



ASLI QoL 2022



AicQoL2022Penang

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10th AMER International Conference on Quality of Life
Shangri-la Rasa Sayang, Malaysia, 16-17 Mar 2022



Public Transport, Ridership and Safe Travelling Environment during COVID-19 Pandemic

Rohana Sham ¹, Chia Kai Xuen ¹, Lee Yi Ting ¹, Mohammad Nazmuzaman Hye ²

¹ Department of Logistics Management, Faculty of Business Management, UCSI University, Malaysia,

² General Manager, Interport Ship Agent LTD, Dhaka, Bangladesh.

rohana@ucsiuniversity.edu.my, 1001852918@ucsiuniversity.edu.my, 1001852992@ucsiuniversity.edu.my, hye@interport.org
Tel: 012-5570602

Abstract

The COVID-19 pandemic has caused a dramatic decrease in public transport demand. Even though public transport in Malaysia is allowed to reboot and run with total capacity after the end of a movement control order, many public transport users still worry and refuse to take public transport as their movement tools. Therefore, government and public transport service providers must pay attention to improving preventive steps to keep public transport users feeling secure. Thus, the present study proposes a research model encompassing perceived risk, standard operating procedure, and information credibility in understanding the feeling of safety among Malaysian public transport users.

Keywords: Public transport; Safety; Travelling Environment; Covid-19.

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DOI: <https://doi.org/10.21834/ebpj.v7i19.3217>

1.0 Introduction

According to Wu et al. (2020), the breakout of COVID-19 has been widely spread to other cities and countries from the epicenter Wuhan China since December of 2019. COVID-19 is identified as the human-to-human transmissible infectious disease as well as the 7th coronavirus (Andersen et al. 2020), and it was officially classified as a global pandemic by The World Health Organization (WHO) in March 2020 (Maier & Brockmann 2020). According to Li et al. (2020), COVID-19 can be transmitted through airborne, droplet, and contact routes. Globalization and the hypermobility of society are the main reasons COVID-19 can rapidly spread worldwide from the first epicenter Wuhan in just a matter of weeks (Wu et al., 2020). This pandemic brings a significant change in people's lives. The break out of COVID-19 had profound effects on people's lifestyles. People stopped traveling to places starting to work from home, which led to a dramatic rise in teleworking and a massive drop in mobility (Tirachini & Cats, 2020). These changes are because governments worldwide are setting all kinds of measures to prevent and control the widespread of COVID-19 to manage public health with their limited resources (Musselwhite et al., 2020), as well as individual decisions not to take public transport to reduce risk of contamination. As a result, the situation affects people's demand for public transport. Therefore this research aims to determine the factors that affect the feeling of safety of public transport users while traveling during COVID-19. Also, the study seeks to examine the relationship between the significant factors that affect the sense of security of transport users while traveling during COVID-19.

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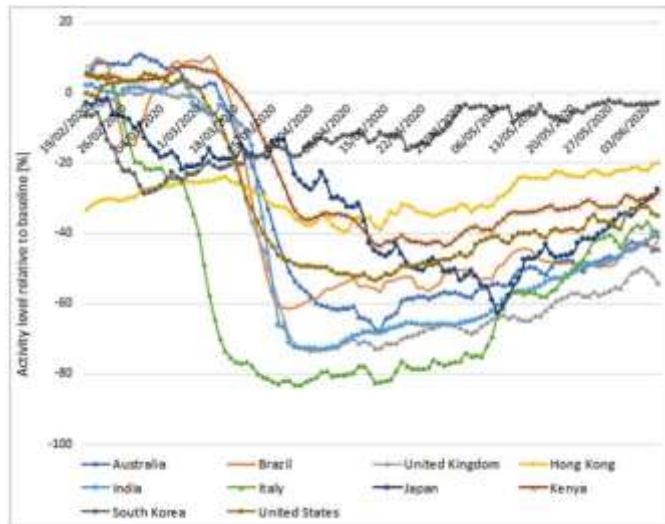


Fig. 1: Change in Use of Public Transportation Hubs
(Source Tirachini and Cat, 2020)

Fig 1 shows an overall change in public transport stations such as bus stops and train stations in different countries. It is evident that starting from March 2020, there will be a massive drop in public transportation stations in most countries. Same in Malaysia, following the execution of MCO, there has been a noticeable decrease in the number of public transport users (Karim, 2020). He also mentions that the overall ridership of Rapid Bus has a drop of 66%. The tremendous loss of ridership was reported for BRT Sunway at 79.5%. Also, a decline of 75.7% is found in MRT feeder buses ridership. Moreover, the ridership of Rapid KL, Rapid Penang, and Rapid Kuantan also reported a ridership drop during MCO at 65.1%, 50.8%, and 62% (Karim, 2020). It is believed that if the situation is not tackled reasonably, it will leave a negative impact on the public transport operators.

