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Survey On Public Perceptions and Satisfactions Toward Public Transportation Services in Negeri Sembilan During COVID-19

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Abstract: Public transportation acts as an essential transportation to the public, and there are many types of public transportation in Malaysia. However, Negeri Sembilan only consists of bus, taxi, train, and e-hailing services. The service quality issues were the causes of people not being interested in using public transport. Hence, the purpose of this study is to determine the public perception toward public transportation services in Negeri Sembilan by using descriptive analysis, to identify the factors that affect the satisfaction level by using factor analysis, to investigate the public experiences and the solutions by using sentiment analysis and lastly to compare the changes before and during COVID-19 by using importance-performance analysis. The result showed that the people were satisfied with the public transport services in Negeri Sembilan. There were three components of factors that affect the satisfaction level, namely vehicles services and reliability, accessibility and responsiveness, as well as additional services, timeliness and privacy. The positive comments were more than the negative comments and the suggestion provided is to offer more promotion and discounts. Lastly, the services such as cleanliness, waiting time, comfortable, cost, safety during the journey, ease for booking and punctuality were the services that are performed well and need to be improved in the future.

Keywords: Public Transportation, Factor Analysis, Sentiment Analysis, Importance-Performance Analysis

1. Introduction

Public transportation allows the public to travel through group rail services than private transit. There are many types of public transport, like city buses, passenger trains and rapid transit. In Malaysia, public transportation includes bus rapid transit (BRT), bus, light-rail transit (LRT), monorail, express rail link (ERL) and commuter rail. Although Malaysia has many types of public transportation, there are some limitations in some states in Malaysia, such as in Negeri Sembilan. Negeri Sembilan is one of the states in Peninsular Malaysia located in the west coast region. There are a total of seven districts in

Negeri Sembilan, which are Jelebu, Jempol, Kuala Pilah, Port Dickson, Rembau, Seremban and Tampin [1]. Seremban is the capital city in Negeri Sembilan [2]. Although Seremban has no airport, it consists of direct bus connections between Seremban and Kuala Lumpur International Airport (KLIA) in Sepang, Selangor. Negeri Sembilan only consisted of bus, taxi, train and e-hailing services.

The importance of public transportation is economic and health benefits [3]. However, when the coronavirus 2019 (COVID-19) pandemic hit Malaysia, all the public transport in Malaysia was affected. The lockdown of the countries caused the tourism sector to face big trouble and impact directly on Malaysia's economy. Malaysians must follow the Standard Operating Procedure (SOP) all the time. Wearing masks and keeping a social distance of 1 meter is the basic rules of the SOP. The affected public transportation services in Negeri Sembilan caused many inconveniences for the public.

Furthermore, the substandard quality of services is the reason for Malaysian not being satisfied with the public transportation services. Malaysians are incredibly frustrated with the services, such as the speed and punctuality issues. Lack of punctuality and limited parking spaces at the station leads to longer waiting times and causes inconvenience. Instead of this, safety issues also occur in Malaysia public transit because most drivers do not obey traffic rules [4]. Thus, improving the quality of public transportation services is necessary. Hence, the public transportation services such as cleanliness, waiting time, comfortable, environment, cost, safety during the journey, drivers' attitude, ease for booking using applications, location terminals/station, privacy, Wi-Fi connections, punctuality, travel time, frequency and information system need to improve to achieve the public satisfactions.

In conclusion, these issues are the main reason that caused the public not to use public transportation. Hence, this kind of problem needs to be fixed and improved. The purpose of conducting this study is to determine the public perceptions toward public transportations services in Negeri Sembilan before and during COVID-19. Furthermore, the factors affecting the satisfaction level also need to be studied in this research. This study also collects the review about public experiences and the solution provided to improve the public transportation services. Finally, the study compares the changes in public transportation services before and during COVID-19.

2. Methodology

The methodology section describes all the methods required to obtain the results of the study. All the methods utilised in this study are shown in sections 2.1 to 2.8.

2.1 Survey method

The survey method is one of the fields of applied statistics. It is used to study the sampling from a population using some survey data collection techniques, such as the questionnaire. The advantages of the survey method are its simplest and costless way to collect primary data [5]. Questionnaire surveys online, also known as a self-administered questionnaire, was used because it can collect the data without an interviewer [6].

