Determinants of airport train operational performance

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ABSTRACT

This study aims to analyze the improvement of the operational performance of Indonesia’s Soekarno-Hatta Airport train through service quality which is mediated by train passenger loyalty and passenger satisfaction. The main problems in this study are the use of the same railway for long-distance train, airport train, and Commuter Line train, the limited use of airport railway with four schedules, the headway which becomes 30 minutes since the number of travels becomes 82 trips, and the tariff being applied now is considered as burdening the passengers. The research method uses a quantitative analysis approach with the technique of Structural Equation Modeling-Lisrel. Data collection is done through observation and questionnaire distribution. The respondents are 306 passengers of trains heading for Soekarno-Hatta Airport. The benefit of this study for the domestic railway company is that by improving service quality, passenger loyalty and satisfaction, it will improve the operational performance of airport trains. The result of this research indicates the significant influence of service quality variable on passenger loyalty through passenger satisfaction, the significant influence of service quality variable on operational performance through passenger satisfaction and passenger loyalty as well as the significant influence of passenger satisfaction variable on operational performance through passenger loyalty.

Keywords: Passenger Satisfaction, Airport Train Operational Performance, Service Quality, Passenger Loyalty

1. Introduction

Airport trains in Jakarta City and surroundings operate outside the rush hours with four trips from Bekasi Station at 10.05, 11.10, 13.13, and 14.11 of Western Indonesia Time. The reverse trip from Soekarno-Hatta Airport starts at 07.50, 08.50, 10.50, and 11.50 of Western Indonesia Time. During Eid al-Fitr 2018, the Soekarno-Hatta Airport train recorded a surge in the number of passengers; usually, the daily average number of passengers was around 1,000 to 2,000, then its number has increased around twofold. Eid home-to-country transport starts to be seen through the increase of airport train passengers up to more than 5,000 people per day, indicating that people start to use airport train service as one of the transportation modes that support Eid transport in that year. Previously, citizens of Jakarta and its surroundings only had alternative transports of bus, taxi, or private vehicle to go to the airport and vice versa. Land transport faces terrible traffic jams due to imbalanced growth between the vehicle number and the length of road. Some airport train services complained by passengers among others are; (1) the insufficient operation of airport train which has been integrated with busway and Commuter Line, (2) the...
In this study, the variables are operational performance as the most problematic performance with two mediating variables, namely passenger loyalty and passenger satisfaction, and service quality as the independent variable. Today, it can be said that the airport train is still limited in its integration and does not have the necessary national coordination for taking advantage of the intermodal transportation of the train to the airport (Chen & Lin, 2016). Stubbs and Jegede (1998) also state that the integration plan of airport trains is not well-coordinated, so the use of intermodal transportation from and to the airport is not optimal. This integration has in the future resulted in a positive alternative on several aircraft routes and caused train travel to the airport to become part of air transportation services (Givoni, 2006; Givoni & Banister, 2007). Thus, the integration will provide a better use of available air capacity than duplicating multiple routes and high-speed rail services. Based on research results of (Chiambaretto & Decker, 2012), uncertainty regarding regulatory treatment may limit the spread and scope of air-rail intermodal agreements.

Theoretically and based on previous studies, it can be described as follows. Some of the main problems in the management of train journey are schedule adjustment and train rescheduling which have ever been studied by (Jespersen-Groth et al., 2009); train operational performance studied by (Burdett & Kozan, 2014; Espinosa-Aranda & García-Ródenas, 2013; Fourie & Zhuwaki, 2017). Train operational performance, according to (Patra, 2009), is explained through reliability, availability, maintainability, and safety as well as life cycle cost for train infrastructures and shows the model for effective infrastructure maintenance plan. Performance measurement based on the study by Stenström (2014) has been shown to improve organizational efficiency and effectiveness. However, the development and integration of performance measurement are also important (Riyanto et al., 2021).

