Factors Determining MRT Users' Satisfaction During Covid-19 Pandemic

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ABSTRACT

This research aimed to acquire an empirical evidence about variables that affect the overall satisfaction of MRT users during Covid-19 pandemic in Indonesia. The Overall Satisfaction variable was measured by using the dimensions of Cleanliness and Safety, Services and Information, with Travel Convenience as a mediating variable in the relationship between Cleanliness & Safety and Overall Satisfaction. This quantitative research used the data gathered from questionnaire distribution through *Google Form*. The number of samples is 349, that had been selected from a total of 445 respondents. Data manipulation and testing used the *SmartPLS* version 3. The results showed that Cleanliness & Safety, Travel Convenience, Service and Information positively affect Overall Satisfaction. Furthermore, Travel Convenience played a role as a mediator in the relationship between Cleanliness & Safety and Overall Satisfaction.

Keywords: *Cleanliness & Safety, Overall Satisfaction, Service and Information, Travel Convenience*

1. INTRODUCTION

So far, public transportation has become one of the solutions of cheap and fast transportation media for the community. As the Covid-19 pandemic has been existing in Indonesia since March 2020, the use of public transportation can be one of the sources of Covid-19 distribution. Therefore, public transportation needs to get special attention from various parties in order to reduce the risk of Covid-19 distribution through public transportation services, of which one of them is MRT.

Public transportation is a kind of transportation service provided to public, managed according to its schedule, operated on the route that has been designated, that spend a certain amount of cost in every trip. There are various kinds of public transportations, some of them are inter-city transportation media as dominated by airlines, inter-city buses, and trains. In recent years, the network of high-speed train or Mass Rapid Transit (MRT) is being developed in Indonesia, especially in Jakarta. MRT is a kind of fast transportation by using electric train, in which the development process was started on 10th October 2014 and the inauguration was held on 24th March 2019 [1].

MRT as a kind of public transportation which becomes the first and relatively new in Indonesia, gets a lot of attention from public communities. Nevertheless, the provincial government of Jakarta Special Region dan MRT Management have tried to present MRT services as well as possible. This has been proven by the achievement of Platinum award in DTKJ *Awards* and MURI Award Ceremonies on Tuesday, 1st December 2020, whereas MRT

Jakarta is stipulated as the most-friendly public transport to disabled people. Mr. William P. Sabandar (The Director of MRT Jakarta) mentioned that MRT Jakarta will provide the best service in public transportation Jakarta Special Region communities and to create a safe, comfortable, and disability-friendly public transportation [2].

In the use of public transportation, there are several points that become the communities' attention in general, one of them is about the service quality. The measurement of public transportation's quality is not only viewed from the service attribute of such transportation medium, but also from the total consumers' satisfaction in using the transportation medium from initially entering the departure station to exiting from the destinated station. Such measurements are about access to the facilities, ticketing services, waiting time on the platform, comfort, safety in the station and in the train, information accuracy, and etc [3]. Moreover, the measurement of service quality for public transportation is divided into several categories, some of them are schedule accuracy, safety system, cleanliness, passengers' comfort, services and information for passengers.

Based on previous research, yet there are no similarities of variables in measuring the MRT users' satisfaction [3] [4] [5] [6]. This research aimed to fill the gap about the unclarity of methods and variables measuring the MRT users' satisfaction generally, by using travel convenience as a mediating variable in the relationship between cleanliness and safety system in the MRT facilities during this Covid-19 pandemic. Besides, this research stressed on this Covid-19 pandemic condition, that mandates the MRT service provider to make some changes in delivering its service.

The changes in service delivery is a must, such as providing hand sanitizer in several sites, checking body temperature, and keeping the distances among people. Furthermore, this research used the *Theory of Planned Behavior* [7] as its fundamental.

The implication expected from this research is an input to public transportation management in general, and especially to the MRT Management about the importance of overall passengers' satisfaction by considering the comfort for users, especially during this Covid-19 pandemic era. Besides, this research hopefully can strengthen and enrich other research in measuring the MRT users' satisfaction conducted in other countries.