2.2 Sampling method

In this study, convenience sampling was chosen as the sampling method since it is the most frequently used sampling method because the respondents can be selected anywhere and anytime [7]. The total population in Negeri Sembilan is 1120000, and 400 public who lives in Negeri Sembilan were chosen as the respondents. The number of respondents was determined using Cochran's formula as in Eq.1 where z is z-value, p is the estimated proportion of the population, q is 1-p and e is the margin error [8]. Then the n_0 obtained from Eq.1 was substituted into the following formula in Eq.2, where N is the total population.

$$n_0 = \frac{z^2 pq}{e^2} \quad Eq.1$$

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} \quad Eq.\,2$$

2.3 Questionnaire

The self-administered questionnaire was used in this survey. The questionnaire uses multiple-choice, dichotomous, Likert scale, and rank questions for closed-ended questions. Instead, respondents are required to review their experiences and provide solutions to improve them. Five sections include demographic profiles in this questionnaire that fulfil the four objectives of this study.

2.4 Reliability test

The reliability test is an indicator of the instrument's accuracy and aids in determining the "goodness" of a measure. The internal consistency or reliability is measured by Cronbach's Alpha and estimates the reliability of the questionnaire [9]. The higher the values indicates that the products are measuring the same dimension. In this study, Cronbach's alpha test was used to test the Likert scale questionnaire using SPSS software. The questionnaire is excellent and good if the α value is more than 0.9 and between 0.8 to 0.9. The questionnaire is acceptable if the α value is between 0.7 to 0.8. Next, the questionnaire is questionable, poor and unacceptable if the α value is between 0.6 to 0.7, 0.5 to 0.6 and less than 0.5, respectively. Eq.3 is the formula to compute Cronbach's Alpha where N is the number of elements, $\bar{c}$ is the average of covariance between item-pairs and $\bar{v}$ is the average variance.

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N - 1) \cdot \bar{c}} \quad Eq.\,3$$

2.5 Descriptive analysis

Descriptive statistics describe and compile a data set from an entire population or a survey [10]. There are three types of descriptive statistics which are the measure of frequency, central tendency, and variability and dispersion [11]. The measure of frequency used to calculate the frequency and percentage of demographic profiles, whether took public transportation before and during COVID-19, types, frequency and purpose of using public transport. The measure of central tendency is used to calculate the mode of the satisfaction level toward public transportation services. Microsoft Excel and SPSS software were used to analyse the data.

2.6 Factor analysis

Factor analysis is a collection of techniques for examining how fundamental constructs influence responses to various variables, which used data reduction to find a small number of factors that account for most of the variances from the variables [12]. Factor analysis aims to compile the data so that the patterns and relationships can be easily translated and comprehended [13]. The process is started with data collection. Next, the correlation matrix is computed to check the correlation. Then, factor extraction using principal component analysis (PCA) is performed. After that, an eigenvalue is obtained to determine the components. The factor rotation by using varimax rotation is then performed to ensure only one component in each factor.

2.6.1 Spearman correlation

Spearman correlation coefficient is a statistical measure to test the strength and direction of the correlation between two variables [14]. When each variable is a perfect monotone function, the Spearman correlation value is +1 or -1. Spearman correlation can be utilised when the data is ordinal, interval, or ratio. The correlation coefficient between 0 to 0.19 shows a very weak positive correlation; between 0.2 to 0.39 indicates a weak positive correlation and moderate positive correlation when it is between 0.4 and 0.59. The strong positive correlation is between 0.6 to 0.79 and between 0.8 to 1

indicates that very strong positive correlation. Next, the formula in Eq. 4 is used to calculate the Spearman correlation where d is the difference between ranks and n is the number of samples. The assumption of factor analysis is there are correlations among the variables.

$$R_s = 1 - \left(\frac{6 \Sigma\, d^2}{n^3 - n} \right) \quad Eq.\,4$$

2.6.2 Factor extraction

Principle component analysis (PCA) is a dimensionality-reduction technique by translating the number of variables into smaller groups that maintain most of the information in the larger group [15]. The formula to calculate PCA is shown in Eq.5 where e_i is coefficient vectors and y_i is an ith principal component [16]. Then, the eigenvalue is calculated by using the formula in Eq.6, where A is the n-by-n matrix, v is the non-zero n-by-1 vector, and λ is the eigenvalue. The factor with the eigenvalue more than one means the variance is more than a single observed variable. Thus, the component was chosen according to the eigenvalue bigger than one.

