

Exploring the train and airplane as transportation mode preferences among commuting students

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Abstract. Transportation has significant role in urban life. Commuting students in universities in Semarang have several options in transportation modes. This study aimed to examine student preferences for train and airplane transportation modes and factors influencing it. Data of 110 students at several Semarang City Universities compiled by purposive sampling were then analyzed using descriptive statistics method. The results showed that most students prefer train transportation modes rather than airplanes. Regarding the level and quality of service, trains provide better services at cheaper, faster, and more practical prices. Meanwhile, based on the quality of service, aircraft transport offers better safety and comfort than Train transport. Although there are differences in the level and quality of comfort, students preferred to use train since the differences are not significant.

Keywords: Modes of transportation; Plane; Preferences; Student; Train

1. Introduction

One of the measurements used to assess the quality of social life is transportation [1]. Public transport is expected to address several issues, such as traffic congestion and the environmental impact of vehicles [2,3]. The high mobility of city dwellers to go to school, work, and daily necessities requires a long travel time. Therefore, the percentage of traffic congestion will be even more significant if people choose private vehicles over public transport [4,5]. Transportation plays an important role in urban development by providing people access to jobs, education, markets, recreation, health, and other services and restoring social contacts. In last few decades, the role of transportation and population mobility in economic growth has increased, along with the technological progress [6].

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The transportation used by people are diverse and affecting urban life. As an important driver of economic and social development, transport infrastructure connects people with work, education, and health[7]. It is also essential services for its use as part of recreation, entertainment, and economic activity [8]. [8] stated that many factors determine transportation behavior and thus affecting the modal choice. The modes may vary depending on the time, length of the trip, and/or destination [9]. The Central Bureau of Statistics (BPS) states that trains and planes are the main modes of transportation for Indonesians[10].

It is important to increase the usage of public transportation and building a good image on the public transportation system [11]. Public transportation must be competitive and meet customer needs and demands. Interventions towards the condition may come through a clear definition of people's choice of mode and attitudes towards transport [6,12–14]. Public perception, as in people's preferences for public transportation, is an important input [10,13]. Intercity transportation by different modes has been widely studied in recent years.

During the last two decades, research related to intermodal passenger transport identified three key factors of connected transport: connectivity, collaboration, and choice [14]. This study highlights connectivity and cooperation in long-distance intermodal passenger transport networks. Connectivity is affected by transfer, baggage and insurance services, terminal analysis and design, integrated information, ticketing and information communication technology, scheduling, and intercity network design, while contractual issues, competition law, institutional design, implementation methods, and specific capital issues affect collaboration [14]. In this case, to travel long distances between countries or islands, the majority of people of course prefer airplanes because of connectivity [15]. Conversely, for modes of transportation, trains will require more tradeoffs, such as time and cost, because it needs connecting modes of transportation in some areas [16]. However, in reaching destinations on the same island or regionally reachable by both train and plane, the railway transportation will have an advantage in getting customers compared to plane[17,18].

The difference in people's preferences in using airplane and train transportation modes is influenced by many things, such as the need for long distance travel. [17]. This research focused on student preferences for train and plane transportation modes and the factors that influence them. The students defined in this research are those who are studying in the city of Semarang and come from various regions. Students' preferences for modal choice are influenced by their strong interest. Results of this study will contribute to the practical knowledge in developing the most suitable public transportation system for students in their long-distance travel.

2. Methods

This research was conducted in Semarang for 3 months (January to March 2023). The respondents in this study were commuter students at several Semarang universities. Semarang was chosen as the research location because it is one of the cities that has many universities attracting students national-wide. Primary data was obtained by conducting

interviews related to students' preferences and reasons for choosing the use of airplane and train transportation modes, as well as factors that influence students in choosing these modes of transportation. Questions were based on two dimensions proposed by Tamin [18], namely service quality related to safety, comfort, and regularity of transportation modes, the second dimension is service level seen from rates, speed, and accessibility. 110 respondents were chosen using purposive sampling with the criteria of using train and airplane transportation during the last three years.