2. LITERATURE REVIEW

2.1. Cleanliness and Safety

In MRT, the train cleanliness becomes a crucial factor for users' comfort. The meaning of cleanliness in this research is the extent of which people can maintain themselves and the environment clean [8]. Furthermore, cleanliness is a condition in which the environment is in the state of clear, pure, and not dirty [9], with no dust, spot, and unpleasant smell [10].

Besides cleanliness, the safety aspect also becomes a supporting factor for MRT users' comfort. Caughey *et al.* [11] stated that safety is a condition in which there is no threat, danger, or loss to someone. According to Dwi [12], safety is a capability of someone to conduct the safety maintenance and monitoring. Meanwhile, Sudjatmika [13] stated that safety is a capability to maintain the condition from anything unwanted. Based on those definitions, it can be concluded that being safe is a condition which is free from danger.

This research refers to the one conducted by [3], in which cleanliness and safety are combined into one variable of measurement.

2.2. Services

Choocharukul & Sriroongvikrai [3] expressed that service becomes an overall perception toward measured performance of transit services from the passengers' perspective. According to [14], service is a continuous process which facilitates the service experience to fulfil various wants, motivations, as well as unique skills. Meanwhile, Jankalova [15] mentioned that good service refers to the availability and sufficiency of service that can be used by public. Based on those definitions, it can be concluded that *service* is an overall performance that can be measured or experienced in transit service from the passengers' perspective.

2.3. Information

Clear information in public transportation mode can ease users in doing their trips by using such mode. Information is a process of encoding and sending messages regarding the process and input that become the characteristics of output [16], after the message has been decoded. Based on [17], information is a kind of communicational activity, or knowledge receive, or knowledge transfer to another person. During this Covid-19 pandemic, the users of public transportation pay more attention to the information related to this pandemic [18].

2.4. Customer Satisfaction

Customer satisfaction is the most expected thing or result by service provider, in this case is the MRT Management. Customer satisfaction is in form of the response regarding the customers expectation fulfilment [19], based on the evaluation of purchase experience that has been conducted previously [20] by comparing between previous expectation and actual performance of the product [21].

2.5. Travel Convenience

Travel convenience is a perception of time and effort needed to find and facilitate the use of transportation [22]. Moreover, travel convenience is related to the effortless attempt to to seek the transportation service that operate according to the users' destinations [23].

The assessment of overall satisfaction for public transportation user needs to be conducted, considering that the system of cleanliness and safety is a crucial matter to public transport and can be a source of Covid-19 transmission. Besides, the service and information provided in MRT also becomes a matter that can give certainty and ease to its users during this Covid-19 pandemic. The research conducted by Dong et al. [18] showed that overall satisfaction in the use of public transportation can be achieved when the users feel safe.

The *Theory of Planned Behavior* underlying this research, in which the behavior of a person is based on his / her power of intention to conduct a certain behavior [7]. According to this theory, human behavior is determined by three kinds of consideration, in which the first is the belief about possible result of behavior and the evaluation (*behavioral beliefs*). The second consideration is the belief about normative expectations from other persons and the motivation to accept those expectations (*normative beliefs*). Meanwhile, the third consideration is about the belief of factors that can facilitate or barrier the behavior and perception of this factor (*control beliefs*) [24]. These considerations can become a fundamental for a person to build the perception about the comfort of MRT public transportation users, thus forming the overall comfort in using MRT during this Covid-19 pandemic.

3. HYPOTHESIS DEVELOPMENT

3.1. Cleanliness & Safety on Travel Convenience

Several researchers have studied about the relationship between cleanliness & safety and travel convenience. [3] in their research in California, have gathered the data from 5000 respondents through questionnaire in San Francisco Bay Area Rapid Transit District (BART) stating that cleanliness & safety have positive and significant effects on travel convenience.