Findings from the research by Banu (2018) in India conclude that improving service quality is one way to enhance the competitiveness of train services. Modified SERVQUAL instruments according to (Pahala et al., 2021; Cavana & Corbett, 2007; Irfan et al., 2012) including some constructions of service quality such as empathy, assurance, physical evidence, punctuality, responsiveness, safety, and security are used to measure the passenger perception on the train service quality. Based on the result of research by Nuraizi et al. (2018), the ideal tariff is recommended after the service quality improvement made by the Soekarno-Hatta Airport train operator. To improve the service, the more holistic approach to control traffic is using the concept of a real-time traffic plan where the train driver will substantially improve the quality of train traffic control (Tscherner et al., 2014).

Findings from the research by Kumuthadevi (2013) reveal that the most important factors determining train passenger satisfaction are basic facilities, namely cleanliness, safety & security, catering, health services, punctuality, behavior toward passengers. The research done by Partogi et al. (2017) in Indonesia analyzes the level of train passenger satisfaction, which is very important to be improved due to the unsatisfying service level. It is understood that customer loyalty is the main element that gives long-term profitability to companies (Chou et al., 2014).

A previous study in Indonesia by Wulansari (2016) on the model of transportation mode selection for the train to the airport includes: 1) Airport train and Bus, 2) Airport train and taxi, 3) Airport train and private vehicle (car). Subsequently, based on the sensitivity analysis it is known that the most sensitive to affect the probability of transportation mode selection is tariff (travel cost). For example, the airport train at New Yogyakarta International Airport was studied by Setiawan (2018) of which the result shows the ideal distance for the passengers who are willing to take the airport train to go to the city. According to Surbakti and Bombongan (2017) in their research want to know the characteristics of train and bus users from Medan to Kuala Namu Airport and how passengers will choose those two transportation modes. Various solutions have been considered including baggage handling, schedule coordination, and compensation for delays, but the question of price was not addressed (Chiambaretto et al., 2013). Factors in cooperation also affect the sensitivity of demand to price, horizontal differentiation between air and rail, and asymmetry in the investment costs of partnerships (Jiang et al., 2017). Another study in Shanghai, China according to Chen and Lin (2016), needs to look at the relationship between the Airport Authority, the Shanghai Railway Bureau, and airlines by encouraging the integration of air trains through the improvement of shared ticketing and code sharing, direct baggage transfers, provision of fast and convenient connections and expansion of the link service area air train.

The results of this study can be used as a reference to improve theoretical and empirical understanding of the competitive structure of the aviation industry and the value function for designing a competition strategy that has a sustainable orientation. Barrett (2004) pointed out the need for strategic planning for the aviation industry not only for domestic low-cost airlines (LCC) or full-service operators. The research objective is to analyze the improvement of the operational performance of Indonesia’s Soekarno-Hatta Airport train through service quality which is mediated by train passenger loyalty and passenger satisfaction. To prove the research objectives empirically, the hypotheses to be tested are as follows:
H1: Service Quality (X) has a direct effect on Passenger Satisfaction (Y1).
H2: Service Quality (X) has a direct effect on Passenger Loyalty (Y2).
H3: Passenger Satisfaction (Y) has a direct effect on Passenger Loyalty (Y2).
H4: Service Quality (X) has a direct effect on Operational Performance (Z).
H5: Passenger Loyalty (Y1) has a direct effect on Operational Performance (Z).
H6: Passenger Satisfaction (Y) has a direct effect on Operational Performance (Z).
H7: Service Quality (X) has a direct effect on Passenger Loyalty (Y2) by mediating Passenger Satisfaction (Y1).
H8: Service Quality (X) has a direct effect on Operational Performance (Z) by mediating Passenger Satisfaction (Y1) and Passenger Loyalty (Y2).
H9: Passenger Satisfaction (Y1) has a direct effect on Operational Performance (Z) by mediating Passenger Loyalty (Y2).

We propose service quality as an analytical tool that can improve the operational performance mediated by passenger satisfaction and passenger loyalty. Figure 1 describes the conceptual framework of this research with nine research hypotheses based on the research constellation, both direct and indirect.

