

RESEARCH ARTICLE

# The Impact of Perceived Accessibility to MRT Service and Perceived Neighborhood Safety on Quality of Life: A Study in Malaysia

Sharon Lim, Wai-Chun Wong, Zhen-Xi Wu, and Chee-Seng Tan\*

Universiti Tunku Abdul Rahman, Malaysia

\*cstan@outlook.my

**Abstract:** Quality of life (QoL) has long been studied by researchers. As a part of the Malaysian government's efforts to improve citizens' QoL, in 2017, a new mass rapid transit (MRT) service was launched in Selangor. Although past studies support that access to public transportation service increases QoL, no study has directly examined the relationship between accessibility to the new MRT service and QoL. Thus, a cross-sectional study was designed to test the effects of perceived accessibility to the new MRT service and perceived safety on QoL. Two hundred and fourteen MRT users were recruited using convenience and online snowball sampling and were asked to report their accessibility to the MRT service, the safety of the neighborhood, and QoL. Hierarchical multiple regression showed that after controlling the demographic factors (age, gender, and income), perceived accessibility to the MRT service had a positive relationship with QoL. However, perceived safety had no relationship with QoL and did not moderate the relationship between perceived accessibility and QoL. Overall, the findings offer the first empirical evidence of the beneficial effect of the MRT service on QoL and highlight the necessity of developing public transportation services in Malaysia.

**Keywords:** quality of life, mass rapid transit service, perceived accessibility, perceived safety, Malaysia

Quality of life (QoL) broadly refers to how individuals assess the goodness of objective and subjective aspects of their lives (Frisch et al., 1992). A large number of studies have identified the antecedent factors of individuals' QoL. For instance, Sakip et al. (2013) found that safety perception is a critical aspect of achieving good QoL.

Meanwhile, environmental studies demonstrated that both traffic congestion and air pollution pose a threat to QoL (Stjernborg & Mattisson, 2016). In line

with the findings, although the number of car owners is increasing rapidly in Malaysia (Ismail et al., 2012), Chan (2017) reported that people using cars as transportation tools reported a lower QoL. On the contrary, Litman (2010) stated that public transportation could reduce emotional stress by increasing people's accessibility to social and recreational activities. Many commuters find that public transportations bring more advantages than their own driving because using public transportation requires less effort and thus reduces stress level (Wener

& Evans, 2007). Indeed, a recent study found that perceived accessibility to public transport is positively related to QoL (Aguiar & Macário, 2017).

A new mass rapid transit line from Sungai Buloh to Kajang (hereinafter known as MRT service) was officially launched on July 17, 2017 in Malaysia. No research to date has been carried out to examine the impact of that new MRT service on commuters' QoL. Although accessibility to public transportation services has been found beneficial to QoL of residents in Malaysia (Mansor et al., 2013; Salleh & Badarulzaman, 2012), it is inadequate to assume that the positive effect can be generalized to the MRT service. In other words, independent research is warranted to understand the impact of the MRT service, if any, on the commuters' QoL. Thus, the primary purpose of the present study is to investigate whether or not perceived accessibility to the MRT service promotes users' QoL. Moreover, considering that perceived safety plays a critical role in QoL (Salleh & Badarulzaman, 2012), the present study aimed to examine the hypothesized moderating role of perceived neighborhood safety in the relationship between MRT services and QoL to offer a more comprehensive picture of the conditional effect of the MRT services on QoL. It is expected that, after statistically controlling the confounding effects of demographic variables (e.g., age, income), a high level of accessibility to the MRT services is beneficial to QoL when perceived safety is high. The outcomes of the present study are expected to shed light on the impact of the new MRT service on people's QoL besides offering further support for the government to continue developing more MRT services and public transportations for people's welfare.

### **Perceived Accessibility to MRT Service and Quality of Life**

The concept of QoL has been broadly defined as the degree to which an individual's life experience satisfies them in terms of physical and psychological needs (Idris et al., 2016; Frisch et al., 1992; Salleh & Badarulzaman, 2012; Yassin et al., 2011). In other words, QoL is the overall satisfaction with the life of an individual (Salleh & Badarulzaman 2012). Previous studies (e.g., Mansor et al., 2013; Schneider et al., 2013; Senlier et al., 2008) have suggested positive roles of public transport services on QoL.