2.0 Background of the study

During the COVID-19 pandemic, some citizens decided not to take public transport to minimize the risk of contamination (Musselwhite et al., 2020). The situation is worsened due to the measurements taken by most of the country to impose travel restrictions to cease the spread of COVID-19 (Vos, 2020). Due to this situation, a dramatic decrease in public transport demand (Boot et al. 2020) had occurred. Despite of public transport in Malaysia is allowed to reboot and run with total capacity starting from June 11, many public transport users still worry and refuse to take public transport as a precaution (Hassan, 2020). Fig 2 shows the Malaysian attitude towards public transport during the pandemic, and Fig 3 shows the decline of public transport usage due to the pandemic.

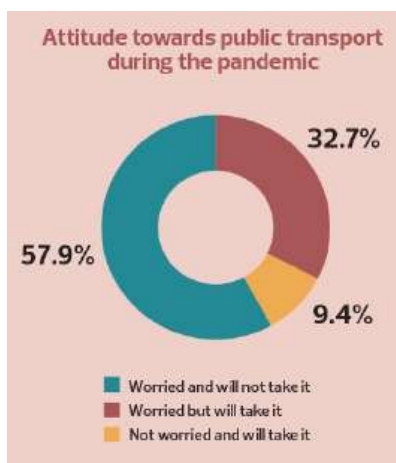


Fig 2: Malaysian attitude towards public transport during the pandemic
(Source: The Edge Malaysia, 2020)

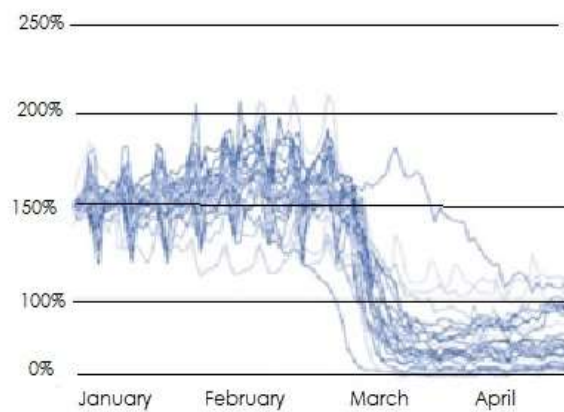


Fig 3: Impact of Coronavirus (COVID-19) on Public Transit usage
(Source: OECD Data, 2020)

The phenomena from both Fig 1 and Fig 2 are much related to the feeling of safety of the ridership towards the traveling environment they have to face.

2.1 Perceived Risk and Feeling of Safety

According to Khosravi (2020) pandemic's perceived risk can lead to changes in individual protective behaviors, which means that the level of a perceived threat that the public towards this pandemic would change their mind either to use or refuse any usage of public transport as a step to protect themselves while traveling during the COVID-19. However, people who cannot travel by other means of transportation are left with no choice but to rely on public transport to support their daily essentials (Koplon, 2020). Many people, especially in peak hours in the morning and evening, have to travel in crowded common spaces with minimal ventilation. This is supported by Goscé and Johansson (2018). They claimed that cramped and overcrowded environments, especially transport hubs, which people visit daily, can become hot spots for contagious diseases.

