Public transportation in Jabodetabek: performance satisfaction analysis

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Abstract. A chronic traffic congestion in JABODETABEK or Greater Jakarta has become a problem that needs to be addressed by the government. The existing public transportation system is associated with poor vehicle condition, poor infrastructure for non-motorized modes, poor customer service and uncomfortable traveling conditions. This study focused on Kereta Rel Listrik (KRL) in JABODETABEK. This study also aims to evaluate the level of passengers' satisfaction towards KRL performance and to identify what needs to be improved on public transportation to attract private transportation users into using public transportation while maintaining its existing passengers. The research was conducted using quantitative method. Questionnaires were distributed to 390 passengers to gather empirical data. Data analysis used to examine the effect of satisfaction on the performance of public transportation is Structural Equation Modelling (SEM) using AMOS 22.0. Result shows that service quality has positive relationship towards perceived value and satisfaction, but insignificantly negative to behavioural intention. On the other hand, perceived value is significantly positive towards behavioural intention, but it has a negative relationship with satisfaction. The satisfaction towards behavioural intention has a positive relationship. The findings in this study may help to improve the performance of existing Kereta Rel Listrik in JABODETABEK.

1. Introduction
In this era, with constantly increasing population and world economy growth, the demands on transportation are also on the rise. The dependency on vehicles by individuals led to its extensive use. People who mostly stay in cities and prefer to drive their own vehicles relegating it to be the main factor of urban congestion. The space requirements for the automobile, which are much greater than any other transportation mode, aggravated the traffic congestion problem, especially in medium-sized and big cities [1, 2].

Public transportation is a sustainable, reasonable alternative to private car use [3, 4]. It is necessary to summarize information concerning what drives customer satisfaction and dissatisfaction on public transportation, so that a more marketable and attractive public transportation can be designed based on it. This study focused on JABODETABEK public transportation where the number of private vehicles is too high. It is widely known that public transportation is essentially popular amongst children, adolescents, and elderly. Less obvious is the reliance of the city for the existing capacity of public transportation are limited only for those who do not have private vehicles; people are slowly starting to realize that it is important to seriously find ways of reducing the use of private vehicles and that will involve some opting into public transportation.
Utilization of public transportation systems in Jakarta is the main key solution in reducing the heavy traffic congestion that requires the need to understand the public’s satisfaction in relation to the public transportation itself. Previous works have reported the crucial of understanding the passengers’ perceptions on the quality of service provided. Service quality reflects the passenger’s perception of public transportation performance and it depends to a great extent on the operating decisions made by a service providers, particularly on decisions of how long and how often it is to be provided, where transit service should be provided, and what kind of services the passengers needed [5]. Understanding the passenger’s satisfaction may be effective to meet the passenger needs, retain the existing public transportation passengers, while attracting more people to switch from private transportation into public transport. In addition, according to Cunningham et al. [6], the accurately assessing passenger’s perception towards public transportation service quality is the vital indicator for service quality improvement. Thus, this study was conducted to explore the passenger’s perception towards public transportation which focused on Kereta Rel Listrik services in order to formulate the effective strategies to increase Kereta Rel Listrik service quality in JABODETABEK as well as enhance the passenger’s satisfaction towards the service.

2. Literature review and hypotheses formulation

2.1. Service quality (SQ)
Service quality (SQ) is essentially a set of properties of services that meets passenger’s expectation and as flaws are eliminated, enhances the passenger’s satisfaction [7, 8]. Therefore, when a passenger becomes satisfied with public transportation service, he/she perceives the service as being of good or high quality and vice versa. A high level of service quality lead to increase in the number of loyal passengers, creating a favourable image of the service providers that may lead to the reduction in traffic congestion. Lai and Chen [9] was reported the service quality of public transportation have ability to influence the perceived value, passenger’s satisfaction and passenger’s behavioural intention towards the service provided. Thus, the following hypotheses are suggested:

- Hypothesis 1: Service quality positively influences the passenger's perceived value
- Hypothesis 2: Service quality positively influences the passenger's behavioural intentions
- Hypothesis 3: Service quality positively influences the passenger's satisfaction

2.2. Perceived value (PV)
The value of a service perceived by passengers is a valuation carried out by comparing the benefits of a service, or relationship against costs or sacrifices incurred [10]. Consumer value is a comparison of the benefits of a product or service received to costs incurred by consumers [11]. If the benefits for consumers are higher than the costs incurred by consumers, it will turn into a high consumer value. If the value received by consumers is continuously given it will ensure a competitive advantage for the company, therefore it is important that companies ensure high consumer satisfaction [10]. The next two formulated hypotheses are:

- Hypothesis 4: Perceived value positively influences the passenger's behavioural intentions
- Hypothesis 5: Perceived value positively influences the passenger's satisfaction