$$y_i = e_i' x = e_{i1} x_1 + e_{i2} x_2 + \cdots + e_{iP} x_P \quad Eq.\,5$$

$$Av = \lambda v \quad Eq.\,6$$

2.6.3 Factor rotation

Varimax rotation is to optimise the total variance of the squared loadings. The factor rotation is performed to determine the factors that are easier to elaborate on. The rotation method aimed to ensure the variables with large loadings on one factor only. This study used the varimax method and analysed using SPSS software. This rotation method results in a general factor with a high or medium load on most of the variables [12]. Communalities is the proportion of each variable's variance that the factors can explain. It was computed first by the formula shown in Eq.7 where h_j is communality of jth variable and S_{ij} is loading or correlation between i[th] component and j[th] variable. Next, the loading scale is calculated before varimax rotation. The formula is shown in Eq.8. Finally, the Varimax rotation is conducted by finding the rotation to maximise the quantity, as shown in Eq.9.

$$h_j = \sum_{i=1}^{p} s_{ij}^2 \quad Eq.\,7$$

$$\tilde{l}_{ij}^* = \hat{l}_{ij}^* \,/\, h_j \quad Eq.\,8$$

$$v = \frac{1}{P} \sum_{j=1}^{m} \left\{ \sum_{i=1}^{p} (\tilde{l}_{ij}^*)^4 - \frac{1}{P} \left(\sum_{i=1}^{P} (\tilde{l}_{ij}^*)^2 \right)^2 \right\} \quad Eq.\,9$$

2.7 Sentiment analysis

Sentiment analysis is also known as opinion mining. The opinions gathered were classified into three types which are positive, neutral, and negative [17]. The two open-ended questions were analysed using R studio software. Firstly, the package "tm" is run. The r code, content_transformer, is used to modify the content in R. Then, the tm_map function removes the punctuation, transforms the text into lower case, removes the numbers, stopwords, and whitespace. Next, the data is cleaned by using the "SnowballC" package. After cleaning up the data, the term-document matrix is built using the function "TermDocumentMatrix()" to count the frequency of each word that appears. Then, display the top five-

word frequency using the "head" command. The word cloud is generated by using the "wordcloud" function. The larger the size of the word, the higher the frequency of the word. The word association tests by using the function "findAssocs" to identify the relationship of the variables. The "syuzhet", "bing", and "affin" package is used to generate the sentiment scores. The "get_sentiment" function was used to accept a character argument and method. Finally, emotional classification is performed using the function "get_nrc_sentiments" to construct a bar plot consisting of anger, anticipation, disgust, fear, joy, sadness, surprise, trust, negative and positive.

2.8   Importance-performance analysis

The importance-performance analysis (IPA) is a valuable method for identifying customer satisfaction and management strategies. There is a total of four quadrants. For example, quadrant 1 is to keep up the good work, quadrant 2 is possible overkill, quadrant 3 is low priority, and quadrant 4 is concentrated here where the horizontal axis is importance. In contrast, the vertical axis is performance [18]. In this study, the *x*-axis was replaced with during COVID-19, whereas the *y*-axis was replaced with before COVID-19. The mean rank is calculated first using the Friedman test, and then the mean rank is computed using SPSS software. After computing the Friedman test, the IPA plot is plotted as a scatter plot. The axis is set before COVID-19 as the y-axis and during COVID-19 as the x-axis. Finally, the IPA is completed and shown in Figure 1 [19].

	Quadrant 2	Quadrant 1
High	**Possible overkill**: It contains attributes of low importance to tourists, which are performing strongly, indicating possible waste of limited resources that are inefficiently used and could be reallocated elsewhere.	**Keep up the good work**: It represents major strengths and potential competitive advantages of a product or service. The attributes situated in this quadrant are considered to be performing well and need continued investments.
	Quadrant 3	Quadrant 4
Low	**Low priority**: It is not performing exceptionally well, but are considered to be relatively unimportant to tourists; therefore, managers should not be overly concerned with these attributes. They represent minor weakness and poor performance is not a problem.	**Concentrate here**: Attributes situated in this quadrant are considered to be underperforming and, as such, represent the product's major weakness and threats to its competitiveness. These attributes have the highest priority in terms of investments.

Performance (Before COVID-19) — y

x   Low   Importance (During COVID-19)   High

Figure 1: IPA grid with before and after COVID-19

3.   Results and Discussion

This section explains the result and discussion of the study. Section 3.1 is reliability test, Section 3.2 is demographic profiles, Section 3.3 is descriptive analysis, Section 3.4 is factor analysis, Section 3.5 is sentiment analysis, and lastly Section 3.6 is importance-performance analysis.

