RESEARCH ARTICLE

Factors Influencing the use of MRT service in Klang Valley, Malaysia

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ABSTRACT - Mass Rapid Transit, also known as MRT, was introduced by the Malaysian government as an alternative transport mode to address issues related to congestion and road traffic crashes as well as improve public transportation connectivity. Alternative transport modes may not be successful in attracting road users to shift their mode from private if the service provided fails to meet the users' expectations. Therefore, there is a need to investigate the factors that influence the modal shift to MRT, which could potentially increase its ridership and reduce congestion as well as risk on the road. Thus, this study aimed to identify the factors influencing the use of MRT service in Klang Valley. The factors influencing the users' decision to modal shift from private vehicles to MRT upon completion of the MRT SBK line were measured through a face-to-face questionnaire survey comprising three sections asking for the respondents' demographic information, their trip profile, and their MRT usage experience. Based on the MRT usage experience, the respondents were given the choice of answers based on the 5-point Likert scale to rate the 19 factor-related statements indicating the factors that encourage the users to use MRT. Using exploratory factor analysis, four dimensions were identified to explain 19 statements: service quality, travel satisfaction, travel value, and connecting facility. Further analysis using the Rasch model was carried out to measure the reliability and validity of the 19 statements indicating the factors influencing the use of MRT based on the 500 respondents received. Analysis of the results indicated that the most influential factors that encourage people to shift their mode of transportation from private to MRT include the convenience of MRT service, cost, and time. Findings of this study support the idea that MRT is a good transport choice with minimal exposure to road crashes. Results from the reliability and validity test also suggested increasing the diversity of respondents since the value of respondents' separation is only slightly good enough.

1.0   INTRODUCTION

Public transport, also known as public transit or mass transit, is a transport system that operates on established routes according to a certain schedule and is made available for use by the public. Buses, rail transit, and taxis are some examples of public transport. Among all, rail public transport is said to be the most dependable mode of transport as it moves on its track and is not affected by the drivers' behaviour or the environment's condition. Travelling by car is riskier than travelling by train. A person is 20 times more likely to be killed when travelling by car as compared to travelling by train, according to the European Transport Safety Council (2003) [1]. Numerous studies have supported this conclusion. According to Litman and Fitzroy [2], shifting to public transport can improve road safety in various ways. As a reduction in overall vehicle travel is expected, a reduction in traffic congestion as well as a lower crash frequency are predicted. In addition, up to a 15% reduction in road traffic crashes is found with the increased frequency of rail services [3].

Nevertheless, achieving a modal shift in developing countries is not easy. Several studies have been conducted to investigate the factors influencing the modal shift to rail public transport. Poor service quality and poor maintenance of public transport facilities are found to be the two main reasons why people prefer private vehicles to public transport. According to Redman et al. [4], the frequency and reliability of a public transport system determine its quality. In Nagoya, Japan, older folks preferred public transport compared to a young population with a high dependency on private vehicles [5]. According to Abuhamoud et al. [6], private vehicle usage, especially cars, is positively related to household size and income as well as vehicle licence ownership. A study by Tuan in [7] revealed that private vehicle ownership increased with increased income as people sought comfort and safety while travelling on the road. Poor public transport service and the cheap price of motorcycles do not encourage the use of public transport [8]. A longer kilometre travelled might not change the users' preference for modal shift, as a significant number of users would still stick to their own private vehicles [7]. On the contrary, the likelihood of shifting private vehicle users to public transport is likely to happen if a reduction in travel time and cost could be achieved [9].

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Previous studies have also shown that the increase in private vehicle ownership has led to congestion and pollution issues within the country. According to the World Health Organisation [10], the rise in private vehicle ownership has caused a reduction in physical activities such as cycling and walking, thus resulting in health-related issues. Therefore, public transport is preferred over private vehicle ownership with respect to advantages to the environment, sociability, safety, and health, as well as being low-cost [11]. Being said so, public transportation is often viewed more positively than private vehicle ownership on certain dimensions [12].

Traffic congestion and distance travelled on the road can be reduced with the use of rail public transport [13]. Thus, shifting road-based transportation to rail-based transportation may become a long-term solution to reduce road-related issues such as traffic congestion, road traffic accidents, parking, and carbon emissions. Since traffic congestion has long been an issue of concern in Malaysia, the Mass Rapid Transit, also known as MRT, was introduced by the government as an alternative transport mode to address these issues as well as improve public transportation connectivity.