2.3 Passenger’s satisfaction (PS)
Satisfaction is predetermined by how the expectations of the passengers are met [12]. It is related to passengers’ needs. The level to which these needs are fulfilled define the enjoyment or disappointment from discrepancy [13]. Oliver [14] highlighted that satisfaction is the passenger’s fulfilment response. It is a consideration that a service feature, or the service itself, provided (or is providing) a pleasurable level of consumption-related fulfilment, including levels of under-or over fulfilment”. Therefore, the last hypothesis is:

- Hypothesis 6: Satisfaction positively influences the passenger's behavioural intentions
2.4 Behavioural intention (BI)
Behavioural intention as an act to represent customers’ loyalty [15]. Therefore, behavioural intention includes repurchases and recommendations [16]. Measurement of behavioural intention can be the best way to predict future buying behaviour [15, 17]. Zeithaml et al. [16] stated that consequence arising from perceptions of service quality in the form of intention to behave by individual consumers is a signal of success or failure of the company to retain its customer.

2.5 Model framework
Based on comprehensive literature review, the current study proposed a model framework to explore the relationship between four constructs, namely service quality (SQ), perceived value (PV), passenger’s satisfaction (PS), and behavioural intention (BI), as displayed in figure 1.

![Figure 1. The model framework](image)

3. Research methodology
The questionnaire that used in this study was adopted by Lai and Chen [9] and was modified based on the detailed service in JABODETABEK and back translated to Indonesian language. The data is collected from 390 KRL passengers in JABODETABEK. The total of sample size in this study was decided based on recommended by Krejcie & Morgan [18]. Random sampling method is employed when selecting the respondents. The valid responses are analysed using the Statistical Package for Social Sciences Software (SPSS) 22.0 and Analysis of Moment Structure (AMOS) version 22.

4. Results and discussion
Based on the respondents’ information obtained, majority of respondents participated in this research are female with a total of 240 or in a percentage of 61.5%, while male respondents are 150 which is equivalent to 38.5%. From the data obtained, age group are categorised into five as shown in the table 1.

4.1 Reliability and convergent validity
Confirmatory Factor Analysis (CFA) was used to evaluate the measurement model in this study. It was also utilized to assess dimension, convergent validity and construct reliability for overall model. The result obtained shows that the factor loading for all items ranging between 0.59 – 0.93, which is exceed the set threshold value of 0.5 as recommended by Hair et al. [19] as shown in table 2.
Table 1. Respondents characteristics

| Groups                  | Frequency | Percentage (%) |
|-------------------------|-----------|----------------|
| Gender                  |           |                |
| Male                    | 150       | 61.5           |
| Female                  | 240       | 38.5           |
| Age                     |           |                |
| 18 - 25                 | 175       | 44.9           |
| 26 - 30                 | 70        | 17.9           |
| 31 - 35                 | 52        | 13.3           |
| 36 - 40                 | 33        | 8.5            |
| > 40                    | 60        | 15.4           |
| Occupation              |           |                |
| Government employee     | 82        | 21             |
| Private employee        | 105       | 26.9           |
| BUMN employee           | 68        | 17.4           |
| Entrepreneur            | 58        | 14.9           |
| Not working             | 8         | 2.1            |
| Student                 | 76        | 19.5           |
| Trips                   |           |                |
| Everyday                | 63        | 16.2           |
| Working days only (Monday to Friday) | 105 | 26.9 |
| Every week              | 67        | 17.2           |
| Once a month            | 79        | 20.3           |
| Every 2 - 3 months      | 81        | 20.8           |
| Everyday                | 63        | 16.2           |
| Route(s)                |           |                |
| Bogor/Depok - Manggarai - Jakarta Kota | 112 | 24 |
| Bogor/Depok - Tanah Abang - Pasar Senen | 85 | 18.2 |
| Bekasi - Jatinegara - Manggarai - Jakarta Kota | 74 | 15.8 |
| Rangkasbitung - Tanah Abang | 55 | 11.8 |
| Tangerang - Duri        | 87        | 18.6           |
| Tanjung Priok - Jakarta Kota | 24 | 5.1 |
| Other routes            | 30        | 6.4            |

Based on table 2, it can be concluded that behavioural intention construct has higher square root of AVE compared to other correlation of constructs and it shows a good sign of convergent validity. Other square roots of AVEs are not as high as other correlation of constructs. All loading values from the constructs are above 0.7, where it is considered accepted as good validity [20].
Table 2. Reliability and convergent validity results

| Constructs         | Indicator | Factor Loading | AVE  | CR  |
|--------------------|-----------|----------------|------|-----|
| Service Quality    | SQ1       | 0.79           | 0.64 | 0.88|
|                    | SQ2       | 0.78           |      |     |
|                    | SQ3       | 0.75           |      |     |
|                    | SQ4       | 0.80           |      |     |
|                    | SQ5       | 0.75           |      |     |
|                    | SQ6       | 0.75           |      |     |
|                    | SQ7       | 0.78           |      |     |
|                    | SQ8       | 0.75           |      |     |
|                    | SQ9       | 0.78           |      |     |
|                    | SQ10      | 0.79           |      |     |
| Perceived Value    | PV1       | 0.86           | 0.74 | 0.86|
|                    | PV2       | 0.90           |      |     |
|                    | PV3       | 0.89           |      |     |
| Passenger’s        | PS1       | 0.90           | 0.63 | 0.87|
| Satisfaction       | PS2       | 0.86           |      |     |
|                    | PS3       | 0.59           |      |     |
|                    | PS4       | 0.75           |      |     |
|                    | PS5       | 0.85           |      |     |
| Behavioural        | BI1       | 0.92           | 0.81 | 0.90|
| Intention          | BI2       | 0.93           |      |     |
|                    | BI3       | 0.85           |      |     |

