Improving train services to increase student mobility and safety on the Purwakarta-Karawang route

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Abstract: Transportation is essential for the mobility of workers and students, yet many prefer motorcycles over public transportation like trains due to inadequate schedules and limited train availability. This choice contributes to Indonesia's high motorcycle usage and associated traffic accident risks. This study focuses on the Purwakarta-Karawang train route and its impact on student mobility at Universitas Singaperbangsa Karawang. Employing a qualitative method with descriptive data collection and SWOT analysis, this research gathers student feedback on current train schedules and their impact on daily commutes. Findings indicate that increasing the number of train schedules could significantly improve student mobility and reduce the reliance on motorcycles, thereby decreasing traffic accidents. Moreover, better train schedules could enhance access to educational and employment opportunities. The study suggests that the local government should consider expanding and optimizing train services to address these issues. This research contributes to the broader field of transportation studies by highlighting the importance of efficient public transport schedules in reducing traffic accidents and supporting student mobility. It emphasizes the need for policy adjustments to improve Indonesia's public transportation infrastructure and services by proposing practical solutions.

Keywords: Motorcycle, qualitative method, SWOT analysis, train route, transportation

Introduction

Transportation is a critical component of daily life, enabling workers and students to move around and contributing to the economic and social development of a region. In Indonesia, the reliance on private vehicles, particularly motorcycles, is notably high. According to (Amalia & Nurmansyah, 2020), Indonesia ranks among the top countries in Southeast Asia for motorcycle usage, with approximately 261 motorcycles per 1,000 inhabitants. The perceived convenience and flexibility of motorcycles over public transportation options like trains drives this trend (Pratiwi et al., 2020).

Despite the government's efforts to provide public transportation, such as trains, the majority of the population still prefers motorcycles. Several factors, such as inadequate train schedules and a limited number of trains, contribute to this preference among the commuting public. This situation is particularly evident on the Purwakarta-Karawang train route, which serves a significant number of students from Universitas Singaperbangsa Karawang (Unsika), Karawang regency, Jawa Barat province.

The current train schedules set by PT Kereta Api Indonesia (PT KAI) are often insufficient and inflexible, failing to accommodate the diverse schedules of students and workers. For example, the first train from Purwakarta to Karawang departs at 05.05 WIB, and the last train leaves at 18.00 WIB (shown at Table 1). During peak hours, from 06.00 to 12.00 WIB, there are only two trains: one at 09.00 WIB and another at 11.20 WIB, leading to overcrowding and inefficiency (Ibrahim et al., 2018). This limited service compels many to choose motorcycles for their daily commutes, despite the higher risk of traffic accidents.

The heavy reliance on motorcycles not only exacerbates traffic congestion but also increases the likelihood of accidents. According to (Halim et al., 2017), the peak hours for motorcycle usage coincide with the times when train services are sparse, from 18.00 to 23.00 WIB. This further underscores the need for more frequent and reliable train services. Additionally, the Covid-19 pandemic has highlighted the risks associated with crowded public transportation, prompting a decline in train usage due to fears of virus transmission (Febriyanti & Putri, 2021).

Furthermore, the physical distance between students' homes and train stations poses an additional challenge. Many students live far from the stations, necessitating the use of motorcycles or other forms of transportation to reach the train stations, which in turn affects their overall travel time and convenience. The lack of safety and security

on the trains, particularly for female passengers, exacerbates this issue, as there are no security personnel on every carriage, unlike on the KRL commuter line Cikarang-Jakarta.

Table 1. Walahar/Jatiluhur commuter line schedule (PT KAI, 2023)