Quantitative approach employed in this study through descriptive statistics to explain respondents' preferences for train and airplane. In the dimension of service level, the variables were the fare, the speed, and the accessibility of both modes. Meanwhile the dimension of service quality included the safety, the comfort, and regularity of both modes according to students [19]. According to the results of Delphi's analysis through interviews from previous studies, these two dimensions are factors that influence a person's interest in transportation modes [20]. To explain the level of service, an assessment was carried out using a conventional scale with a scale of 1-10 to determine the score base from Rahman & Zakaria [21]. The conventional scale score is shown in Table 1. as follows:

Table 1. Scoring scale [21].

Scoring Scale	Interpretation
1 – 2	Very Bad
3 – 4	Bad
5 – 6	Medium
7 – 8	Good
9 – 10	Very Good

3. Result and discussion

3.1. Socio-economic characteristics

Data in this study was obtained through the questionnaires to 110 respondents. Data were then compiled according to characteristics: gender, age, regional origin, preferences, and income. In detail, Table 2 shows the socio-demographic profile of respondents in this study.

Table 2. Socio-demographic characteristics of respondents (n=110).

Respondent Character		Frequency	%	Description	
Gender	Man	63	57.27%		
	Woman	47	42.73%		
Age	<18	0	0%		
	18-20	95	86.36%	Mean=	19.56
	21-23	11	10%	Max=	25
	24-26	4	3.64%	Min=	18

	>26	0	0%		
Origin	Central Java	26	24%		
	West Java	54	49%		
	East Java	11	20%		
	Yogyakarta Special Region (DIY)	12	11%		
	Riau	2	2%		
	North Sumatra	5	5%		
	Preference	Train	65	59,10%	
Aircraft		45	40,90%		
Income (per month)	<500,000	1	0.91%		
	500,000-999,000	23	20.91%	Mean=	1,633,056
	1,000,000-1,999,000	62	56.36%	Max=	5,400,000
	3,000,000-3,999,000	6	5.45%	Min=	200,000
	>4,000,000	3	2.73%		

Table 2 shows that more than 50 or 57.27% of respondents study were male. In this study respondents were dominated by students who were taking Bachelor, in the age range of 18-20 years with a total of 95 people. Their hometown was majority from West Java (such as Jakarta, Bandung, and Cirebon). In traveling to Semarang, they preferred to use the train. This preference was influenced by accessibility, included short distance to reach, access to location, traffic flow, and travel time to the destination.

3.2. Student preferences for train and aircraft modes of transportation

Respondents' preferences in the choice of mode of transportation are affected by several variables such as travel time, cost, and distance [22]. Meanwhile, according to [23], indicators of accessibility are distance, access to location, transportation, and traffic flow. Figure 1 shows that this study used four indicators, namely (1) distance traveled, the short length of respondents' distance to the airport or station and to the study location influence them to decide what mode of transportation they will use. Respondents tend to choose airplane transportation mode if the distance of study location is far, while if the study distance is close or still within the province, they will tend to choose train transportation mode because it is considered to have more affordable costs, (2) access to the location, (3) traffic flow, and (4) travel time to the location. So that in choosing the mode of transportation that respondents will use, they will tend to choose transportation modes with distance, access to location, traffic flow and travel time that is shorter and easier to reach.