Surfaces such as handrails buttons that public transport users often touch can be a virus transmission medium, and thus public transport users get a higher risk of contamination (Tirachini & Cats, 2020). Moreover, there are the vulnerable such as the elderly and the children taking public transport, who have a higher risk of being contaminated. All the recent research trends are still focusing on the risk of the travelers from an accident and crime point of view when safety is a concern, leaving the feeling of a safety component for each individual who rides on public transport still missing, especially during the pandemic. This has created a massive gap for the study to fill. This study proceeds with the Protection Motivation Theory (PMT) theory. It stipulates that the emotional state of fear arousal affects attitudes and behavior change indirectly through the appraisal of the danger's severity (Rogers,1975). Research conducted by Mazareanu(2020) asked their respondent, "if coronavirus were to spread to your community, would you be more or less likely to use public transport" revealed the following result in Fig 4:

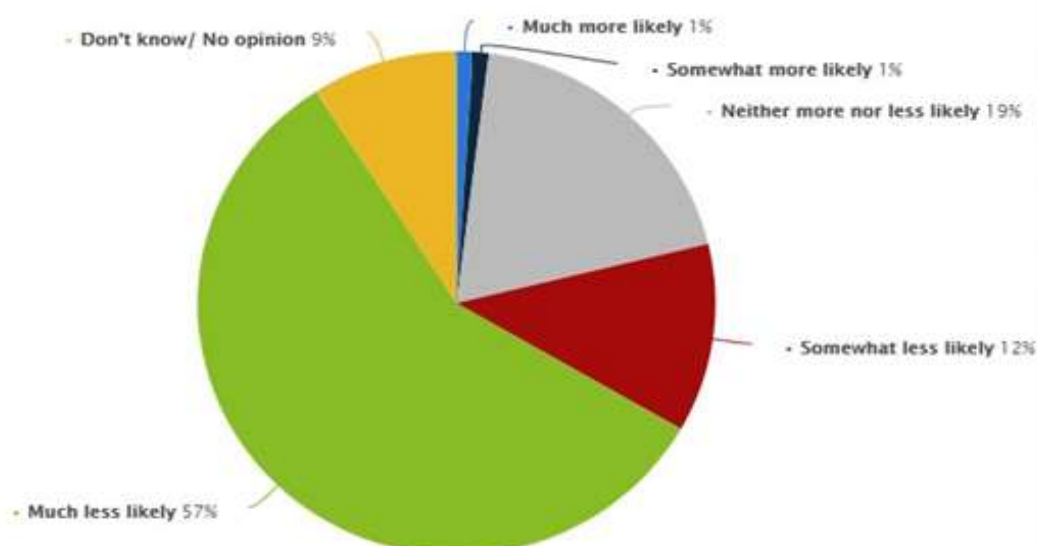


Fig 4. Usage of public transport
(Source: Mazareanu(2020))

Thus following hypothesis is proposed:

H₁: There is a relationship between perceived risk and safety among public transport users in urban areas while traveling during COVID-19.

2.2 Standard Operating Procedures (SOPs) and Feeling of Safety

The second factor being a focus in this study is SOP. During the COVID-19 pandemic, discouraging public transportation might be the most prudent 'social distancing' strategy. There have been severe difficulties in managing the spread of the disease due to the high rate of transmission of the outbreak, the shortage of vaccines, and some prescription therapies for COVID-19. Non-medical interventions such as promoting personal safety procedures, personal hygiene and the use of face masks, the imposition of travel restrictions, and the preservation of social distance from potentially infectious cases are essential to resolve these problems (Khosravi, 2020). Fig 5 demonstrated how the social distancing on the public bus, where users should only be allowed to sit spaced apart without touching each other, and seats should be 'crossed off' for this purpose. Busses should not begin to travel until passengers have taken their seats. Passengers should not leave their seats until the complete bus stops for lighting to avoid passengers having any contact with handrails and supportive seats. However, not all operators are willing to change to adhere to the procedure. This will involve an extra cost to their daily operation.

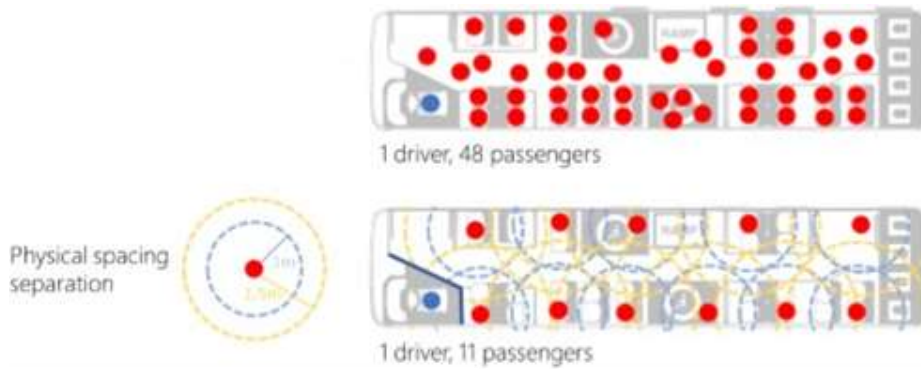


Fig 5: Physical isolation of public transit capability
(Source: International Transport Forum, 2020)

Thus following hypothesis is proposed:

H₂: There is a relationship between SOP and the feeling of safety among public transport users in urban areas while traveling during COVID-19.