[25] in their research in China collecting data from 3000 respondents by questionnaire stated that safety and comfort have positive and significant effects on travel convenience. This research used the structural equation modeling (LISREL). In addition, the research conducted by [26] has provided a result that cleanliness & safety have positive and significant effects on travel convenience. Data was collected by using questionnaire toward 170 respondents. The research conducted by [18] among public transportation users in 8 (eight) cities in China, has acquired the result that 'feeling safe' dominates the overall satisfaction among those users during Covid-19 pandemic. Based on several researches conducted in the past, this research would test the hypotheses as follows:

H_1: Cleanliness & safety positively affect travel convenience among MRT users during Covid-19 pandemic.
H_4: Cleanliness & safety positively affect overall satisfaction among MRT users during Covid-19 pandemic.
H_5: Cleanliness & safety positively affect overall satisfaction, mediated by travel convenience among MRT users during the Covid-19 pandemic.

3.2. Travel Convenience on Overall Satisfaction

Several researchers have studied about the relationship between travel convenience and overall satisfaction. Srivastava & Kaul [27] stated that travel convenience has a positive and significant effect on overall satisfaction. Besides, [3] in their research in California using 5000 respondents proved that travel convenience has a positive

and significant effect on overall satisfaction. Meanwhile, the research conducted by [28] mentioned that convenience has a positive and significant effect on overall satisfaction. Moreover, the assessment on public transportation passengers' satisfaction during this Covid-19 pandemic is different from those conducted in the past [18].

Based on those researches, the hypothesis developed in this study is as follow:
H_2: Travel convenience positively affects overall satisfaction of MRT users during Covid-19 pandemic.

3.3. Service and Information on Overall Satisfaction

Several researchers have also explored the relationship between service & information and overall satisfaction. The research conducted by Dong et al. [18] during Covid-19 pandemic showed that public transportation passengers pay more attention to information from the provider compared to the condition in the past.

Choocharukul & Sriroongvikrai [3] in their research in California, collecting data from 5000 respondents through questionnaire in San Francisco Bay Area Rapid Transit District (BART) revealed that service and information has a positive and significant effect on overall satisfaction, while this exogenous variable has the most significant effect compared to the other variables.

Anselmsson & Johansson [29] also investigated the relationship between service and information and overall satisfaction in retail industry using 542 respondents. This research resulted that service and information has a positive and significant effect on overall satisfaction. In addition, Koenig-Lewis & Palmer [30] also researched about the relationship between service and information and overall satisfaction by involving 304 respondents using questionnaire. This researched concluded that service and information has a positive and significant effect on overall satisfaction.

Based on that research, the hypothesis can be developed as follow:
H_3: Service and information positively affects overall satisfaction of MRT users during Covid-19 pandemic.

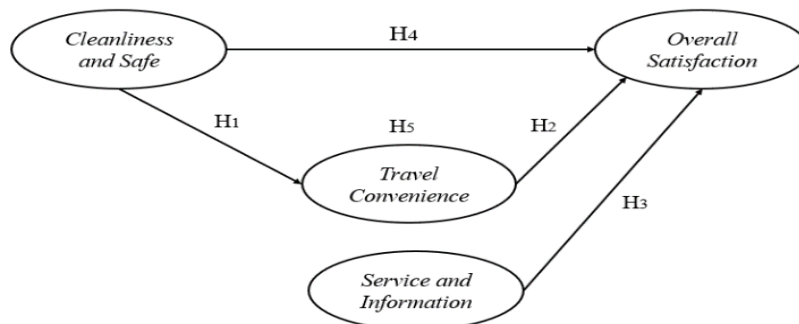This research model can be displayed as follow:

Figure 1 Research Model

4. METHOD

The population of this research is all MRT users in Indonesia during Covid-19 pandemic. The sampling technique used in this research is the *convenience sampling* through Google Form. The samples used in this research came from 445 respondents, due to the opinion from Hair, *et al* [31] mentioning that more than 100 respondents should be used as samples. For data analysis purpose, the Smart PLS version 3 was used in this research.

This research used the survey technique to gather data, thus this is *cross-sectional research*. *Cross-sectional* research is the research in which its data collection is in form of the answer of research questions gathered from samples and the data collection process is only conducted once [32]. In order to filter the respondents who have used MRT, a filter question was created initially, which is: Have you ever used the MRT services during Covid-19 pandemic?