For instance, Senlier et al. (2008) investigated QoL in Kocaeli, a city in Turkey, with accessibility to public transportation as one of the factors. Their results indicated that access to public transportation services in Turkey did predict QoL. Similarly, Schneider et al. (2013) found that access to public transportation services improves the QoL of the residents in Minnesota as the services allow them to travel to important destinations more easily.

Meanwhile, the positive effect of public transportation services on QoL has also been observed in the Malaysian context. Salleh and Badarulzaman (2012) investigated the role of household satisfaction of social, physical, and economic features in QoL by interviewing middle-income households in Penang, Malaysia. Although 56% of the residents were satisfied with their QoL, the remaining 44% were concerned that the public transportation services, the cost of living, and the safety issue had affected their QoL. The results suggest that, as in other countries, public transportation services play a vital role in QoL. The importance of public transportation services is further supported by Mansor and colleagues' (2013) finding that access to public transportation services positively contributes to the QoL of residents in Terengganu.

### **Perceived Safety and Quality of Life**

As observed, one's perception of safety and fear of criminal victimization may impact the QoL in various ways, such as their living patterns and daily routines (Deniz, 2016; Sakip et al., 2013). The European Commission (2013) researched 79 European cities to examine its people's QoL and its antecedent factors. The results derived from 41,000 respondents indicated a positive relationship between participants' perceived safety (in both their neighborhood and city) and their QoL. Deniz (2016) investigated the role of perceived safety in QoL and health of 50 female and 43 male participants aged 55 to 80 years old in Turkey. Results showed that fear of victimization caused them to choose to stay in a nursing home rather than living alone, thus restricting them from their social activities and daily transportation style.

Likewise, a similar positive relationship between perceived safety and QoL has also been documented in Malaysia. Mansor et al. (2013) conducted a study on 600 citizens from different districts with half hailing from rural areas in Terengganu and found a

significant relationship between perceived safety and QoL. Besides, Yassin et al. (2011) identified social relationships, safety, condition of their home, and education that contributed to the level of QoL among 900 villagers residing along the Pahang and Muar rivers. Similarly, Idris et al. (2016) examined the QoL of 240 villagers aged between 15 to 84 years old living near Tembeling, the Pahang, and the Muar Rivers. They found that safety, housing, social involvements, family relationships, and education contributed to a higher QoL in the villagers.

### **The Moderating Role of Perceived Safety**

Although studies have shown that perceived safety contributes to one's QoL, perceived safety also plays a role in the perceived accessibility to public transportation service (Litman, 2014). Specifically, when the neighborhood's crime rate is high, people are afraid to drive their vehicles, walk, or cycle as snatching cases may happen to them anytime, anywhere. Similarly, the findings of Adebola et al. (2014) indicated that safety is important and is a prerequisite for mobility. Litman (2014) also mentioned that public transportation services are relatively safer than other transportation modes in terms of crash risk and crime risk.

As previous studies have suggested that both accessibility to public transportation services (Litman, 2010; Mansor et al., 2013; Schneider et al., 2013) and perceived safety (Deniz, 2016; Hassan et al., 2013; Mansor et al., 2013) have positive impacts on QoL and that perceived safety may influence the usage of public transportation services, it is reasonable to assume that perceived safety may moderate the association between accessibility to public transportation services and QoL. In other words, it is logical to assume that accessibility to the MRT services is more likely to improve QoL when the commuters feel safe to walk around in the city or neighborhood. On the contrary, accessibility to the MRT services will not contribute to QoL if the city or neighborhood is unsafe for the commuters.

### **The Present Study**

According to Maslow's (1968) hierarchy of needs theory, there are five categories of needs in a hierarchical manner, starting from the need for

physiological means, safety, belongingness, self-esteem to self-actualization. To proceed to a higher level, the lower level of needs must first be fulfilled. Put differently, after fulfilling the basic needs, individuals will strive to achieve a higher level of needs with a heightened sense of security. Reasonably, people whose highest levels of need are fulfilled are more likely to have higher QoL levels.

