user activities offered, it turned out that only 12.8% of respondents for a distance of 8.35 km and 19.1% of respondents for a distance of 13.0 km carried out activities that had financial benefits. The purpose of doing activities is dominated "to make not to get bored". Based on this condition, it can be concluded that the Value of Activity (VoA) was close to zero. It means that the respondent has not carried out any activities that can be used to consider the decrease in the value of time while in the fleet. This was very different from the condition of people in developed countries who have made great efforts to take advantage of their time to carry out productive activities at all times.

Conclusion

The Covid-19 pandemic has triggered changes in lifestyles and the community's social and economic conditions and the provision of subsidies so that free tariffs for public passenger transportation (AUP) can be applied, resulting in a very low value of user time while in the fleet. The type of activity while in the fleet, which is an activity with no financial value to carry out activities, is to avoid boredom, indicating that the Value of Activity (VoA) is close to zero. In this condition, the economic benefits estimated at the time of planning for subsidies will be very different from reality.

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