The operationalization of *travel convenience* variable was measured by 7 indicators, while the variable of *service and information* has 4 indicators, the variable of *cleanliness & safety* has 8 indicators, and the variable of *overall satisfaction* has 5 indicators. All indicators are adopted from the research conducted by Choocharukul & Sriroongvikrai [3] with some adjustments in Covid-19 pandemic era.

5. RESULTS AND DISCUSSIONS

5.1. Results

Among 445 data gathered, 96 data did not pass the screening question. Therefore, the data that could be used for further process came from 349 respondents. As many as 149 respondents are male (42.7%) and 200 respondents are female (57.3%). As many as 246 respondents aged between 17-21 years old (70.5%) and 77 respondents aged between 22-30 years old (22.1%). In the matter of monthly expenses, 64.8% respondents spent less than IDR 3 million. In the matter of occupation, 91.1% respondents were college students. In the matter of education level, 77.9% respondents were senior-high-school students, 20.9% respondents had undergraduate degree, and the remaining had post-graduate degree.

In the first *loading factor* test, all indicators had the scores greater than 0.6 except for indicator CS5. Hence, this indicator could not be used in the next data analysis process. Below is the result of validity analysis after excluding the indicator of CS5.

Table 1 Outer Model

Variable	Indicator	Loading	CA	CR	AVE	HTMT		
						CS	OS	SI
Cleanliness & Safety (CS)	CS1	0.788	0.872	0. 902	0.569	-	-	-
	CS2	0.792						
	CS3	0.809						
	CS4	0.824						
	CS6	0.667						
	CS7	0.752						
	CS8	0.627						
Overall Satisfaction (OS)	OS1	0.804	0.868	0. 905	0.656	0.841	-	-
	OS2	0.826						
	OS3	0.859						
	OS4	0.756						
	OS5	0.801						
Service and Information (SI)	SI1	0.732	0.786	0.862	0.609	0.754	0.804	-
	SI2	0.828						
	SI3	0.815						
	SI4	0.742						
Travel Convenience (TC)	TC1	0.742	0.873	0.900	0.531	0.877	0.867	**0.814**
	TC2	0.678						
	TC3	0.702						
	TC4	0.669						
	TC5	0.695						
	TC6	0.801						
	TC7	0.807						
	TC8	0.724						

Notes: Loading : Standardized loading, CA: Cronbach's Alpha, CR: Composite Reliability, AVE: Average Variance Extracted, HTMT: Heterotrait-Monotrait Ratio of Correlations

Based on the result of data analysis as displayed in Table 1, the Average Variance Extracted (AVE) score of each variable in this research is greater than 0.5. Therefore, all variables in this research have fulfilled the criteria of validity measured by Average Variance Extracted (AVE) [33].

Based on the result of cross-loadings in Table 1, it can be concluded that the cross-loadings value of each item in the variable is greater than those of other variables. Thus, it can be concluded that all variables in this research have met the criteria of validity measured by cross-loadings [34].

Moreover, the result of calculation in the HTMT test in this research model can be seen in Table 2, in which all measured HTMT values are less than 0.9, thus it can be concluded that all variables have met the validity criteria through HTMT Test.

5.2. Reliability Test

In this research, the reliability test was conducted by observing the values of composite reliability and Cronbach's alpha. In the tests of composite reliability and Cronbach's alpha, a variable is considered reliable if the values of composite reliability and Cronbach's alpha is greater than 0.6 [35]. Based on the value of Cronbach's alpha (CA) as displayed in Table 1, all variables in this research have the values greater than 0.6. Therefore, it can be concluded that all variables in this research have met the reliability criteria through the composite reliability values.