According to Economic Planning Unit Malaysia (2011), transportation service is a crucial factor that contributes to one's development, such as in the access to opportunities for employment and work. Hence, the newly launched MRT service in 2017, which indirectly helped citizens achieve most of the fundamental needs, is assumed to play a beneficial role in their QoL. Similarly, with the hierarchy of needs theory that supports the positive relationship between perceived safety and QoL, when individuals perceive that their city or neighborhood is safe, their psychological needs for safety are fulfilled. Therefore, it not only motivates them to seek the next level of need (i.e., belongingness) but also poses higher tendencies for them to achieve high levels of QoL. Indeed, analysis of the data of 88 countries from 1960 to 1994 support that needs fulfillment is beneficial to QoL (Hagerty, 1999).

Drawing on Maslow's hierarchy of needs and past findings, we hypothesize that perceived accessibility to the new MRT service and perceived safety can promote QoL. Furthermore, the relationship between perceived accessibility to MRT services and QoL is assumed to be moderated by perceived safety. It is assumed that, when the perceived safety is high (i.e., safety need is fulfilled), the high accessibility to MRT services is likely to promote QoL.

## **Methods**

### ***Participant and Research Design***

A cross-sectional design was employed in the present study. A total of 220 MRT users in Selangor were recruited using convenience sampling and online snowball sampling. Five participants below 18 years old and one participant who reported two standard deviations below the mean score of QoL were removed from further analysis. Details of the 214 participants' demographics are presented in the Results section.

## **Instruments**

### ***Perceived Accessibility Scale (PAC; Lättman et al., 2016)***

The items of the PAC were modified to fit the purpose of the present study by replacing public transport service with the new MRT service. Participants responded to the 4-item PAC to indicate their perceived accessibility to the MRT service on a 7-point Likert scale (1: Do not agree at all; 7: Agree completely). A sample item was “It is easy to do daily activities with MRT service.” The 4-item scores were averaged with a high score indicating a high (perceived) accessibility to the MRT service. Cronbach’s alpha coefficient was .83 in the present study.

### ***Perceived Safety***

A total of three items were selected from the Community Safety Scale (CSS; Shoffner & Vacc, 2002) and Neighborhood Environment Walkability Scale (NEWS; Saelens et al., 2003) to evaluate participants’ perceived safety. The original 15-item CSS was not employed because some of the items (e.g., “Drug dealing is a problem in my neighborhood community”) do not apply to the Malaysian context. A sample item adapted for the present study was, “There are places in my neighborhood where I do not feel safe.” Similarly, the 67-item NEWS was not fully employed in the present study due to its length and long duration. Two items adapted for the present study were: “It is unsafe for me to go on walks in my neighborhood during the day” and “It is unsafe for me to go on walks in my neighborhood at night.” The selected three items were then evaluated using a 4-point Likert scale (1: Strongly disagree, 4: Strongly agree). A mean score was computed with a higher score denoting a lower perceived safety. To ease interpretation, we reversed the score again in which the higher the new mean score is, the higher the perceived safety. The scale showed good internal consistency ( $\alpha = .80$ ).

### ***Brunsviken Brief Quality of Life Scale (BBQ; Lindner et al., 2016)***

The BBQ consists of 12 items corresponding to the six life domains (i.e., leisure, view on life, creativity, learning, friendship, and view of self) that contribute to one’s life satisfaction. Participants responded to the items on a 5-point Likert scale

(1: Do not agree at all, 5: Agree completely). Each domain is assessed by two items, which are the satisfaction-rating item and importance-rating item. A domain score was computed by multiplying the scores of the satisfaction-rating items and importance-rating items. For instance, the leisure domain score was generated by multiplying the score for the satisfaction-rating item (“I am satisfied with my leisure time: I have the opportunity to do what I want in order to relax and enjoy myself”) and the importance-rating item (“My leisure time is important for my quality of life”). The six domain scores were then summed to generate a composite score, ranging from 6 to 150. A higher total score indicates a higher QoL. Overall, the scale showed acceptable internal consistency ( $\alpha = .76$ ).