The MRT is capable of carrying large number of passengers efficiently and forms the backbone of a city's public transport system together with other rail-based modes such as the light rail transit (LRT) systems, trams, monorails and commuter trains [14]. However, to ensure the sustainability of such facilities, an in-depth understanding of the end-users' expectation and perception is required. In addition, examination on the modal shift to MRT services in our country is still limited. Therefore, exploring the modal shift and factors of choosing MRT to understand the real needs of residents for MRT can be very helpful. Thus, a quantitative study of the population using the MRT was be undertaken to comprehend the modal shift and factors influenced MRT usage, so that the MRT facilities can be improved by the authorities.

In addition to explore the factors that influenced the use of MRT, this study also aims to determine the reliability and validity of the instrument used. As the study involves psychology and cannot be measured directly, an instrument to measure the respondents was developed. Attention was given to the instrument developed in terms of validity and reliability as the reliability and validity of the instrument is essential to determine the consistency of the measurement tools used [15]. The Rasch model is said to be the most suitable model used to determine the reliability and validity of a study instrument. In the Rasch model, the reliability is modelled as a function of respondent parameter and item parameter. Reliability evaluates the stability of measures, internal consistency of measurement instruments, and interrater reliability of instrument scores [16]. Meanwhile, validity is the extent to which the interpretations of the results of a test is warranted, which depends on the particular use the test it is intended to serve. The validity and reliability study of an instrument is crucial to maintain the integrity of the questionnaire from exposure to defects [17].

The subsequent section of this paper is organised as follows: Section 2 highlighted studies conducting surveys on public transport satisfaction, factors influencing usage, and Rasch analysis in validating surveys as measuring instruments. Section 3 describes the research design and summarises the characteristics of the 500 respondents for this study. Section 4 presents and briefly discusses the results. Lastly, Section 5 concludes the study and suggests improvements for future research.

2.0   LITERATURE REVIEW

The literature shows several studies have been conducted to explore the factors affecting user satisfaction that potentially modify travel behaviour and enhance loyalty to public transport services. Recognising the factors affecting user satisfaction becomes valuable information that can guide public transport operators to improve their service and attract more potential users. The exploration of these factors is normally executed via customer surveys. For example, a study by Cantwell et al. [18] concluded that factors such as reliable service, short waiting times, and reduced travel time have a positive impact on the commuting satisfaction of public transport users.

In other studies, Le-Klähn et al. [19] investigated factors that influence the satisfaction level of public transport in Munich. The study measures users' satisfaction based on 16 factors: punctuality, reliability, network connection, service frequency, convenience of time schedule, accessibility of train stations and bus stops, accessibility of vehicles, safety on board, ease-of-use, information, cleanliness of vehicle, space on vehicle, seat availability, staff service, comfort while waiting at bus stops or train stations, ticket price, and satisfaction in general. Using factor analysis, four dimensions of public transport service are identified: travel comfort, service quality, accessibility, and additional features. The results of this study highlighted the most influential factors that are necessary for service improvement, including information, ticket price, service frequency, space on the vehicle, cleanliness of the vehicle, and ease of use.

A similar approach was used by Fellesson and Friman [20] to measure factors related to the satisfaction of public transport services in nine countries using a telephone survey. Factor analysis was used to identify public transport dimensions from all seventeen statements rated by the respondents. The seventeen relevant statements about public transportation are travel time, waiting time, number of departures, bus stop, transfers, planning information, traffic information, reliability, knowledgeable staff, staff behaviour, security externally and internally, traffic accidents, comfort, modern, clean, and seats. The four dimensions identified from factor analysis were comfort, reliability, safety, and staff.

Focus on public transport in Malaysia, Dahalan et al. [21] studied the confidence level of youths in the quality of public transport services in the Klang Valley (Greater KL). It was found that although the majority of the respondents were frequent users of public transportation, their level of confidence in the quality of public transportation service provided by the operators was only moderate. Most of them nevertheless acknowledged the importance of public

transportation in their daily lives but stressed the imperative of upgrading the service quality of the system so as to enhance their confidence in it. In other studies [22], Mi and Ali investigated specifically what drives young adults to choose mass rapid transit (MRT). To deliver their thoughts and opinions effectively, an in-depth interview was performed involving 15 respondents among UKM students. The findings from the study revealed that low price, convenience, reduced traffic congestion, environmental protection, time-saving, good condition, safety, high efficiency, good enjoyment, and more business opportunities were the factors that led young adults to use public transport.