Fig. 1. Research Variable Constellation Model

2. Research Method

There are four latent variables in this research, namely Service Quality (X) as an independent variable, Passenger Satisfaction (Y1) and Passenger Loyalty (Y2) as intervening variables, and Operational Performance (Z) as the dependent variable. Each of the latent variables is measured by some observed variables/indicators. The research uses a quantitative method with the model of Structural Equation Modeling (SEM) Lisrel. According to (Hair et al., 2014), data collection uses a sampling technique and is carried out through observation unit groups of Proportionate Stratified Random Sampling with Slovin formula. The respondents are 306 train passengers going to Soekarno-Hatta Airport out of 1,300 passengers as the population. The respondents who fill in the questionnaires depart from four stations, namely Manggarai, Sudirman Baru, or BNI City, Batu Ceper leaving for Soekarno-Hatta Airport. SEM for quantitative analysis is much used by previous researchers to test the conceptual framework. Lisrel Program 8.7.1 shows the measurement of structural problems and is used to test the hypothesis model. The research steps using such SEM–Lisrel includes; (1) descriptive analysis, as the description of respondent’s response data, (2) initial evaluation, namely Confirmatory Factor Analysis; (3) validity and reliability test of measurement model; (4) testing of full structural model (Standardized); (5) evaluation on the index of fit model structural; (6) testing of full model Structural (T values); (7) estimated structural model of the inter-relations of latent variables through path coefficient test; and (8) hypothetical test.

3. Results and Discussion

3.1. Result of Full Structural Model Testing

The result of the structural equation test is presented in Fig. 2. The test of the full model of SEM is carried out in two kinds of testing, namely model fitness and hypothetical test of the model. The test of the full model of SEM is used to see the model worthiness or model fitness. The evaluation of good fitness of the Structural Equation Model is done by comparing the recommended values of the fitness index. The result of model fitness testing overall uses the $\chi^2$ (chi-square) test which obtains the value of 328.26 with a p-value of 0.000 and RMSEA of 0.072. Referring to the value of RMSEA, the model has been fit as well as with most of the other GOF indexes that have fulfilled the fitness criteria so that it can continue to the next step of the analysis.
After the model fitness test, the next step is to research hypothetical testing through a structural model (Fig. 3). From the recapitulation stated, it can be known that in the first substructure, the Service Quality variable gives 34.7% influence to PS, whereas the rest of 65.3% is given by other variables which are not studied. In the second substructure, service quality and passenger satisfaction variables give 51.3% influence to passenger loyalty whereas the rest of 48.7% is given by other variables which are not studied. In the third substructure, service quality, passenger satisfaction, and passenger loyalty variables give 56.3% influence to operational performance whereas the rest of 43.7% is given by other variables which are not studied.

3.2. Hypothetical Testing

Based on the path coefficient of service quality to passenger satisfaction is as big as 0.589 in a positive direction. it means the better the service quality the higher the Passenger Satisfaction will be. Based on the test result it can be concluded that hypothesis 1 is accepted, meaning that service quality significantly affects passenger satisfaction; the better the service quality the higher the passenger satisfaction will be. This study supports the studies done by some researchers in Indonesia such as (Ningsih & Suryalena, 2017), that service quality comprising tangibility, reliability, responsiveness, assurance, empathy simultaneously show the significant result on the satisfaction of train passengers of Padang Pariaman in West Sumatera and Surabaya. Whereas other researches by (Chou et al., 2014; Foroutan et al., 2016; Tamaruddin et al., 2020; Ibrahim et al., 2019; Ramseook-Munhurrun et al., 2010). Thus, the result of this research is in line with theoretical studies and the result of previous related research. It means that service quality affects passenger satisfaction.

3.3. Service Quality affects Passenger Loyalty

From the path coefficient of service quality toward the passenger loyalty is 0.44 with a positive direction. It means that the better service quality the higher passenger loyalty will be. Based on the test result it can be concluded that hypothesis 1 is accepted, meaning that service quality significantly affects passenger loyalty, the better the service quality the higher passenger loyalty will be. This study supports the research done by some researchers like (Segoro, 2013) which has a result showing that service quality directly and positively affects customer loyalty. Research by Chou and Kim (2009) uses service quality and loyalty variables as important factors which affect the long-term operation, growth, and the advantage of a service-oriented transportation system. Thus, the result of this study is in line with theoretical studies and the result of previous related studies, although some research reveals that service quality does not have a significant influence on customer loyalty variable. It means that service quality affects passenger loyalty.