### ***Covariate Variables***

As past studies have demonstrated that gender (Huang, & Kämpfen, 2019), income (e.g., Aziz & Ahmad, 2017; Zhang et al., 2015), and age (Tan et al., 2018) play a role in the level of QoL, these demographics were collected and treated as covariate variables in the analysis. Statistically controlling the effect of these variables will show a clearer picture of the impact of the accessibility to the MRT services and perceived safety on QoL.

### ***Research Procedure***

Ethical clearance was approved by the Scientific and Ethical Review Committee of Universiti Tunku Abdul Rahman (ref. no: U/SERC/04/2018) before the data collection. The questionnaires were printed out in hardcopy and distributed to the commuters around the MRT stations in Selangor. All participations in the research were on a voluntary basis. Informed consent was mentioned to each participant, and a short briefing was given to the participants before they participated in the research. Participants were well-informed that they could withdraw should their rights are violated. Our contact information was also given to the participants for further details, questions, or issues related to the study. As the response rate to the hardcopy survey was unsatisfactory, we carried out an online survey via the widely used social networking sites to recruit participants using a snowball sampling method. Similar procedures were employed for the online survey.

## Results

### *Participants' Demographic Information*

Table 1 shows the demographic information of the 214 participants ( $M_{\text{age}} = 27.91$ ,  $SD = 8.89$ ). The majority of the participants were females (56.10%), emerging adults (18 to 29 years old, 73.36%), Chinese (79.07%), single (76.60%), and with a monthly income of RM 3000 and below (68.37%).

### *Descriptive Analysis*

The descriptive statistics and correlation for all the study variables and age are presented in Table 2. Following Kim's (2013) suggestion, all the variables, except age and perceived accessibility, are normally distributed. After transforming the score of age and perceived accessibility, analysis results using the original and transformed scores were found compatible (the effect became insignificant using the transformed

score of age. As age was treated as a control variable, the difference is expected to have a negligible impact, if any). Results based on the original scores are shown in Table 2.

Correlation analysis showed that QoL was positively correlated with age and perceived accessibility to MRT service, but not perceived safety. Similarly, a positive relationship was observed between age and perceived safety as well as between perceived safety and perceived accessibility to MRT service.

### *Regression Analysis*

A hierarchical multiple regression analysis was conducted to examine the effect of gender (male as the reference group), income (RM 3000 and below as the reference group), age (Step 1), (reverse-scored) perceived safety (Step 2), perceived accessibility to MRT service (Step 3), and the interaction of perceived safety and perceived accessibility to MRT service

**Table 1**

*Participant's Demographic Information (N = 214)*

Characteristic	N	%
Sex		
Male	94	43.90
Female	120	56.10
Age		
Emerging adult (18 to 29 years old)	157	73.36
Adult (30 to 64 years old)	55	25.70
Elderly (65 years old and above)	2	0.94
Ethnicity		
Malay	25	11.63
Chinese	169	79.07
Indian	13	6.00
Others	7	3.30
Income		
RM 3000 and below	147	68.37
RM 3001 and above	68	31.63
Relationship status		
Single	164	76.60
Married	25	11.70
Married with children	23	10.80
Divorced or widowed	2	0.90

**Table 2***Descriptive Statistics and Correlations for All Study Variables (N=214)*

Variables	Skew <sup>a</sup>	Kurtosis <sup>b</sup>	1	2	3	4
1. Age	1.96	4.20	1			
2. Perceived Safety	0.49	-0.40	-.16*	1		
3. Perceived Accessibility	-0.83	1.09	.12	-.25***	1	
4. Quality of Life	0.25	0.42	.20**	-.01	.25***	1
Mean	-	-	27.91	2.32	5.27	101.66
Standard deviation	-	-	8.89	0.68	0.93	18.19

Note. <sup>a</sup>SE = 0.17, <sup>b</sup>SE = 0.33. Perceived Safety = Reverse-scored Perceived Safety; Perceived Accessibility = Perceived Accessibility to MRT Service.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