Several difficulties in measuring the satisfaction level of public transport passengers were highlighted in the research conducted by Gallo [23]. To determine if the questionnaire survey is adequate to measure satisfaction, the researcher has proposed Rasch analysis and the Analysis of Means (ANOM). The study was conducted based on the idea that the Rasch rating scale model gives sufficient statistics for an underlying unidimensional latent trait such as the satisfaction generated by local transport operators.

The reliability of survey questionnaires as measurement instruments was studied by Yasin et al. [24] based on the Rasch model approach. In their study, Winsteps Version 3.69.1.11 software was used to examine the functioning of items in terms of reliability and separation of item-respondent, item polarity, and item suitability in measuring the construct and standardised residual correlation values. Results found that 16 items were removed from the non-compliance examination criteria. Since this study is only a pilot study, the actual distribution of respondents can be used to measure the constructs of learning transfer for NOSS system-based skills training and workplace learning. In another study, Veloo and Hashim [15] conducted a study to validate the reliability of a mathematical learning orientation instrument through Rasch analysis. The Likert-scale data was analysed using the Winstep Version 3.48 software to determine the type of response needed. The results show that the reliability values for the instruments are greater than 0.7.

A study with regards to testing the validity and reliability of an Arabic collocation learning strategy instrument was conducted by Asbulah et al. [25]. For that purpose, questionnaires were distributed among 61 final-year students of Arabic language programmes at public universities as respondents in this study. The validity and reliability of this study were measured using the Rasch Measurement Model using Winstep version 3.69.1.11. The final analysis found that no items were dismissed, and it was statistically proven that the item in this instrument has a high degree of validity and reliability. Thus, it is suitable to be used by students at the IPT level. Meanwhile, Neumann et al. [26] evaluated the instrument quality in science education by using Rasch-based analyses of a nature of science test. The construct analysis revealed that the instrument did not match the published operationalization of the NOS concepts. Overall, their study outlined an approach to how Rasch modelling may be used to evaluate and improve Likert-type instruments in science education. Another study in educational testing, conducted by Zaini and Othman in [27] concluded that the item parameters in the Rasch model represent item difficulty, while respondent parameters represent the ability or achievement level of the person being assessed. Their results indicated that the higher the respondent's ability than the difficulty of an item, the higher the probability of a correct answer for that item.

3.0   METHODOLOGY

This study was conducted using the questionnaire survey at five different major MRT stations (Bukit Bintang, Kajang, Pasar Seni, Taman Mutiara, and Sungai Buloh). On-board face-to-face survey methods were carried out in 2018 by researchers to collect information on MRT users after morning peak periods (9.30 a.m.–3.30 p.m.).

The questionnaire was developed to obtain information related to the MRT users' demographics, the mode of transport that users used before MRT, and the factors that encourage the users to use MRT. The questionnaire was constructed and divided into three sections: A listed questions related to demographic information, B asked about modal shift, and C listed questions related to the factors that influence the choice of travel using MRT. In Section C, about 19 factor-related statements were listed to be rated by the MRT daily and occasional users as respondents. To understand the influential factors on modal choice, the respondents are required to answer all 19 statements by giving a rating of the importance of each statement influencing the use of MRT. The selection of these 19 statements is based on the identified variables in measuring the performance index used by the service provider. A five-point Likert scale was used to rate from 1 to 5, indicating the less important factors to the most important, as shown in Figure 1. The 19 statements on the influential factors on modal choice in this study were measured based on the average mean and further analysed using Rasch analysis using Winstep Version 3.68.2 software based on the Rasch measurement model.

C9	Please rate the influence of the following factors to your choice of travel in using MRT					
		Please tick your choice				
		Less important ≤ Neutral ≤ most important				
		1	**2**	**3**	**4**	**5**
a.	MRT service is always available (e.g. frequency of trains, hours of operation)					
b.	MRT provides a comfortable travel (e.g. cleanliness, comfortable space on train)					
c.	MRT stations are accessible to users (e.g. getting in and out of the station)					
d.	There is adequate parking space at the station					
e.	MRT is easy to use (e.g. interchanging, purchasing tickets/passes, finding ways)					
f.	Feeder bus ease my journey					
g.	It is much safer to travel with MRT compared to driving/riding					
h.	Information on how to use MRT is useful (e.g. maps, timetables, journey planner)					
i.	Information during travel ease my journey (e.g. real-time information, options)					
j.	I can reach my destination on time/adhere to schedule					
k.	I am satisfied with the customer care and service (e.g. helpful)					
l.	Security officer on-board makes me feel safer					
m.	I can use the free time on-board to do something else					
n.	Travelling on MRT is cheaper than by private vehicles					
o.	Difficulty to find parking at my destination (e.g office/mall etc)					
p.	I want to avoid traffic jam					
q.	I want to contribute to less pollution					
r.	I prefer not to drive/ride my private vehicles					
s.	Satisfies needs such as status, prestige and feeling of control of one's journey					