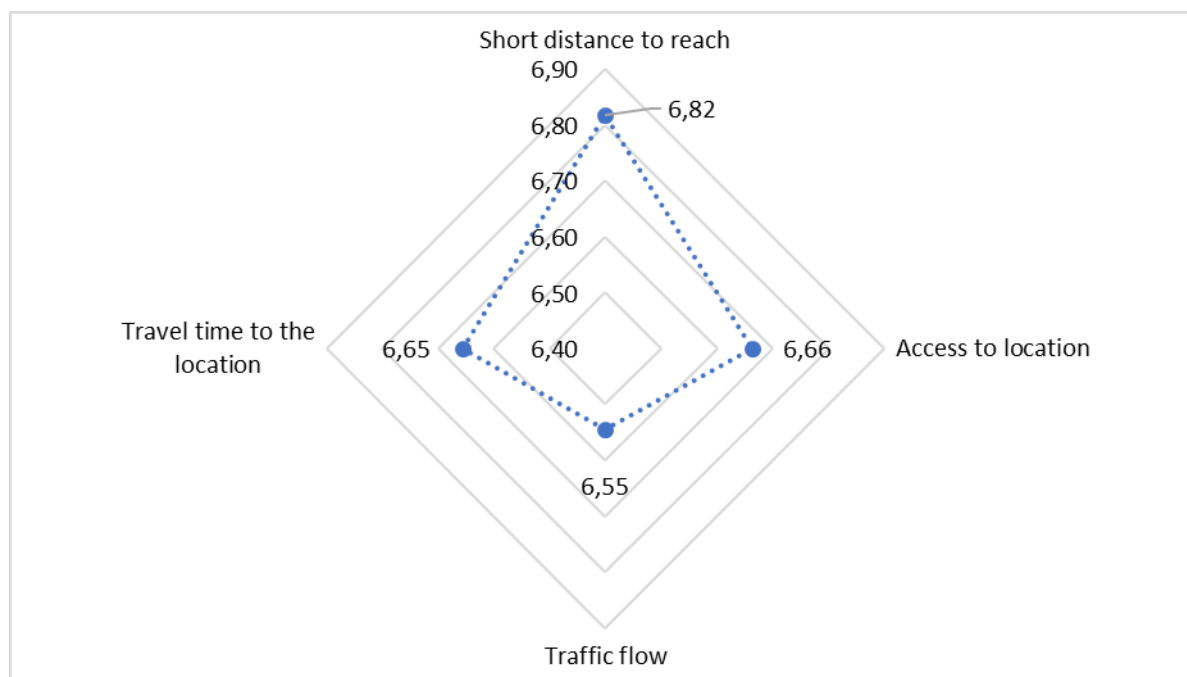


Figure 1. Student preferences for accessibility.

The preferences of student modes of transportation based on gender can be seen in Table 3. Based on Table 3, it can be seen that the preferences of students, both women and men, prefer to use train transportation when compared to planes, where the number of male respondents chooses to use train transportation mode as many as 37 people (57%) and female respondents as many as 28 people (43%). The choice of train transportation mode was because both male and female respondents stated that train ticket prices were cheaper when compared to airplanes. Apart from that, the areas they want to go to also have easy access to train transportation, so students prefer trains.

Table 3. Preferences for students' train and aircraft modes of transportation by gender.

Modes of transportation	Woman		Man		Total
	Number of people	%	Number of people	%	
Plane	19	42%	26	58%	45
Train	28	43%	37	57%	65

Airplane mode of transportation was preferred by male respondents, namely 26 people (58%) and female respondents as many as 19 people (42%). Most respondents, both men and women, chose to use airplane transportation because the area they were going to was more accessible by plane as most of their destinations were outside Java Island, so airplanes were their main option. Besides that female respondents chose to use this mode of transportation since it was faster than trains.

Table 4. Preferences for student modes of train and airplane transportation by age.