3.1 Reliability test

The reliability test using Cronbach's alpha was conducted using SPSS software. The Cronbach's alpha value is 0.912. Thus, it can conclude that the internal consistency is excellent since Cronbach's alpha value lies above 0.9. Hence, this questionnaire is reliable for this survey.

3.2 Demographic profiles

Table 1 shows the demographic profiles. There were 218 (54.5%) female and 182 (45.5%) male respondents who participated in the study. 159 respondents (39.75) were between 19 to 29 years old. Next, 171 respondents (42.75%) were Chinese, followed by 136 Malay (34%), 92 Indian (23%) and one respondent (0.25%) from Siam. The 400 respondents were from Seremban (130), Port Dickson (101), Kuala Pilah (44), Tampin (43), Rembau (39), Jelebu (23) and Jempol (20). The respondents who work in the private sector was the highest, recorded as 131, whereas the lowest was retirees with only seven respondents. Instead of this, 139 respondents (34.75%) earned monthly income between RM

2001 to RM 4000. 195 respondents (48.75%) were single, while 205 respondents (51.25%) were married. Lastly, 127 respondents (31.75%) had an education level with SPM or any equivalent level.

Table 1: Demographic profiles

Diversity	Category	Freq., (%)	Diversity	Category	Freq., (%)
Gender	Female	218 (54.5)	District	Jempol	20 (5)
	Male	182 (45.5)		Private sector	131 (32.75)
Age	Below 18 years old	22 (5.5)	Occupation	Students	107 (26.75)
	19 – 29 years old	159 (39.75)		Self-employed	75 (18.75)
	30 – 39 years old	135 (33.75)		Private sector	72 (18)
	40 – 49 years old	64 (16)		Unemployed	8 (2)
	50 – 59 years old	17 (4.25)		Retirees	7 (1.75)
	Above 60 years old	3 (0.75)	Monthly income	Below RM 2000	131 (32.75)
Ethnicity	Chinese	171 (42.75)		RM 2001 – RM 4000	139 (34.75)
	Indian	92 (23)		RM 4001 – RM 6000	115 (28.75)
	Malay	136 (34)		Above RM 6000	15 (3.75)
	Other	1 (0.25)	Marital status	Married	205 (51.25)
District	Seremban	130 (32.5)		Single	195 (48.75)
	Port Dickson	101 (25.25)	Education level	Below SPM	54 (13.5)
	Kuala Pilah	44 (11)		SPM or any equivalent	127 (31.75)
	Tampin	43 (10.75)		STPM / Diploma	99 (24.75)
	Rembau	39 (9.75)		Bachelor's degree	119 (29.75)
	Jelebu	23 (5.75)		Master	1 (0.25)

3.3 Descriptive analysis

A total of 312 respondents (78%) had their transportation, while 88 respondents (22%) did not have their transportation. 270 respondents owned only a car, 46 respondents owned both cars and motorcycles, and four respondents owned motorcycles. The top three reasons of the respondents who used public transport were to save money (101), convenience (97), and to avoid traffic jams (62). Next, 393 respondents (98.2%) used public transportation before the pandemic and decreased to 364 (91%) respondents during the pandemic. Table 2 shows the highest frequency of public transportation used before the pandemic were bus, KTM commuter, e-hailing, and taxi, with 152 respondents (38%). In contrast, 101 respondents (25.3%) used only bus and e-hailing during the pandemic. Table 3 shows that 255 respondents used public transportation three to four times per week before the pandemic, whereas 385 respondents used public transportation only one to two times per week during the pandemic. Based on Table 4, the purpose of the respondents using public transportation before and during the pandemic was going to work, recorded as 210 (52.5%) respondents and 181 (45.3%) respondents, respectively.