Station	Number of Train					
	320	316	322	318	324	328
Cikarang-Cikampek-Purwakarta						
Cikarang (CKR)	05:50	07:24	11:30	13:20	18:45	20:02
Lemahabang (LMB)	05:57	07:31	11:37	13:27	18:59	20:14
Kedunggedeh (KDH)	06:07	07:41	11:47	13:37	19:09	20:24
Karawang (KW)	06:15	07:55	11:55	13:45	19:25	20:39
Klari (KLI)	06:23	08:03	12:11	13:53	19:50	20:54
Kosambi (KOS)	06:29	08:09	12:18	13:59	19:56	21:09
Dawuan (DWN)	06:37	08:32	12:27	14:07	20:04	21:17
Cikampek (CKP)	06:44	08:39	12:34	14:14	20:13	21:22
Cibungur (CBR)	06:55	08:53	12:46	14:40	20:24	-
Purwakarta (PWK)	07:06	09:04	12:57	14:52	20:35	-
Purwakarta-Cikampek-Cikarang	325	315	319	317	321	323
Purwakarta (PWK)	-	05:05	09:00	11:20	13:40	18:00
Cibungur (CBR)	-	05:18	09:15	11:34	13:56	18:13
Cikampek (CKP)	04:20	05:30	09:26	11:45	14:07	18:32
Dawuan (DWN)	-	05:37	09:32	11:52	14:13	18:38
Kosambi (KOS)	-	05:46	09:40	12:01	14:21	18:46
Klari (KLI)	-	05:53	09:46	12:08	14:27	18:52
Karawang (KW)	04:48	06:02	09:54	12:18	14:42	19:00
Kedunggedeh (KDH)	04:56	06:11	10:02	12:27	14:51	19:08
Lemahabang (LMB)	05:07	06:21	10:12	12:38	15:02	19:18
Cikarang (CKR)	05:14	06:27	10:18	12:44	15:09	19:24

Given these challenges, it is crucial to explore and implement solutions that enhance the efficiency and accessibility of train services. One potential solution is to increase the number of train schedules and reduce the intervals between trains, making public transportation more attractive and practical for daily commuters. Another option is to expand the KRL commuter line service beyond its current endpoint in Cikarang to include Karawang and Purwakarta. This extension would not only improve connectivity but also potentially reduce traffic accidents by decreasing the number of motorcycles on the road.

Several studies support the benefits of improved public transportation. Researchers (Akbar & Andarini, 2014; Zaky & Sari, 2024) highlight that trains offer numerous advantages, including reduced traffic congestion, lower pollution levels, cost savings, and time efficiency. Other researcher (H Wijayanto, 2019) also notes that using trains can significantly reduce the risk of traffic accidents and provide a safer mode of transportation for students and workers alike. Furthermore, researchers (Lestari et al., 2022) contend that students residing with their families enjoy enhanced health and well-being, bolstered by enhanced transportation options that facilitate easy commuting without necessitating temporary housing near campuses.

However, the current state of train services falls short of these potential benefits. The lack of frequent and convenient train schedules leads to overcrowded carriages, delayed services, and a general lack of reliability, which diminishes the attractiveness of trains as a viable alternative to motorcycles. Additionally, the pandemic has underscored the need for safe and hygienic public transportation options, as overcrowded trains can become hotspots for virus transmission (Darmin et al., 2022).

Given the high rate of motorcycle accidents in Indonesia, which, according to (Susanto et al., 2019), account for 80% of all traffic accidents, there is an urgent need to address this issue. The main causes of these accidents are human factors, such as reckless driving and fatigue (Hidayati & Hendrati, 2016; MA Soffania, 2018). By providing a safer and more reliable public transportation option, it is possible to reduce the number of motorcycles on the road, as well as the number of traffic accidents.

The purpose of this study is to analyze the current state of train services on the Purwakarta-Karawang route and propose solutions to improve their efficiency and accessibility. By employing a qualitative research method, this study gathers and analyzes data from students at Universitas Singaperbangsa Karawang to understand their commuting needs and preferences. We will use the findings to make recommendations to the local government and PT KAI on how to enhance train services to better support student mobility and reduce the reliance on motorcycles.

Improving the train services on the Purwakarta-Karawang route is essential for enhancing student mobility, reducing traffic congestion, and decreasing the risk of traffic accidents. By increasing the number of train schedules and extending the KRL commuter line, it is possible to provide a safer, more efficient, and more reliable mode of transportation for students and workers. This study aims to contribute to the broader field of transportation studies by providing practical solutions and policy recommendations to improve Indonesia's public transportation infrastructure and services.

Method

This study employs a descriptive qualitative method to understand and analyze the transportation needs and preferences of students at Universitas Singaperbangsa Karawang concerning the use of trains on the Purwakarta-Karawang route. We chose this method because it allows us to deeply explore the experiences, behaviors, and perceptions of participants.

1. Type of research
This research uses a descriptive-qualitative method. The aim is to paint a clear picture of the studied phenomenon, namely the use of trains by Unsika students. Qualitative strategies generate descriptive information in the form of phrases constructed from observations of people and behaviors (Luth'v et al., 2022). This method is particularly suited for understanding students' perspectives on the efficiency and effectiveness of current train schedules.