Modes of transportation	Age						Total
	18 – 20 Years		21 - 23 Years		24 - 26 Years		
	Number of people	%	Number of people	%	Number of people	%	
Plane	41	91%	4	9%	-	-	45
Train	54	83%	7	11%	4	6%	65

Based on the Table 4, the majority of respondents aged 18 to 20 and they prefer to use the train as their transportation, namely 54 people or 83%, and airplanes as many as 41 people or 91%. Respondents aged 21 to 23 years who chose to use the train were 7 people (11%) and airplanes were 4 people (9%). For the age range of respondents from 24 years to 26 years, all respondents prefer to use the train, namely 4 people. Similar to gender, the choice of students based on age vulnerability in choosing transportation is dominated by trains because train ticket prices are more affordable and there are many station facilities in their area. The choice of students in the mode of transportation is influenced by their urgency (interests), where the urgency of the respondents includes: 1) because of the need to attend family events, 2) the need to move between cities, 3) the need to visit relatives' homes, 4) the need to return to their hometown, 5) the need to go home during Eid, 6) the need to go to college, and 7) the need to go on business trips.

Another reason why respondents have a higher interest in using trains is because it allows them to conduct online meetings while traveling, and also train transportation allows students to access more areas as there are more train stations than airports. Train also allows them to enjoy the beautiful scenery along the route of the railway. However, students who opt for airplane transportation also have a specific reason: traveling by plane is faster, it saves time. The difference in transportation preferences between students was influenced by the experience on using both modes of transport during this last three years. This result is in accordance with research conducted by Malokin et al [20], where the choice of transportation mode is greatly influenced by the availability of access from transportation in reaching the areas that passengers want to go to.

3.3. Factors influencing student preferences in choosing train and airplane modes of transportation

Various factors strongly influence the preferences chosen by students regarding modes of transportation. According to Ricardianto et al [24], the level of service quality from transportation modes will influence people's choices of modes of transportation. The service quality and comfort will also influence the loyalty if the consumers in choosing their modes of transportation. This study identifies the factors influencing the preferences of students by understanding the characteristic of transportation modes. The factors were seen from the level of service (rates, speed, accessibility) and quality of service (safety, comfort, and

regularity). Table 5 shows the average scores of all the factors, compared head-to-head. The comparison of factors in student preferences based on the dimensions of service level and quality of train and plane in their mean scores are interpreted as Medium. Range of score fell on the 6.36 to 6.68 shows that the respondent was mostly agree in identifying the service level and the service quality of both train dan plane.

Table 5. Average factors comparison of student interests based on the dimensions of service level and quality of trainway and airplane services.

Aspect	Indicator	Value	SD	Mean	Interpretation
Train Service Level Factors	Rates	6.43	2.66	6.68	Medium
	Speed	6.92	2.69		
	Accessibility	6.68	2.57		
Train Service Quality Factors	Security	6.81	2.66	6.65	Medium
	Comfort	6.50	2.58		
	Regularity	6.63	2.62		
Plane Service Level Factor	Rates	5.99	2.47	6.36	Medium
	Speed	6.42	2.73		
	Accessibility	6.66	2.71		
Plane Service Quality Factors	Security	6.82	2.80	6.67	Medium
	Comfort	6.65	2.83		
	Regularity	6.55	2.74		

3.4. Service level

The level of transportation service is a particular attribute related to alternative of transportation options that provide satisfaction to users of each mode of transportation [24,25]. Based on table 5, the level of service for trains and planes showed a fairly good average, namely 6.68 for train and 6.36 for plane. In terms of service level aspect, trains are better than planes although the difference was not significant. The first indicator "Tariff" for trains, has a value of 6.43, then for airplanes it has a value of 5.99. The second indicator, "Speed" for trains, has a value of 6.92. then for the plane has a value of 6.42. The third indicator "Accessibility" for trains, has a value of 6.68, while for airplanes, it has a value of 6.66. The train score for mode of transportation showed a better value compared to those for the plane in all three service level indicators.

The higher level of scores in all three indicators of train service compared to airplanes were significantly contributed by fares and speed. According to the data compiled in this study, train transportation is more profitable because the costs are cheaper than planes. Besides, in terms

of speed, trains are considered more practical in their use. Furthermore, in terms of accessibility, the availability of trains is more widely spread across the regions so that students can make use of railway at more ease. This is in accordance to the opinion of Malokin et al [26] and Litman [27] that one of the factors that influence the choice of transportation mode is the availability of modes transport itself.