5.3. Inner Model

5.3.1. R-Square (R^2) Test

R-Square value is used to measure the level of variation of the change in independent variable toward dependent variable. The R^2 criteria consists of three classifications, which are: $R^2 = 0.67$, 0.33, and 0.19 as strong, moderate, and weak. The change in R^2 value can be used to observe whether the exogenous latent variable has a substantial effect on the endogenous latent variable. The output R^2 value of overall satisfaction and travel convenience variables are 0.657 and 0.605 consecutively. This shows that the variables of Cleanliness & Safety, Travel Convenience, and Service and Information simultaneously affecting Overall Satisfaction variable, have a moderate-to-strong predictive power as much as 0.657, which means that if there is a change in the variables of Cleanliness & Safety, Travel Convenience, and Service and Information simultaneously, then the Overall Satisfaction variable will change as much as 65.7%, while the remaining 34.3% will be affected by other variables not included in this research. The effect of Service and Information on Overall Satisfaction has a moderate predictive power as much as 0.605, which means that if there is a change in the variable of Service and Information, then the Overall Satisfaction variable will change as much as 60.5% and the remaining 39.5 % will be affected by other variables out of the scope of this research.

5.3.2. f-Square (f^2) Test

The Effect Size (f^2) measures the effect of certain predictor construct on endogenous construct. This measurement is used to evaluate whether the elimination of a predictor construct will cause big effect to the values of f-Square from the endogenous construct. In Table 2, it can be seen that the variables of Cleanliness & Safety, Travel Convenience, and Service and Information have small effects on Overall Satisfaction in structural level, with the value less than 0.15. Meanwhile, the variable of Cleanliness & Safety and Travel Convenience have big effects with the value of 1.528.

5.3.3. Hypothesis Tests

The hypotheses testing in this research are divided into two parts, which are the direct effect and the mediation effect hypotheses testing. H_1, H_2, H_3, and H_4 are the hypothesis of direct effects, while H_5 is the hypothesis of indirect effect. The value of t-statistics and p-value in the significance level of 95% is greater than 1.96 and less than 0.05 consecutively, in order for a hypothesis to be accepted. Path coefficient is a measurement that shows the relationship between variables. The relationship that can be defined from a path coefficient value, ranges from -1 to +1. The direction shown by a negative or positive sign clarifies the relationship between variables. The results of t-statistics, p-values, and path coefficients of the direct effect hypotheses can be seen in Table 2. The test of hypothesis 5 can be seen in Table 3.

Table 2 Inner Model

	Variable Relationship	*Path*	f^2	**t-Statistics**	**p-Values**	**Explanation**
H_1	$CS \rightarrow TC$	0.778	1.528 (Strong)	28.330	0.000	Accepted
H_2	$TC \rightarrow OS$	0.365	0.129 (Weak)	6.067	0.000	Accepted
H_3	$SI \rightarrow OS$	0.230	0.079 (Weak)	4.715	0.000	Accepted
H_4	$CS \rightarrow OS$	0.306	0.103 (Weak)	5.651	0.000	Accepted

The path coefficients for all relationships are greater than zero. The t-statistics for all hypotheses are greater than 1.96. The p-values of all hypotheses are 0.000 (< 0.05), with 95% significance level. Based on path coefficients, t-statistics, and p-values, hence all hypotheses (H$_1$ - H$_4$) could be accepted.

Table 3 Mediation-Test Result

	Variable Relationship	Path	t-Statistics	p-values	Explanation
H$_5$	$CS \rightarrow TC \rightarrow OS$	0.292	5.932	0.000	Accepted

The result of the fifth hypothesis test shows that the path coefficient of H$_5$ is 0.292 (> 0), the t-statistics is 5.932 (> 1.96), and the p-value is 0.000 (< 0.05). Based on these parameters, H$_5$ stating that Cleanliness & Safety as an indirect and positive predictor of the Overall Satisfaction variable mediated by Travel Convenience, could be accepted. This means that Travel Convenience has a significant effect in mediating between Cleanliness & Safety and Overall Satisfaction, and this mediating relationship has a positive direction.

5.3.4. Discussions

This research is based on the Theory of Planned Behavior [7] stating that human behavior is determined by three kinds of considerations, which are behavioral beliefs, normative beliefs, and control beliefs. These considerations become the fundamental of this research to develop someone's perception about the comfort of MRT public transportation users, thus forming the overall satisfaction of using MRT during Covid-19 pandemic.