(Step 4) on QoL. Table 3 shows that in Step 1, the regression model was statistically significant,  $F(3, 210) = 3.36, p = .02$ , and accounted for 3.2% of the variance in QoL. Next, perceived safety was added to the model. Although the model was still significant,  $F(4, 209) = 2.56, p = .04$ , the relationship between perceived safety and quality of life was not significant. In Step 3, the model with perceived accessibility to MRT service was significant,  $F(5, 208) = 4.99, p < .001$ . Perceived accessibility to MRT service not only had a positive relationship with quality of life but also contributed an additional 5.4% to the explained variance of QoL. Finally, the included interaction of perceived safety and perceived accessibility to MRT service did not have a positive relationship with QoL, though the model was significant,  $F(6, 207) = 4.43, p < .001$ , and accounted for 8.8% of the total variance of QoL.

## Discussion

Quality of life plays an essential role in psychological well-being. The present study examined the role of perceived accessibility to MRT service and perceived safety in QoL after controlling the demographic variables. Consistent with our hypothesis, accessibility to MRT promotes individuals' QoL.

Based on past findings, several demographic factors, such as age, gender, and income, were included in the present study. Age was found to have a positive relationship with the self-reported QoL. However, the effect disappeared after the score was transformed to address the normality issue. The results shall then be

taken with caution and that it is premature to conclude the role of age in QoL. Also, as age was treated as a controlled variable in the present study, the discrepancy may have little impact, if any, on the findings.

On the other hand, there were no gender differences in QoL. Similarly, income did not play a role in one's QoL. Although some studies (e.g., Aziz & Ahmad, 2017; Zhang et al., 2015) found a positive relationship between income and QoL, others (e.g., Wyshak, 2016) found no relationship between the two variables, possibly because the association between income and QoL depended on the individual's desire and perception towards money (Tang, 2007). Moreover, as the participants of the present study consisted of individuals from different age populations, their perceptions of money may differ from one to another. To further clarify the role of income in QoL, future researchers may focus on a specific age group or individuals with similar income levels to exclude the confounding effect.

Out of our expectation, there was no relationship between perceived safety and QoL. The result contradicts with some past studies (e.g., Deniz, 2016; Mansor et al., 2013) but in line with Hassan et al.' (2013) findings among 3,494 residents from 100 districts around Malaysia that public safety was not a significant predictor of QoL. Such discrepancy could be due to three reasons. First, safety does not play a role in QoL. Factors other than perceived safety may play a greater role in QoL, as reported by our participants. Second, the 3-item measurement applied in the present study is not sufficient to capture the participants'

**Table 3**

*Summary of Hierarchical Regression Analysis for Perceived Safety, Perceived Accessibility to MRT Service and Quality of Life (N = 214)*

Predictor	Step 1			Step 2			Step 3			Step 4		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Step 1												
Age	0.44	0.15	.22**	0.45	0.16	.22**	0.42	0.15	.20**	0.43	0.15	.21**
Female	2.25	2.55	.06	2.43	2.58	.07	2.84	2.51	.08	2.96	2.51	.08
Income	-0.40	3.03	-.01	-0.23	3.06	-.01	-0.43	2.97	-.01	-0.47	2.96	-.01
Step 2												
Safety				0.84	1.86	.03	2.51	1.86	.09	-10.55	10.49	-.39
Step 3												
MRT							4.99	1.33	.26***	-1.10	5.00	-.06
Step 4												
Safety x MRT										2.52	1.99	.52
Adjusted $R^2$		.032			.028			.086			.088	
<i>F</i> Value		3.26*			2.56*			4.99***			4.43***	

*Note.* *B* = Unstandardized Coefficients; *SE* = Standard Error;  $\beta$  = Standardized Coefficients Beta; Income = RM 3001 and above; Safety = Reverse-scored Perceived Safety; MRT = Perceived Accessibility to MRT Service.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

concept of safety. Third, the impact of safety may subject to environmental and demographical variations among the participants. Sakip et al. (2013) found that high-income people and self-employed residents have higher needs to feel safe compared to residents working in public and private companies or those with lower income. It is also noteworthy that our participants came from different residential areas. As neighborhood safety varies from one residential area to another, the differences in our focused measure on neighborhood safety may balance the effect of perceived safety on QoL.