Table 2: Types of public transport taken

| COVID-19 pandemic	Type	Frequency	Percentage (%)
Before	Bus, KTM Commuter, E-hailing & Taxi	152	38
After	Bus & E-hailing	101	25.3

Table 3: Frequency of using public transport

Frequency per week	Before COVID-19 pandemic		During COVID-19 pandemic	
	Frequency	Percentage (%)	Frequency	Percentage (%)
1 - 2	105	26.3	385	96.3
3 - 4	255	63.7	12	3
5 - 6	25	6.3	1	0.3
7 and above	15	3.8	2	0.5

Table 4: Purpose of using public transport

Purpose	Before COVID-19 pandemic		During COVID-19 pandemic	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Entertainment	73	18.3	155	38.8
School	86	21.5	42	10.5
Travel	29	7.2	15	3.8
Work	210	52.5	181	45.3
Others	2	0.5	7	1.6

Based on Figure 2, it can conclude that 248 (62%) of the respondents were satisfied with the public transportation services in Negeri Sembilan and 22 respondents were very satisfied with the public transportation services in Negeri Sembilan.
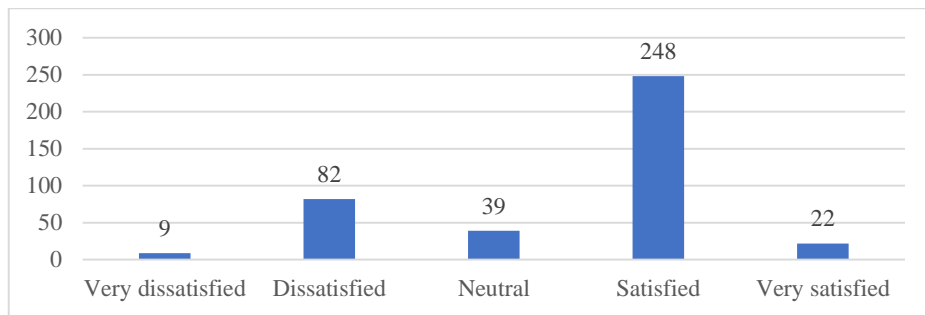
Figure 2: Satisfaction level toward public transportation services

3.4 Factor analysis

Figure 3 shows the correlation matrix using Spearman correlation to test the correlation of the 15 components. All the components correlated with weak positive relationships, moderate positive relationships, and strong positive relationships.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0.646	0.671	0.597	0.294	0.452	0.351	0.262	0.401	0.424	0.296	0.616	0.375	0.405	0.314
2	0.646	1	0.626	0.665	0.361	0.545	0.429	0.289	0.406	0.439	0.304	0.788	0.448	0.477	0.387
3	0.671	0.626	1	0.724	0.365	0.458	0.436	0.344	0.438	0.46	0.261	0.627	0.376	0.364	0.336
4	0.597	0.665	0.724	1	0.355	0.501	0.449	0.284	0.371	0.38	0.249	0.649	0.395	0.419	0.359
5	0.294	0.361	0.365	0.355	1	0.401	0.33	0.358	0.32	0.226	0.057	0.266	0.227	0.147	0.301
6	0.452	0.545	0.458	0.501	0.401	1	0.669	0.428	0.405	0.36	0.191	0.481	0.358	0.395	0.234
7	0.351	0.429	0.436	0.449	0.33	0.669	1	0.455	0.421	0.427	0.23	0.432	0.391	0.372	0.219
8	0.262	0.289	0.344	0.284	0.358	0.428	0.455	1	0.512	0.424	0.162	0.276	0.187	0.154	0.208
9	0.401	0.406	0.438	0.371	0.32	0.405	0.421	0.512	1	0.573	0.265	0.399	0.291	0.369	0.175
10	0.424	0.439	0.46	0.38	0.226	0.36	0.427	0.424	0.573	1	0.357	0.446	0.319	0.476	0.191
11	0.296	0.304	0.261	0.249	0.057	0.191	0.23	0.162	0.265	0.357	1	0.309	0.287	0.485	0.088
12	0.616	0.788	0.627	0.649	0.266	0.481	0.432	0.276	0.399	0.446	0.309	1	0.488	0.49	0.381
13	0.375	0.448	0.376	0.395	0.227	0.358	0.391	0.187	0.291	0.319	0.287	0.488	1	0.467	0.253
14	0.405	0.477	0.364	0.419	0.147	0.395	0.372	0.154	0.369	0.476	0.485	0.49	0.467	1	0.209
15	0.314	0.387	0.336	0.359	0.301	0.234	0.219	0.208	0.175	0.191	0.088	0.381	0.253	0.209	1

Figure 3: Correlation matrix using Spearman correlation

The components with communalities more than 0.4 indicate the high contribution of the factors and no need to be excluded. The result showed that all components had contributed to measuring the factors and that no component needed to be excluded. Then, three components were selected with the eigenvalues more than one and considered as solid factors. Table 5 shows each factor had its factor loading on each component except for privacy. The privacy factor was categorised in component 3 since the value was 0.564 compared to 0.52 in component 2. Component 1 was most highly correlated with waiting time, punctuality, environment, comfortable, cleanliness, and informative system. Next, the second component was most highly correlated with ease for booking using applications, driver's attitude, location terminals/station, safety during the journey, and cost. Lastly, the last component, component 3, was most highly correlated with Wi-Fi connections, frequency, privacy, and travel time.