2.3 Information Credibility and Feeling of Safety

Information credibility is an essential aspect of an individual's information evaluation. It can be defined as an individual's subjective evaluation of the accuracy of the obtained information. In this research, information credibility is the extent to which one perceives information to be believable and is a strong predictor of an information consumer's further action (Flanagin & Metzger, 2020). At any point of the pandemic, practitioners must know about rumors and the possibility of "emotional contagion" among people (Goodwin, Gaines, Myers, & Neto, 2010).

The social background will influence the degree of concern encountered. For example, the low-income class will worry about problems such as the equitable and fair distribution of health care (Vaughan & Tinker, 2009). Thus, the low-income type is probably experiencing a higher concern for health risks. Their negative emotions, such as fear and anxiety, are increasing, and reducing risks is facing significant challenges (Khosravi, 2020). Public awareness can be affected by the way the media cover it. There are a few reasons why media can affect the public emotionally, such as the media are trusted by most people; the value and tone of media reports; media sources and their trustworthiness; formats they present risks; and media channels and types. Although the degree is different for all these media factors, the correlation between them and risk perception is supported by theory and experience.

Thus following hypothesis is proposed:

H₃: There is a relationship between Information Credibility and the feeling of safety among public transport users in urban areas while traveling during COVID-19.

2.4 Feeling of safety and Public Transport Ridership

This study proceeds with the definition of safety in that it is vitally important to the continued success of the busway operation (Goodwin et al., 2020). The movement control has resulted in a dramatic decline in transportation demand (Ibold, Medimorec, Wagner, Peruzzo & Aires, 2020). Coronavirus, COVID-19, is increasingly impacting how people conduct their daily lives, and the current situation is challenging to estimate (Musselwhite et al., 2020). The transportation sector has been one of the primary victims of COVID-19. The fear of coronavirus, the executive order of the governor, mandating people to stay home as much as possible, and growing restrictions imposed by governments have adversely affected both public transport services and their demands (Harikumar, 2020). The following is the theoretical framework proposed for the study:

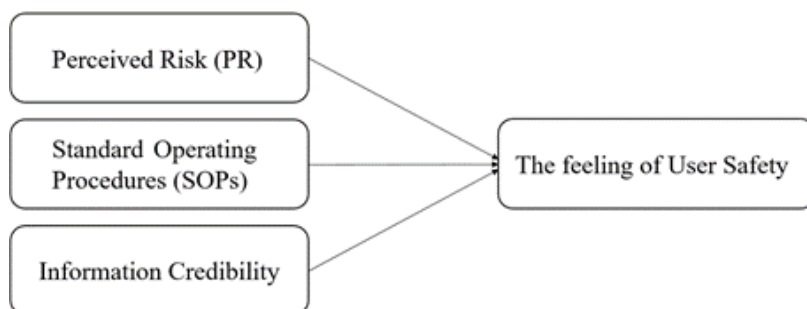


Fig.5 Theoretical Framework

3.0 Methodology

In this study, a quantitative method is applied. According to Johan et al. (2020), the quantitative method is the research method that focuses on numbers and figures in the data collection and data analysis. Moreover, Wade (2011) also defined quantitative methods as research methods that deal with any measurable thing that studies phenomena and their relationships in a systematic way. It is used to answer questions on relationships within measurable variables to explain, predict and control a phenomenon (Leedy 1993, Sham et al. 2019). The qualitative method is not suitable due to the nature of the research, which requires a survey (Johan et al.,2020, Kamaruddin, 2020). Using the quantitative method, the researchers made hypotheses and tested those independent and dependent variables based on the concept to be studied (Golafshani, 2003). The study proceeded with 384 samples which is adopted from Krejcie and Morgan (Sham et al.,2020, Krejcie & Morgan (1970) and non-probability sampling as the sampling technique. Samples based on convenience and their judgment (Showkat & Parveen, 2017) are used due to the ability to generate valuable insights into the study of particular phenomena. The data were collected around Kuala Lumpur urban area bus stops with questionnaires (Sham et al.,2021, Vaus, 2014) as the primary tools for understanding the scenario. Respondent was selected among the active working-age with a minimum age of 18 years and above (Flanagin & Metzger, 2020) who ride on public transport. Data were then analyzed using inferential analysis (Frost,2019).