2. Population and sample
The population for this study consists of passengers on the local train route between Purwakarta and Karawang, with a majority being Unsika students residing in Purwakarta. We selected the sample using purposive sampling, specifically targeting students who regularly commute by train. A total of 56 respondents participated in the study, providing a representative view of the needs and challenges they face.

3. Data collection technique
We collected data by distributing an online questionnaire via Google Forms. We designed the questionnaire to collect data on transportation choices, costs, travel time, travel risks, and students' opinions on current train schedules. Questions addressed key aspects such as time efficiency, cost, and risk, which are crucial in determining transportation choices.

4. Data analysis technique
We used SWOT (Strengths, Weaknesses, Opportunities, Threats that shown at Figure 1) analysis to analyze the collected data. According to (Benzaghta et al., 2021), SWOT analysis helps identify the strengths, weaknesses, opportunities, and threats related to the use of trains. We conducted this analysis to formulate strategies that can enhance train usage and reduce reliance on motorcycles. The strategy combinations include:
   a. The SO (Strengths-Opportunities) Strategy: involves leveraging strengths to maximize opportunities.
   b. The ST (Strengths - Threats) Strategy: involves leveraging strengths to counteract threats.
   c. The WO (Weaknesses-Opportunities) Strategy: involves reducing weaknesses in order to exploit opportunities.
   d. The WT (Weaknesses and Threats) Strategy: minimizing weaknesses and avoiding threats.

We then interpreted the data from the SWOT matrix to offer policy recommendations to the local government and PT KAI for enhancing train schedules and services.

	Strengths	Weakness	
Opportunities	S O	W O	External
Threats	S T	W T	Factor
	Internal Factor		

Figure 1. SWOT matrix

5. Research process
   a. Preparation: creating the questionnaire based on literature and field conditions.
   b. Data collection: distributing the questionnaire to selected respondents.
   c. Data analysis: using SWOT analysis, categorize and analyze data.

d. Reporting: compiling the research findings and policy recommendations.

Result and Discussion

The use of trains as a mode of transportation for students commuting between Purwakarta and Karawang offers several significant benefits, such as reduced traffic congestion, lower pollution levels, cost savings, and time efficiency (Akbar & Andarini, 2014; H Wijayanto, 2019; Zaky & Sari, 2024). Utilizing trains for commuting between home and campus is particularly advantageous for many Unsika students who do not opt for boarding houses or rentals. Besides providing greater safety and comfort, using trains can help reduce traffic accidents.

According to traffic accident data from the West Java Provincial Police at Table 2, obtained from (BPS Jawa Barat, 2018), motorcycle accidents in Purwakarta and Karawang are significantly higher compared to other vehicle types. This indicates a high and dangerous potential for motorcycle accidents. Students' survey data also suggests that they perceive train transportation as efficient in terms of both time and cost.

Table 2. Number of traffic accidents by police and vehicle type in Jawa Barat province (BPS Jawa Barat, 2018)

Regency/City	Motorbike	Passenger Car	Truck	Bus	Special Vehicle	Total Accidents
Polres Bogor	331	87	97	10	-	357
Polres Sukabumi	183	39	51	6	6	158
Polres Cianjur	289	58	68	10	2	264
Polres Bandung	363	78	76	9	-	310
Polres Garut	542	115	62	20	6	453
Polres Tasikmalaya	116	16	26	3	2	97
Polres Ciamis	424	88	59	19	-	340
Polres Kuningan	229	48	22	3	-	180
Polres Cirebon	197	40	83	17	13	203
Polres Majalengka	335	53	80	19	-	319
Polres Sumedang	313	79	114	5	-	298
Polres Indramayu	979	282	188	45	2	895
Polres Subang	97	21	28	8	-	95
Polres Purwakarta	516	125	103	31	-	463
Polres Karawang	540	65	86	27	5	504
Polresta Bogor	191	38	29	4	-	149
Polresta Sukabumi	173	30	29	4	4	138
Polrestabes Bandung	583	200	30	12	5	470
Polresta Cirebon	333	60	49	11	3	265
Polresta Cimahi	599	127	127	17	-	481
Polresta Tasikmalaya	385	64	59	17	-	322
Polresta Banjar	141	23	21	2	1	100
Total	7859	1736	1487	299	49	6861

Based on the data in Table 2, motorcycle accidents in Purwakarta and Karawang are significantly higher than other types of vehicles, indicating a high and dangerous potential for motorcycle accidents. Thus, according to survey data from several students, using train transportation is efficient in terms of time and cost.