Hence, the components were categorised with the factors stated. Component 1 was vehicle services and reliability, component 2 was accessibility and responsiveness, and lastly, component 3 was additional services, timeliness and privacy.

High-quality public transportation encourages customers to retain and attracts new customers. The functional factors such as frequency, price, punctuality, and travel time are the essential factors that impact customer satisfaction and require more attention to improve it [20]. Moreover, there are five categories of factors includes the bus stop facilities, bus services, driver attitude, bus capacity, and vehicle [21]. Among these five categories, bus services are the most crucial factor because the respondents have a strong interest in bus services, punctuality, and bus schedule. Hence, it can prove that vehicle services and reliability are the most important components in this study and need to be taken into consideration to improve them.

Table 5: Rotated component matrix

| Services	Component			Services	Component		
	1	2	3		1	2	3
Waiting time	0.773			Location terminals/station		0.680	
Punctuality	0.762			Safety during journey		0.671	
Environment	0.751			Cost		0.572	
Comfortable	0.707			Wi-Fi connection			0.790
Cleanliness	0.687			Frequency			0.727
Information system	0.636			Privacy		0.520	0.564
Ease for booking using application		0.777		Travel time			0.461
Drivers' attitude		0.713					

3.5 Sentiment analysis

The top five most frequent words that appear in the comments are "time" (70 times), "bus" (66), "transport" (36), "good" (35) and "cheap" (31). Figure 4 shows the word cloud generated using R. The bigger the word means, the higher the frequency. Hence, it can be concluded from the comment that "time" appears the most followed by the "bus", "transport", and others.

Figure 4: Word cloud of public comments

Figure 5 shows that the sentiment scores were more on positive sentiment, followed by the negative sentiment, trust, anticipation, and joy. It can be concluded that the comments on the public transport services in Negeri Sembilan consisted of more positive comments than negative, which means the respondents were satisfied with the public transportation services. However, it did not state that it was good enough because there were also negative comments. Hence, it needed to improve the public transportation services in Negeri Sembilan continually.
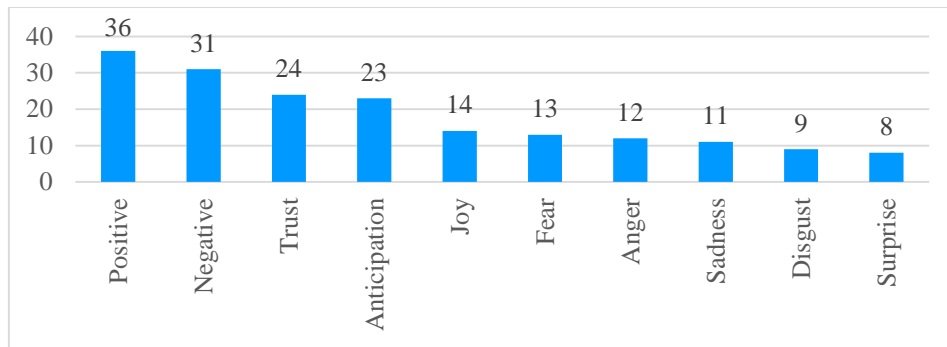
Figure 5: Bar plot of sentiment scores

According to the suggestions, the top three suggestions were to provide more promotion or discounts (50), clean up the vehicles or stations (45) and improve the frequency of public transport (35). Hence, the responsible parties should be more concentrated on these three sectors to provide better public transportation service at Negeri Sembilan and attract more people to use it. The economic depression nowadays has affected many people getting unemployed, and the expenses are getting higher. Thus, lowering the price of public transport can help people solve their problems. Cleanliness is also one factor that affects the satisfaction and decision of the people. Hence, cleaning up the vehicles and station is crucial because a clean environment will make the people feel comfortable to use. The public transportation services in Negeri Sembilan should improve the frequency of the public transportation services. This will decrease the waiting time, and people will feel the convenience to use it. This can help the people save their time and be confident to use the public transportation services provided.