Consistent with past studies (e.g., Litman, 2010; Schneider et al., 2013), perceived accessibility to MRT service positively contributes to QoL in the present study. Respondents who perceived that the MRT service could be accessed easily are more likely to report higher levels of QoL. Such beneficial effects could be due to public transportation services allowing easy travel for people to important destinations, reduction in transportation expenses and traffic congestions, as well as the mobility of non-drivers (Litman, 2014). Overall, our findings not only replicate the positive effect of public transportation service in

the Malaysian context but also highlight the importance of public transportation. Similarly, consistent findings across different countries have shown that public transportation is critical and conducive to citizens' psychological well-being.

Finally, the hypothesized moderating role of perceived safety in the relationship between perceived accessibility to MRT service and QoL was not supported. The result is contrary to previous studies (e.g., Adebola et al., 2014), suggesting that safety plays an important role and is a prerequisite for mobility. The discrepancy could be due to the insignificant relationship between perceived safety and QoL.

#### ***Implications of the Study***

The present study brings forth a significant contribution to the literature of QoL. First, our results replicate past findings and lend further support to the beneficial role of public transportation on citizen's QoL. To our best knowledge, the present study is the first to investigate the impact of the new MRT service (SBK lines) in Malaysia on commuters' QoL. The findings not only offer the first piece of empirical

evidence to the benefit of MRT service but also shed light on the facilitative effect of public transportation on people's well-being across different countries and cultures.

Besides, the findings also suggest that one way to boost citizens' QoL is to have good public transportation. Also, the findings of the present study raise the public's awareness of the importance of public transport services besides acknowledging the Malaysian government's effort in maintaining commuters' welfare. With the results, it is hoped that the Malaysian government could build more MRTs in different areas to improve citizens' QoL, thus create a sustainable living environment for future generations.

Finally, our findings theoretically contribute to the literature by adding evidence to the relationship between needs achievement and QoL. Supporting Maslow's (1968) hierarchy of needs theory, our results demonstrate that needs achievement has a positive effect on QoL. Meanwhile, the non-significant relationship between safety and QoL implies the necessity of evaluating the elements of the five types of needs in modern societies.

### **Limitations**

There are some limitations in the present study that shall be addressed. First, the frequency of taking the MRT service was neglected. Lättman et al. (2016) have suggested that the frequency of traveling has a positive impact on perceived accessibility. People who have more experience in using the service tend to have a good impression of the service. Therefore, it is interesting for future researchers to examine whether the facilitative effect of perceived accessibility can also be observed among less frequent users. In a similar vein, the present study has overlooked factors that influence individuals' QoL, such as perceived social support and personality traits (Kang et al., 2018; Pocnet et al., 2017). It is recommended for future researchers to consider these factors when identifying the pure effect of perceived accessibility to MRT on QoL. Finally, the sampling method employed in the study could be a limitation. Although we have used online surveys to recruit participants with a diverse background, it is still difficult to reach out to all areas in Selangor, which limits the generalization of the results to the population. It is also worth noting that the majority of the respondents were Chinese, and responses were collected via dual channels (hardcopy

and online survey). We suggest that future researchers recruit an equal number of respondents from the three major ethnic groups using a single channel to avoid biases in examining further the positive effect of the MRT services.

Although future studies are urged to fulfill the gaps of the above-mentioned limitations, researchers may extend the scope of their investigation to the underlying mechanism of the relationship between perceived accessibility and QoL. Although some studies (e.g., Bascom & Christensen, 2017; Santos et al., 2017) have found that public transportation service significantly affects one's social participation, other studies (e.g., Amiri et al., 2017; Kusmaedi et al., 2017) suggested that social participation is one of the predictors of QoL and life satisfaction. Therefore, future researchers can investigate the hypothetical mediating role of social participation in the association of accessibility to MRT service and QoL.

### **Declaration of ownership**

This report is our original work.

### **Conflict of interest**

None.

### **Ethical clearance**

This study was approved by our institution.

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