Figure 1. Part C on the factors that influence the choice of MRT usage

3.1 Characteristics of respondents

About 520 sets of questionnaires managed to be distributed at the selected stations. After excluding the incomplete survey, the total valid data collected was 500 respondents. The survey managed to attract respondents in multi-racial and a good mix of age categories, with most of the respondents aged between 18 and 35 years old. The data of 500 respondents were classified as daily users (who commute to work or school by MRT) and occasional users (who travel using MRT for certain tasks, e.g., meetings). The majority of both daily (43.3%) and occasional users (51.5%) of the MRT have no personal income (many of them are students). About 25% of respondents have an income range of RM2001–RM5000. A summary of the demographic profile of the respondents in this study is presented in Table 1.

Table 1. Demographic profile of respondents

Variable	Daily User (n (%)) (n = 263)	Occasional User (n (%)) (n = 237)	Total n = 500 (%)
Gender			
Male	95 (36.1%)	71 (30.0%)	166 (33.2%)
Female	168 (63.9%)	166 (70.0%)	334 (66.8%)
Age			
<18	40 (15.2%)	16 (6.8%)	56 (11.2%)
18 – 35	191 (72.6%)	185 (78.1%)	376 (75.2%)
36 -55	30 (11.4%)	30 (12.7%)	60 (12.0%)
>55	2 (0.8%)	6 (2.5%)	8 (1.6%)
Occupation			
Government	10 (3.8%)	15 (6.3%)	25 (5.0%)
Self-employed	14 (5.3%)	17 (7.2%)	31 (6.2%)
Housewife	1 (0.4%)	5 (2.1%)	6 (1.2%)
Private	113 (43.0%)	72 (30.4%)	185 (37.0%)
Student	112 (42.6%)	103 (43.5%)	215 (43.0%)
Labourer / Blue Collar	1 (0.4%)	0 (0.0%)	1 (0.2%)
Unknown	12 (4.6%)	25 (10.5%)	37 (7.4%)

Table 1. (cont.)

Variable	Daily User (n (%)) (n = 263)	Occasional User (n (%)) (n = 237)	Total n = 500 (%)
Income			
No income	114 (43.3%)	122 (51.5%)	236 (47.2%)
<RM2000	52 (19.8%)	38 (16.0%)	90 (18.0%)
RM2001 – RM 5000	79 (30.0%)	48 (20.3%)	127 (25.4%)
>RM5000	13 (4.9%)	16 (6.8%)	29 (5.8%)
No fixed income	2 (0.8%)	9 (3.8%)	11 (2.2%)
Unknown	3 (1.1%)	4 (1.7%)	7 (1.4%)

4.0 RESULTS AND DISCUSSION

4.1 Modal Shift by MRT Users

The modal shift for the MRT daily users was gathered, and the result is summarised in Table 2. In total, less than half of respondents (41.8%) shifted from private to MRT, which comprises 33.8% of car drivers and 8.0% of motorcycle riders. However, the remaining 53.7% of respondents are shifting from other public transport, such as a bus, taxi, or train, to MRT.

Table 2. Daily users' transport mode before shift to MRT service

Mode	Daily User (n = 263)	Percentage (%)
Private Transport		
Car	89	33.8
Motorcycle	21	8.0
Public Transport		
Bus	48	18.3
Taxi/ Grab/ Uber	10	3.8
LRT/ Monorail/ KTM	83	31.6
Others (walking)	12	4.6

The shift from rail-based transportation such as LRT, monorail, or KTM commuters was 31.6%, while the shift from public buses and taxi/Grab/Uber was 18.3% and 3.8%, respectively. In addition, only a small group of users (4.6%) used to walk to reach their destinations before they used MRT as their transport mode.