4.0 Findings

Cronbach's alpha value for dependent variable regarding the feeling of user safety has a value of 0.753 which means 75.3% of the variance is reliable variance. While, the Cronbach's alpha value for independent variable of perceived risk is 0.805, standard operating procedures is 0.859, and information credibility is 0.927. Among all the cronbach's alphas, information credibility is the highest value compared to other dependent and independent factors. Thus, it achieves high reliability. The finding starts with the means score analysis for each variable involved.

4.1 Mean Score Analysis on Perceived Risk and Feeling of Safety

Table 1 Mean Score Analysis for Perceived Risk

	Mean	Std. Deviation
If I have seen a greater danger of being infected with COVID-19, I will reduce my travel by public transport.	4.51	0.626
In a pandemic, I always feel unsafe using public transport.	4.41	0.763
I am always worried that I will become infected during this COVID-19 pandemic while using public transport.	4.15	0.707
Due to my fear, I always avoid using public transport to prevent getting COVID-19 if I have a choice.	4.08	0.791
Due to my feelings of fear of potential COVID-19 contamination, I will reduce my public transport usage.	4.18	0.732

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Table 1 shows that the respondents had indicated that, "If I have seen a greater danger of being infected with COVID-19, I will reduce my travel by public transport." has the highest mean of 4.51. A mean of 4.51 is close to 5, which is considered strongly agree on the Likert scale. It indicates that most of the respondents strongly agree that if they sense greater danger, they will reduce their travel using public transport. The traveling environment then followed this during COVID-19 (4.41).

4.2 Mean Score Analysis on SOP and Feeling of Safety

Table 2 Mean Score Analysis for SOP

	Mean	Std. Deviation
I trust Malaysia's SOP design for urban public transport usage.	3.45	0.971
If all passengers must wear masks, I will be more confident when riding on public transport.	3.91	0.864
If the social distancing is in place, I will take public transport.	3.81	0.931
When all passenger temperatures are properly scanned, my trustworthy level of travel on public transport increases.	3.81	0.888
During this time, scanning QR codes through the proper MySejahtera Apps being provided builds my trust for my public transport ridership.	3.67	0.924
My public transport riding will increase if my level of safety is improved by simply providing a hand sanitizer at the station and stop.	3.87	0.901
The Standard Operating Procedure (SOP) execution affected my feeling of safety while riding on public transport.	3.89	0.863

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

The highest mean score was reported on the increase in confidence if all public transport users must wear masks (3.91) while riding on it. This was followed by executing the SOP while depending on public transport (3.89).

4.3 Mean Score Analysis on Information Credibility and Feeling of Safety

Table 3 Mean Score Analysis for Information Credibility

	Mean	Std. Deviation
My public transport riding will increase when I have access to enough information on the safety aspect of traveling.	4.01	0.881
Fake information received will reduce my safety feeling to my public transportation riding.	4.08	0.858
The information I receive via social media networks affects my sense of safety and public transport ridership.	4.12	0.851
If my sense of safety towards COVID-19 information on social media platforms reaches me wrongly, my riding on public transport will be affected.	4.02	0.813
If I get more fake news about COVID-19, my fear of public transportation will increase and reduce ridership.	4.14	0.887

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Table 3 shows the mean score of information credibility and feeling of safety which recorded that the information via social media affects the sense of security (4.12) on public transport ridership, especially when they received fake news (4.14).