Based on the conducted research, respondents expressed strong opinions regarding their living arrangements during their studies. The majority of respondents indicated that living at home with parents is preferable because it ensures better nutritional intake, parental supervision, and cost savings compared to living in a boarding house or rented accommodation. Research by (Lestari et al., 2022) supports this finding, explaining that students living with parents experience a more peaceful and orderly life due to the absence of rent or living expenses, and the availability of someone to care for them during illness.

On the other hand, a minority of respondents believe that living independently is better as it fosters self-reliance, financial and time management skills, better campus involvement, and the ability to choose social circles. However, like living with parents, living independently has its drawbacks, such as limited parental supervision, higher living costs, and potential safety concerns.

Therefore, most Unsika students believe that improved train schedules and services would greatly support their transportation needs, especially for those residing in Purwakarta. This includes having train schedules that support students with morning classes starting at 07.30 WIB, midday trains for flexibility, and evening trains for students with late activities. Increasing the number of train schedules with short intervals would ensure student

safety when commuting at night and and support their career development while they are students, especially hard-soft skills (Iyan et al., 2020; Nuraini et al., 2024; Rahmatunissa et al., 2020, 2020; Rumira et al., 2023; Sijabat et al., 2024; Sutardi et al., 2020).

As indicated by respondent aspirations and the SWOT analysis in Table 3, improving train services can unlock several beneficial opportunities. According to the data, 50 out of 56 respondents stated that additional or modified train schedules would support and ease student and public mobility. Local train schedule issues and frequent traffic accidents see the implementation of electric rail trains (KRL) as a viable solution. Researchers (Nazwirman & Hulmansyah, 2017; Permana et al., 2019) support this, stating that KRL is highly reliable for students to avoid traffic congestion, with dedicated lanes for faster travel, larger capacity, and affordable tariffs.

Table 3. The summary of the strategy steps for the SWOT analysis of train route usage for Unsika students.

Strengths	Weakness
1) Safety: using trains can reduce traffic accidents 2) Cost: more economical, as the expenses for students or workers are lower 3) Family time: students and workers can stay with their families.	1) Conditions: passengers from various backgrounds often create uncomfortable conditions 2) Scheduling: due to long intervals, train schedules are inefficient.
Opportunities	**Threats**
1) Employment access: provides broader job opportunities for Purwakarta residents. 2) Educational access: increased train schedules could increase the desire to pursue further education because it is easier and more affordable.	1) Crime: the potential for criminal activities exists anytime and anywhere. 2) Competition: easy transportation increases competition.

The advantages of KRL include dedicated women's carriages to reduce sexual harassment incidents (Laia & Nurlaela, 2020) describe aspects of KRL service quality, such as quick waiting and travel times, adherence to schedules, comfortable seating and handrails, maintained cleanliness in trains and stations, security personnel and emergency equipment in each carriage, responsiveness to customer complaints, affordable tariffs, adequate train availability, and guaranteed safety and emergency medical equipment. These factors should be considered when implementing KRL services as public transportation to address the current issues.

Conclusions

Universitas Singaperbangsa Karawang's analysis on the use of train transportation for student mobility, along with a projection of the Purwakarta-KKarawang route, concludes that the availability of public transportation facilities in the form of trains benefits students, workers, and the wider community. However, the limited schedule and long time lag from one train to the next pose obstacles because they are perceived as less efficient and flexible, leading the majority to prefer using private vehicles.Therefore, the government can address these issues by expanding the train fleet, which would allow for an increase in the schedule and the departure and return times for trains. Another consideration is that the government can extend the commuter line's route to Purwakarta. This can open up better opportunities for the future, such as access to education and employment. The potential threat is a surge in competitiveness, which could lead to friction between communities. Future research should analyze train track projections for inter-city and local trains. If we add local trains, we can also apply a SWOT analysis and review the impact on inter-city train schedules. Another review could look at the effect on the government's state budget funds (Anggaran Pendapatan dan Belanja Negara—APBN).

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