4.2 Factors influencing the users to use MRT service

The factors influencing the usage of MRT can be explained by the users' mean scores on the factor-related statements listed in the questionnaire. Higher score rated by the MRT daily and occasional users to indicate the importance of each statement influencing the use of MRT. Using the five-point Likert scale, a score of one indicates the less important, and a score of five indicates the most important. Tables 3 and 4 summarise the statements for both daily and occasional users by mean, median, and mode, respectively.

Based on the result shown in Table 3, the five top factors rated by the daily users for using MRT include: (1) MRT provides a comfortable ride ($M = 4.67$), (2) users want to avoid traffic congestion ($M = 4.60$), (3) MRT is easy to use ($M = 4.59$), (4) MRT facilities are always available ($M = 4.58$) and (5) MRT station easily accessible to all users ($M = 4.57$). This result showed that the advantages of the MRT that provide comfort, accessibility, ease, complete facility and continuous movement became the most influential factors for users to choose the MRT over other modes of transport.

Other factors related to the information during travel ease users' journeys (M = 4.54), travelling with MRT is safer than driving or riding (M = 4.52), users can reach their destination according to the time and schedule set (M = 4.52), and users are satisfied with MRT customer service (M = 4.50) were also rated with a high mean score of more than 4.5.

The survey results also revealed that factors related to parking are the least influential factors on MRT usage, where statements on the limited parking at destinations such as office buildings and shopping complexes and the ample parking provided at MRT stations were rated with the lowest mean score (M = 3.87 and M = 3.74, respectively).

Table 3. Factors that influenced the choice of daily users of MRT

Item	Factors	Mean	Median	Mode	SD
b.	MRT provides a comfortable travel	4.67	5.00	5	0.525
p.	Avoid traffic congestion	4.60	5.00	5	0.729
e.	MRT is easy to use	4.59	5.00	5	0.714
a.	MRT service is always available	4.58	5.00	5	0.694
c.	MRT stations are accessible to users	4.57	5.00	5	0.667
h.	Information on how to use MRT is useful	4.54	5.00	5	0.734
g.	Safer than driving/riding	4.52	5.00	5	0.776
j.	I can reach destination on time	4.52	5.00	5	0.653
k.	Good customer service	4.50	5.00	5	0.653
i.	On-board information ease journey	4.49	5.00	5	0.771
q.	MRT reduce pollution	4.43	5.00	5	0.821
n.	Cheaper than travel via own vehicle	4.40	5.00	5	0.918
m.	Utilize time in train for other things	4.37	5.00	5	0.817
l.	Feel safer on security in the train	4.19	4.00	5	0.994
s.	Meet status requirements & prestige	4.12	4.00	5	1.018
r.	Prefer not to drive	4.05	4.00	5	1.158
f.	Feeder bus ease my journey	4.02	4.00	5	1.214
o.	Difficult to find parking at destination	3.87	4.00	5	1.199
d.	Adequate parking space at the station	3.84	4.00	5	1.160

To see if the preferences of the occasional users were different from those of the daily users, analyses of the factors influencing both groups were conducted separately. The results of rating the statements for occasional users by mean, median, and mode were summarised in Table 4. Similar to the daily users, the occasional users rated (1) comfortable rides, (2) easy to use, and (3) can avoid traffic congestion as the top three reasons with the mean value range. Factors related to the information provided make travel easier, the facilities are always available, and the stations are easily accessible were rated as the second highest mean group by the occasional users of MRT. Comparing this result with a study conducted in Hanoi City by [7], comfortable rides and safety become the most important factors in choosing a transport mode for high-income people, but not for low-income people.

Table 4. Factors that influenced the choice of occasional users of MRT

Item	Factors	Mean	Median	Mode	SD
b.	MRT provides a comfortable ride	4.57	5.00	5	0.677
e.	MRT is easy to use	4.51	5.00	5	0.661
p.	Avoid traffic congestion	4.50	5.00	5	0.768
i.	On-board information ease journey	4.48	5.00	5	0.698
a.	MRT service is always available	4.47	5.00	5	0.722
c.	MRT stations are accessible to users	4.46	5.00	5	0.710
j.	I can reach destination on time	4.43	5.00	5	0.731
m.	Utilise time in train for other things	4.40	4.00	5	2.030
h.	Information on how to use MRT is useful	4.39	5.00	5	0.854
g.	Safer than driving / riding	4.38	5.00	5	0.770
q.	MRT reduce pollution	4.37	5.00	5	0.826
k.	Good customer service	4.33	4.00	5	0.815
n.	Cheaper than travel via own vehicle	4.19	4.00	5	0.928
l.	Feel safer on security in the train	4.06	4.00	5	1.000
r.	Prefer not to drive	3.98	4.00	5	1.015
s.	Meet status requirements & prestige	3.95	4.00	5	1.056
f.	Feeder bus ease my journey	3.90	4.00	5	1.285
o.	Difficult to find parking at destination	3.81	4.00	5	1.214
d.	Adequate parking space at the station	3.77	4.00	4	1.183