3.5. Service quality

The quality of transportation services is an important dimension because it relates to the fulfillment of the sense of the passengers of the mode of transportation [24,28]. As shown in Table 5 the quality of train and aircraft services showed a fairly good average, namely 6.65 for trains and 6.67 for airplanes. In terms of service quality, the scores of planes was higher than trains, indicating a better service quality for planes than trains.

The first indicator "Security", for trains has a score of 6.81. Meanwhile, the score for airplanes was 6.82. The second indicator "Comfort", trains gained a score of 6.50. Meanwhile, the score for the plane was 6.65. The third indicator, "Regularity", trains have a score of 6.63, while planes gained a score of 6.55. The train transportation mode shows a better score on the regularity indicator compared to the plane. Meanwhile, the airplane transportation mode showed a better score on safety and comfort indicators compared to train transportation.

The level of plane safety showed a good score indicated that the standards of flight safety and security, as well as the quality of aircraft maintenance, were implemented comprehensively. Then, it also an indication of how communication of instructions from the flight crew to the passenger has enhanced the safety. Meanwhile, in terms of convenience, according to the data compiled, planes are more comfortable. This is because the journey of the train for students to go long distances is more exhausting compared to the journey by planes. The level of regularity of the train in the context of satisfaction showed a good score, indicating that the performance of the train service is good. This is also contributed by the KAI Access application making boarding pass easier via E-Boarding services. During pandemic, the E-Boarding services has promoted the safe distance in public mobility. These results are in accordance with the opinion of Acheampong et al [29] regarding the factors of public transport services that directly affect the number of passengers of a mode of transportation.

As stated by [24,26,29], the choice of transportation mode is greatly influenced by the availability of the mode of transportation itself in the region. Many students preferred to use train transportation modes because of their places of origin. If it was still on the island of Java, train will be significantly easier to access since the train station are more common in various cities albeit the city sizes. The majority of medium sized cities in the island of Java has their own trains station. As for the plane, this transportation mode is chosen by students who come from outside Java. The natural landscape of archipelago made the only

transportation modes available that allows them to return to their home area was by the plane.

In addition to good accessibility, the good supply of supporting facilities and services has a considerable influence in determining the transportation preferences of students. The availability of good facilities and services is one of the reasons they prefer a specific mode of transportation [29]. Furthermore, Acheampong [29] and Setiawan et al [30] stated that the availability of good facilities and services has a direct influence on the determination of the number of passengers in a mode of transportation.

4. Conclusions

Transportation system, especially the public transportation, is the major driver of population mobility. The quality of public transportation system may affect significantly to the growth of a region, both in economic and social dimension. Planes and trains scattered national wide in Indonesia and can be reached easily. However, the difference in terms of service level and service quality became the determining factors for the students' preferences in choosing a mode of transportation. Differences in interest were caused by the motives and urgency of the mobility for student in choosing between two modes of transportation. For students, the mode of train transportation was proven to be more preferred compare to the plane as the modes of transportation in long distance journey.

Assessment of the level of service and quality of service revealed that there are several factors that influenced the preferences in using trains and planes. Based on the level of service, trains provided better service in the form of cheaper prices, faster journey, and also the practicality of use. Meanwhile on service quality, although plane transportation provided better safety and comfort compare to the train as mode of transportation, the difference was not too significant. This led the student to consistently preferred the train. This preference was influenced by the regularity of train transportation and also the cost factor. The two factors were considered as quite significantly different between train and plane. In addition, trains are also preferred according to the urgency and personal reasons of most students. It was shown by the dominant preference of trains were chosen in shorter distance journey between regions in Java Island. So, this research highlighted that the preference of the university students in Semarang in choosing the modes of transportation between train and plane were determined by the distance traveled and the level of service provided.

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