3.6 Importance-performance analysis

Figure 6 shows there was seven service lies on the first quadrant, which indicated that to keep up the good work. The seven services were cleanliness, waiting time, comfortable, cost, safety during the journey, ease for booking and punctuality. These kinds of services were considered as well-performing and needed to improve continually. In addition, the variable "1", which is cleanliness, showed the lowest mean rank, which means that good performing for before and during the COVID-19 pandemic. Even though this service was executed well, but the cleanliness of the public transport as well as the station is still needed to improve to maintain the cleanliness continually. However, there were eight services lies on the third quadrant, which are environment, driver's attitude, location terminals/station, privacy, Wi-Fi connections, travel time, frequency, and informative system. These kinds of services revealed that it was a low priority which indicates that these services were not performing well, but it was considered unimportant. Hence, there is no need to pay too much attention to these services.
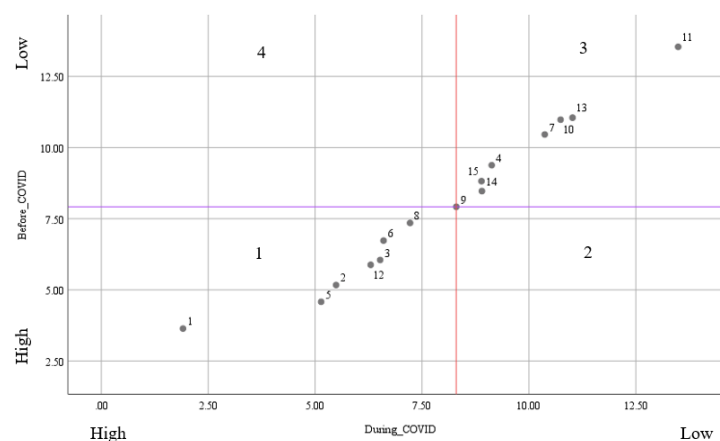
Figure 6: IPA plot to compare the rank before and during the COVID-19 pandemic

4. Conclusion

In conclusion, this study is focused on the public perceptions and satisfaction toward public transportation services in Negeri Sembilan during the COVID-19 pandemic. A total of 400 responses were collected through an online questionnaire survey and focused on those who took public transportation before and during COVID-19 at Negeri Sembilan. There are four objectives in this study by using four different methods such as the descriptive analysis, factor analysis, sentiment analysis, and, lastly, importance-performance analysis. As a result, all four objectives were achieved.

First, the respondents are satisfied with public transportation in Negeri Sembilan. More than half of the respondents stated that they are satisfied or very satisfied with the public transport services. Most of the respondents have their transportation but still, consider using public transport because of the reason save money. The traffic jam issues were the main reason the citizens in Negeri Sembilan chose to use public transport even though the public transportation is not developed as the Kuala Lumpur area. In addition, there are three components categorised. Component 1, named vehicles services and reliability, is the most significant factor that affects the satisfaction level, followed by component 2, accessibility and responsiveness, and component 3, which is additional services, timeliness and privacy. Furthermore, the comments for the public transportation services in Negeri Sembilan proved that most of the respondents are satisfied with the services because the positive comments are more than the negative comments. Then, the most frequent suggestions provided by the passengers are provided more promotion or discounts, clean up the vehicles or stations and improve the frequency of the public transport. Lastly, this study successfully identified what services are performed well and need to be improved. The services such as cleanliness, waiting time, comfortable, cost, safety during the journey, ease for booking and punctuality showed that it is performed well and need to improve continually in the future. The services such as environment, drivers' attitude, location terminals/station, privacy, Wi-Fi connections, travel time, frequency, and informative system reveal that all these services are considered a low priority, which means that the government no need to focus too much on these services.

The recommendation to improve the public transportation services in Negeri Sembilan is to increase the number of public transport supplies in peak hours. Hence, this can help attract more Malaysians to use public transport since waiting time is the factor that the passengers will consider, so it needs to improve continually in the future. Next, future researchers should increase the number of respondents for each district so that can obtain balance respondents to improve the result of the research. Lastly, the suggestion to the government is to explore a website in the future to track and compulsory the people who had taken public transportation to review the journey experience, which involves different categories including satisfaction on the time, attitude, convenience, and other service quality. Hence, it can make the future researcher more efficiently get the data, and the data are more reliable for similar research in the future.

Acknowledgement

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