There are five factors rated as the least important factors with mean values below 4.00: (1) ample parking facilities at the station (M = 3.77), (2) limited parking at the destination (M = 3.81), (3) MRT feeder (M = 3.90), (4) meeting status requirements and status (M = 3.95), and (5) being comfortable not driving (M = 3.98). From the survey, it showed that factors related to parking and feeders were the least important factors for both daily and occasional users to choose MRT as their transport mode. Different preferences for parking are highlighted by [7], as the provision of parking facilities at MRT stations would greatly increase the modal shift of motorcycles to MRT in Hanoi City.

An exploratory factor analysis method (EFA) was conducted using principal component analysis and varimax rotation. Bartlett's sphericity (Chi-square = 1752.986, p < 0.000) and Kaiser Meyer-Olkin (KMO) measure of sampling adequacy, and the value of 0.895 indicates the data is appropriate for factor analysis. Results from factor analysis identified four dimensions to explain 19 factor-related statements on a 5-point Likert scale. Table 5 shows the factor loadings according to the four dimensions identified: service quality, travel satisfaction, travel value, and connecting facility.

Table 5. EFA Results

Items	Factor	Factor loadings			
		1	2	3	4
Service Quality					
j	I can reach destination on time	.743			
l	Feel safer on security in the train	.662			
k	Good customer service	.660			
i	On-board information ease journey	.660			
h	Information on how to use MRT is useful	.587	.422		
m	Utilise time in train for other things	.493			
Travel satisfaction					
b	MRT provides a comfortable ride		.833		
c	MRT stations are accessible to users		.746		
a	MRT service is always available		.680		
e	MRT is easy to use		.621		
g	Safer than driving / riding	.472	.477		
Travel value					
q	MRT reduce pollution			.744	
p	Avoid traffic congestion			.735	
s	Meet status requirements & prestige			.714	
r	Prefer not to drive			.538	.412
n	Cheaper than travel via own vehicle	.402		.448	
Connecting facility					
d	Adequate parking space at the station				.763
f	Feeder bus ease my journey				.647
o	Difficult to find parking at destination				.619

Further analysis has been carried out to examine the demographic profile (refer to Table 1) association with the four dimensions that influenced the choice of using the MRT. Using a simple T-test and ANOVA, results found that almost all four dimensions are not associated with demographic profile except for occupation and the second dimension measuring travel satisfaction (refer to Table 5). It varies across different occupations, with P = 0.006, F = 2.737, and df = 8.

4.3   Rasch Analysis

An analysis of Rasch utilising Winstep Version 3.68.2 software was performed to examine the reliability and validity of the instrument used in this study. The reliability and validity of each item in the questionnaire are necessary to ensure reliable and valid results [28]. The reliability of the instruments was determined by referring to the value of Cronbach's alpha and the results of the separation and reliability index. Meanwhile, the indicator determining the validity of the instrument is referred to, as is the analysis of item polarity based on the value of PTMEA CORR [29].

The acceptable reliability value of Cronbach Alpha in Rasch analysis is between 0.71-0.99 [29]. Referring to the results in Figure 2, the value of Cronbach Alpha obtained is 0.87, which indicates that the instrument used is in very good condition and effective with a high level of consistency. In addition, the high value of Cronbach Alpha also indicates that the questionnaire was able to maintain consistency even though the sample or group of respondents changed.

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PERSON RAW SCORE-TO-MEASURE CORRELATION = .89
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .87
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Figure 2. Value of Cronbach Alpha

Then, the analysis of the instrument is carried out to examine the reliability and separation index for both item reliability and respondent reliability. The statistics generated by Rasch analysis for item and respondent separation and reliability index are shown in Table 6. From the results, the value of the item separation index is 6.30, and the reliability index of the item is 0.98. A good index of separation is achieved if the value is greater than 2.0 [30], and the value of 6.30 for the item separation index indicates that the difficulty level of the items in the instrument is high and easily classified. Whereas the reliability index of the item (between 0 and 1) shows that the reliability of the item in this research instrument is good and strongly acceptable. Both the separation and reliability of the item are in excellent range.