4.4 Model summary of regression analysis

Table 4. Model summary of regression analysis

Model	R	R ²	Adj. R ²	StdErr of the Est.	Change statistics		
					R ²	F	df1
1	0.940 ^a	0.885	0.884	0.72679	0.885	970.228	3

Regression was conducted to find the impacts of perceived risk, SOP, and information credibility towards the feeling of safety among public transport users in an urban area. The value of R square has shown that the 94% of the variance in the feeling of safety can be attributed to the change in the three IVs mentioned. The value of R indicates that the model has good prediction quality.

4.4.1 Coefficients in regression analysis

Table 5. Coefficients

Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig
1	(Constant)	0.058	.406		0.143	0.886
	Perceived Risk	.262	.014	.334	19.150	<.001
	SOP	.289	.008	.633	36.271	<.001
	Information	.326	.010	.577	33.036	<.001
	Credibility					

The coefficients in regression analysis shows that perceived risk ($\beta = .262, p < .05$), SOP ($\beta = .289, p < .05$) and information ($\beta = .326, p < .05$) have made a significant contribution to the prediction of criterion variable. This is because their significant values are all less than 0.05. Besides, information credibility has the largest beta coefficient, which is 0.326. Hence, it is the strongest unique predictor in predicting the feeling of safety among urban public transport users compared to SOP (0.286) and perceived risk (0.262). Perceived Risk has the smallest beta coefficient, which is ($\beta = .062, p < .05$). It shows that it is the weakest unique predictor factor in predicting the feeling of safety among public transport users in an urban area. With this result, all three hypotheses were accepted:

Following is the hypothesis being accepted:

H₁: There is a relationship between perceived risk and safety among public transport users in urban areas while traveling during COVID-19.

H₂: There is a relationship between SOP and the feeling of safety among public transport users in urban areas while traveling during COVID-19.

H₃: There is a relationship between information credibility and the feeling of safety among public transport users in urban areas while traveling during COVID-19.

5.0 Discussion

The research aims to discuss the crisis of pandemic and the impact on demand of public transport and the feeling of user safety. Three variables are considered to examine whether the user's feeling of safety among urban area citizens is dependent on various attributes such as perceived risk, standard operating procedures and information credibility. This study found that the perceived risk had significantly affected the safety of the current public transport users. This study outcome aligns with the research conducted by Ibuka et al. (2010), who also concluded that perceived risk significantly affects people's precautionary behavior. Thus people will avoid crowded places such as public transportation to stay safe. Another significant finding in this study was that Standard Operating procedures would affect the users'

safety during the COVID-19 pandemic. This is also in line with the result by Khosravi, 2020). The result of the information credibility indicates that respondents are mostly affected by the information they received, especially on the fake news on social media regarding the spread of COVID -19. The result is aligned with Goodwin, Gaines, Myers, & Neto (2010). Mcknight and Kacmar (2007) had conducted a study on factors and effects of information credibility. The outcome of the study has shown that credibility of the information received by users will significantly affect their feeling of safety. This study gathered respondents' opinion regarding the reliability level of the information they received, and examined whether the information credibility can affect their feeling of safety taking public transportation during the COVID-19 pandemic. From the output of the descriptive analysis, the mean score is relatively high at an overall mean score of 4.07, which indicates that respondents are mostly agreed that receiving unreliable information will negatively affect their riding behaviour on public transportation. Therefore, this study result is aligned with Mcknight and Kacmar (2007)'s study result.

6.0 Conclusion and Recommendation

The pandemic has had a significant impact on the demand for public transportation. The seriousness of the pandemic and the information awareness should be taken seriously by all people, as there are large numbers of passengers unaware of and underestimating the pandemic's danger. Additional factors might impact the users' feeling of safety while taking public transportation during the pandemic. Thus, future researchers should establish more factors analysis as leading independent to analyze the scenario more extensively from the perspective of COVID-19 victims and their family members' travel behavior.

Acknowledgements

Many thanks go to all the respondents who have participated in the survey conducted. It is a self-funded survey done to understand the situation of current public transport users in Klang Valley.

Paper Contribution to Related Field of Study

This study provides an overview of the factors of demand drop in public transport during this pandemic and ways to overcome the confidence of public transport users by determining the real factors that affect their level of safety while traveling during the COVID -19 situation. Through this study, the public transport planners discovered a comprehensive solution or some improvement that needs to be done in the traveling environment during the pandemic. Therefore, this study is worth reviewing by the public transport planners to have a clear overview of the current situation and the causes that lead to this situation.

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