3.4. Passenger satisfaction affects Passenger Loyalty

The path coefficient of Passenger Satisfaction toward Passenger Loyalty is 0.358 with a positive direction. It means the higher Passenger Satisfaction the higher Passenger Loyalty will be. Based on the test result it can be concluded that Hypothesis 1 is accepted, meaning that Passenger Satisfaction significantly affects Passenger Loyalty, the higher Passenger Satisfaction the higher Passenger Loyalty will be. This study supports the result of research by Foroutan et al. (2016) showing that the result of research on Zendegi traina in Iran shows that passenger satisfaction has a significant relation with passenger loyalty. The same test in Iran finds a positive relationship between satisfaction and passenger loyalty (Esmaeili et al., 2013). It means passenger satisfaction affects passenger loyalty. According to Yuan et al. (2021), passenger satisfaction and impact on loyalty and user complaints indicate that several groups of passengers share common interests in ticketing services, reliability, accessibility, and convenience. While some striking differences in perceptions are identified in personalized services, information services, and connectivity.
3.5. Service Quality affects Operational Performance

The path coefficient of service quality toward operational performance is 0.233 with a positive direction. It means that the better service quality the better operational performance will be. Based on the test result it can be concluded that hypothesis 1 is accepted, meaning that service quality significantly affects operational performance; the better the Service quality the better operational performance will be. Previous research on the Soekarno-Hatta Airport train has been done by Nuraizi et al. (2018) discussing the recommended ideal tariff after improving the priority quality or the service provided by the operator. Thus, the result of this study is in line with theoretical studies and the result of previous related studies. It means that service quality affects operational performance.

3.6. Passenger Satisfaction affects Operational Performance

The path coefficient of passenger satisfaction toward service quality is 0.188 with a positive direction. It means that the higher the passenger satisfaction the higher the operational performance will be. Based on the test result it can be concluded that hypothesis 1 is accepted, meaning that passenger satisfaction significantly affects operational performance; the higher the passenger satisfaction the higher the operational performance will be. Previous research on the Soekarno-Hatta Airport train has been done by Nuraizi et al. (2018) discussing the recommended ideal tariff after improving the priority quality or the service provided by the operator. Thus, the result of this study is in line with theoretical studies and the result of previous related studies. It means that passenger satisfaction affects operational performance.

3.7. Passenger Loyalty affects Operational Performance

From the path coefficient of passenger loyalty toward service, quality is 0.434 with a positive direction. It means the higher the passenger loyalty the higher the operational performance will be. Based on the test result it can be concluded that hypothesis 1 is accepted, meaning that passenger loyalty significantly affects passenger loyalty; the higher the passenger satisfaction the higher the operational performance will be. This study supports the result of research done by some researchers like Chou and Yeh (2013) who add in their research that the increase of evaluation indicator will be able to enhance passenger loyalty and improve operational performance in train service. Thus, the result of this study is in line with theoretical studies and the result of previous related studies. It means that passenger loyalty affects operational performance.

3.8. Mediation Testing

The seventh hypothesis tested is the indirect influence of service quality on passenger loyalty through passenger satisfaction. In the result table of estimated influence size among research variables (mediation), it can be known that the path coefficient of the direct influence of service quality on passenger loyalty is 0.444 and the indirect influence through passenger satisfaction (indirect effect) is 0.211 so that the total effect of service quality on passenger loyalty through passenger satisfaction both directly and indirectly (total effect) is obtained 0.655. From this result, it can be known that the total indirect influence of service quality on passenger loyalty through passenger satisfaction is 0.655 bigger than its direct influence as big as 0.211. This indicates that the passenger satisfaction variable has a positive contribution in mediating the relation between service quality and passenger loyalty.