This research involves 349 respondents. Based on the description of research subject, 149 respondents are male (42.7%) and the remaining 200 respondents are female (57.3%). As many as 246 respondents aged between 17-21 years old (70.5%), 91.1% respondents were college students, and the remaining were employees. Meanwhile, based on recent education, 77.9% respondents were senior-high-school graduates.

Based on the result of loading-factor in Table 1, the indicator of CS5 has been eliminated due to its loading-factor less than 0.6. Therefore, such indicator was not used in further data analysis process. Instead of the CS5 indicator, all the other indicators of each variable have loading-factor greater than 0.6, which means that the variable has met the loading-factor requirement.

As the result of the first hypothesis test, the path coefficient (β) is 0.778, t-statistics is 28.33, and p-value is 0.000. This result shows that H$_1$ was accepted and is aligned with the result of the research conducted by [3], [25], and [26], whereas Cleanliness & Safety positively and significantly affects Travel Convenience, and these two variables have a positive relationship.

The path coefficient from the second hypothesis test shows the value of 0.365, t-statistics of 6.067, and p-value of 0.000. According to these results, the second hypothesis was accepted concluding that Travel Convenience positively and significantly affects Overall Satisfaction, and these two variables have a positive relationship. This result is in line with the research conducted by [28], [27], and [3]. The third hypothesis was also accepted with the path coefficient of 0.230, t-statistics of 4.715, and p-value of 0.000. This result is in line with the research conducted by [3], [29], and [30] in which Service and Information positively and significantly affects Overall Satisfaction, and these two variables have a positive relationship.

Based on the path coefficient of H$_4$ as much as 0.306, t-statistics 5.651, and p-value 0.000, it can be concluded that H$_4$ was accepted. This is in line with the research of [3] whereas Cleanliness & Safety becomes a predictor of Overall Satisfaction, and these two variables have a positive and significant relationship.

From the fifth hypothesis test, the result was acquired in which the path coefficient is 0.292, t-statistics is 5.932, and p-value is 0.000. Thus, Cleanliness & Safety positively and indirectly affects Overall Satisfaction, as mediated by Travel Convenience. This is in line with the result of [3].

According to the results of hypotheses test, it's been proven that during this Covid-19 pandemic, Cleanliness & Safety, Travel Convenience, and Service and Information positively and significantly affect Overall Satisfaction of MRT users in Jakarta, and Travel Convenience which serves as a mediating variable, significantly plays its role in mediating between Cleanliness & Safety and Overall Satisfaction.

The managerial contribution of this research is about the importance of Cleanliness & Safety, Travel Convenience, and Service and Information in determining Overall Satisfaction of MRT users in Indonesia, in which Cleanliness & Safety can strongly affects Travel Convenience. In addition, Service and Information provides weak effect on Overall Satisfaction.

As the implication of this study, there is a need to improve the cleanliness & safety as well as travel convenience in order to increase the overall satisfaction of the MRT and other public-transportation users.

6. CONCLUSION & SUGGESTION

Based on the research that has been conducted, it can be concluded that Cleanliness & Safety becomes a positive predictor of Travel Convenience, and these two variables have a positive relationship. Service and Information serves

as a positive predictor of Overall Satisfaction, and these two variables have a positive relationship. Cleanliness & Safety becomes a positive predictor of Overall Satisfaction, and these two variables also have a positive relationship. Travel Convenience plays its role in significantly mediating between Cleanliness & Safety and Overall Satisfaction variables, while this mediating relationship has a positive direction.

Some suggestions can be provided for the next research. Practitioners need to pay attention about the importance of *Cleanliness & Safety, Travel Convenience,* and *Service and Information* in determining *Overall Satisfaction for* MRT and other public transportation users, especially the *Cleanliness & Safety* that has been proven to be able to strongly affect the *Travel Convenience.* This research can strengthen the previous research conducted by [3]. Besides, academicians can conduct similar research in different public transportation industry in order to broaden the scope of research, or add another variable, such as ease-of-access [36].

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