4.2 Goodness of fit indices

The goodness-of-fit of the measurement models explained how good the item in examining the intended constructs [21]. The Goodness of fit indices that assess the measurement model encompass the normed chi-square test, p-value, Goodness of Fit (GFI), Adjusted of Goodness of Fit (AGFI), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Incremental Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA), and Normed Fit Index (NFI). According to range of acceptable value by Shah and Goldstein [22], the values of goodness of fit indices obtained in this study are in the acceptable range and considered fit as shown in table 3.
**Table 3. Goodness of fit indices results**

| Goodness of Fit Indices | Results  | Range of acceptable value | Remarks |
|-------------------------|----------|---------------------------|---------|
| Chi-square              | 1129.58  | (0.0, 1270.0)             | Acceptable |
| P-value                 | 0.00     | (0.0, 0.94)               | Acceptable |
| Chi-square/df          | 3.16     | (0.02, 4.80)              | Acceptable |
| GFI                     | 0.82     | (0.75, 0.99)              | Acceptable |
| AGFI                    | 0.76     | (0.63, 0.97)              | Acceptable |
| CFI                     | 0.93     | (0.88, 1.00)              | Acceptable |
| TLI                     | 0.91     | (0.73, 1.07)              | Acceptable |
| IFI                     | 0.93     | (0.88, 0.98)              | Acceptable |
| RMSEA                   | 0.07     | (0.00, 0.13)              | Acceptable |
| NFI                     | 0.90     | (0.72, 0.99)              | Acceptable |

**4.3 Evaluation of structural model**

The relationship between each construct for the proposed model in this study is shown in table 4. The service quality of public transportation in JABODETABEK had a significant and direct effect on perceived value ($\beta = 0.884, p < 0.001$) and passenger’s satisfaction ($\beta = 0.982, p < 0.001$). In addition, the service quality did not show any significant effect on behavioural intention ($\beta = -0.251, p = 0.547$). Thus, the hypothesis 1 and hypothesis 3 were supported and hypothesis 2 was rejected. In addition, the perceived value had a significant effect on behavioural intention ($\beta = 0.530, p < 0.001$), while the effect of perceived value and passenger’s satisfaction was not significant ($\beta = -0.040, p = 0.191$). Therefore, hypothesis 4 was supported while hypothesis 5 was rejected. Furthermore, passenger’s satisfaction reported had a significant influence on behaviour intention ($\beta = 0.621, p < 0.001$) towards public transportation (KRL) in JABODETABEK. This proved that hypothesis 6 is supported. The summary of the interrelationship among the constructs is summarized in table 4.

**Table 4. Summary of hypothesis testing model**

| Path       | $\beta$ | p-value | Hypotheses result |
|------------|---------|---------|-------------------|
| SQ > PV    | 0.884   | ***     | H1-Supported      |
| SQ > BI    | -0.251  | 0.547   | H2-Rejected       |
| SQ > PS    | 0.982   | ***     | H3-Supported      |
| PV > BI    | 0.530   | ***     | H4-Supported      |
| PV > PS    | -0.040  | 0.191   | H5-Rejected       |
| PS > BI    | 0.621   | ***     | H6-Supported      |
5. Conclusions

From a questionnaire that was distributed to 390 respondents who are the passengers of Kereta Rel Listrik (KRL) in JABODETABEK, the results were then analysed using SEM analysis and used to measure the satisfaction on KRL performance. From this study, it can be concluded that:

- Overall, KRL passengers in JABODETABEK feel dissatisfied with the services provided and the performance of KRL. Nevertheless, the involvement of passengers in public transportation, especially KRL and the behavioural intention of passengers to continue using KRL remains high. This is due to the high needs for transportation to travel from one place to another. In addition, the high level of behavioural intention by passengers is also influenced by several factors, such as fares, income levels, public transportation routes, frequency of public transportation for the routes itself, the quality of services provided are not much different than other, have no option but to use other transportation, and so on.

- There are some things that need to be improved in public transportation to attract private transportation users into public transportation. Based on the results obtained, factors that influence the intention of people in using KRL are punctuality, comfortable waiting area, staff’s behaviour, fares, cleanliness, and so on. By using KRL, passengers can reach many places when in Jakarta. Availability of information is very helpful for passengers when traveling.

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