3.9. Indirect Influence of Service Quality on Passenger Loyalty through Passenger Satisfaction

The obtained value of $t_{\text{statistic}}$ is 0.211 bigger than $t_{\text{table}}$ (1.96). Since the value of $t_{\text{statistic}}$ (0.211) is bigger than 1.96, then in the error rate of 5% (two tails) it is decided to accept $H_1$ and reject $H_0$ so that the seventh hypothesis is accepted. Thus, it can be concluded that there is an indirect significant influence of service quality variable on passenger loyalty through passenger satisfaction. The results of research by Foroutan et al. (2016) in Iran and according to Chou et al. (2014) in Taiwan; explain that train service quality has a significant relation with passenger satisfaction, and customer loyalty. Passenger satisfaction has a significant relation with passenger loyalty. Thus, the result of this study is in line with theoretical studies and the result of previous related studies. It means that there is an indirect significant influence of service quality variable on passenger loyalty through passenger satisfaction.

3.10. Indirect influence of Service Quality on Operational Performance through Passenger Satisfaction and Passenger Loyalty

The obtained value of $t_{\text{statistic}}$ is 8.051 bigger than the value of $t_{\text{table}}$ (1.96). Since the value of $t_{\text{statistic}}$ (8.051) $> 1.96$, at an error rate of 5% (two-tail) it is decided to accept $H_1$ and reject $H_0$ so that the eighth hypothesis is accepted. Thus, it can be concluded that there is an indirect significant influence of service quality variable on operational performance through passenger satisfaction and passenger loyalty. This study also supports the research done by Kao and Xu (2017) in Taiwan explaining that the improvement of performance and service quality will give higher satisfaction, enhance loyalty, and passenger's willingness to keep using the train. Thus, the result of this study is in line with theoretical studies and the result of previous related studies. It means that there is an indirect significant influence of service quality variable on operational performance through passenger satisfaction and passenger loyalty.
3.11. The indirect influence of Passenger Satisfaction on Operational Performance through Passenger Loyalty

The obtained value of t\text{statistic} is 5.047 bigger than the value of t\text{Table} (1.96). Since the value of t\text{statistic} (5.047) > 1.96, then at an error rate of 5% (two-tail), it is decided to accept H1 and reject H0 so that the ninth hypothesis is accepted. Thus, it can be concluded that there is an indirect significant influence of passenger satisfaction variable on operational performance through passenger loyalty. Research using several indicators of train service performance is done by some researchers (Permana et al., 2021; Chou et al., 2014; Chou & Yeh, 2013; Eprilianto, 2013). Thus, the result of this study is in line with theoretical studies and the result of previous related studies. It means that there is a significant influence of passenger satisfaction variable on operational performance through passenger loyalty. The contribution and novelty that will be resulted from this study is that this study can give an explanation to people about the operational performance of the airport train company related to service quality, passenger loyalty, so it can be hoped to improve the service and enhance passenger satisfaction.

4. Conclusion

The results of this research can be explained from the dimension of airport train service quality, access for train passengers facilitating to continue their trip to the airport without going out of railway station, and the schedule of departure and arrival available and attached at the railway station or in publication media. Officers will give information if there is an obstruction of the travel clearly and communicatively. Some improvements are needed; in terms of train schedule, it should be integrated with airlines, railway management needs to be more responsive to all complaints from train passengers. In terms of passenger satisfaction, the design of a passenger seat with a backrest like an aircraft seat that can be laid down gives comfort to passengers during travel; providing a rack for luggage near the entrance gives convenience to passengers. Meanwhile, ticket prices are still not fully acceptable to the public. In terms of loyalty, passengers get more certainty of travel time by train to the airport than other transports so that they take Airport train into account as the main choice. Ergonomic and comfortable seats also determine passenger loyalty. In the operational performance, the operational schedule of airport train arrival and departure set up by the railway management can avoid rush hours so that it does not obstruct the schedule of regular trains, and the travel time from BNI City station to the airport targeted to be 30 minutes is very realistic. To improve the service performance, the use of rail for airport trains should be aligned with the rail for the commuter train so the travel time to the airport will not become longer. It also needs to pay attention to the punctuality of train arrival and departure from and to the airport.

References


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