Table 6. Reliability and separation index for both item and respondent reliability

	Item	Respondent
Separation index	6.30	2.56
Reliability Index	0.98	0.87

The value of the separation index of the respondents is 2.56, which is slightly greater than 2.0, and it indicates that the capability of each respondent to answer this questionnaire is slightly more diverse and can be classified by its ability level. On the other hand, the reliability index value of the respondent obtained is 0.87, which is in a good range. Results of the respondent reliability and separation index showed that the instrument used is quite sensitive to differentiate the ability level of each respondent who answered the questionnaire. In addition, it also suggests that the number of respondents used in this study is sufficient to determine the hierarchy of difficulty items within the instrument.

The Point Measure Correlation (PTMEA CORR) value was generated by Rasch analysis to detect item polarity or item validity in order to test how far the instrument's construct can measure the importance of factors influencing the choice of MRT users. The positive value of the PTMEA CORR indicates the item can measure the construct [29]. Meanwhile, if the value is negative, it indicates that the item cannot measure the construct. In addition, if there is an item that has a PTMEA CORR value in the lowest positive, then the item should be noted, as it may be difficult for the respondent to answer. The value of the PTMEA CORR of each item generated by Rasch Analysis using Winstep software is listed in Table 7. Based on the results obtained, all items show a positive value of PTMEA CORR, with an index ranging from 0.4 to 0.55. This result also showed that all items measuring the constructs to be measured validated the 19 factor-related statements used in the questionnaires.

Table 7. List of PTMEA CORR for each item

Entry Number	PTMEA CORR	Item
13	0.40	m
16	0.46	p
15	0.46	o
6	0.47	f
2	0.49	b
4	0.50	d
14	0.50	n
1	0.50	a
5	0.51	e
17	0.51	q
10	0.52	j
3	0.52	c
8	0.53	h
12	0.53	l
11	0.53	k
19	0.53	s
18	0.53	r
7	0.55	g
9	0.55	i

5.0   CONCLUSIONS

In this study, the factors that influence the choice of MRT users were examined using an on-board face-to-face questionnaire survey at MRT stations. Based on the result, the provision of MRT service in Klang Valley created a shift in mode from private transport (33.8% from cars and 8.0% from motorcycles) and other public transport such as buses, taxis, or trains to MRT. The main factors influencing the use of MRT rated by the respondents related to the statements that MRT provides a comfortable ride, users want to avoid traffic congestion, and MRT is easy to use. Furthermore, factors related to parking and feeders were the least important factors that influenced them to choose MRT as their transport mode. Using exploratory factor analysis, four dimensions were identified to explain the 19 factor-related statements: service quality, satisfaction of travel, travel value, and connecting facility. Findings from this study provide an insight into the potential modal shift of car drivers and motorcyclists to a rail-based transport system in Klang Valley, Malaysia. Long-term strategies are needed to encourage modal shifts for motorcycle trips, which indirectly would improve motorcycle safety in Malaysia.

Through Rasch analysis, it can be concluded that the instrument used in this study has good quality due to its high value of reliability. Findings also revealed that the value of respondents' separation measured is slightly greater than 2.0, indicating that the diversity of respondents is slightly good. For improvement, the diversity of respondents is needed in order to enhance the quality of the study in future research. The results generated from Rasch analysis through the positive value of PTMEA CORR also indicated that all 19 factor-related statements used in the questionnaires measuring the constructs were used to measure the importance of factors influencing the choice of MRT users.

6.0   AUTHOR CONTRIBUTIONS

Rizati Hamidun and Rohayu Sarani: Conceptualization, Design, Draft manuscript preparation

Rizati Hamidun, Rohayu Sarani, Nora Sheda Mohd Zulkiffli, Farah Husna Mohd Nazaidi, Nor Aznirahani Mhd Yunin, Azzuhana Roslan: Data collection, Data analysis, Interpretation of results

Nor Aznirahani Mhd Yunin, Ho Jen Sim: Writing- Reviewing and Editing

All authors reviewed the results and approved the final version of the article

7.0   FUNDING

8.0   DATA AVAILABILITY STATEMENT

The data used to support the findings of this study are included within the article. Data sharing is not applicable to this article.

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10.0   CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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