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THE EFFICIENCY ANALYSIS OF MOTORCYCLE VERSUS PUBLIC TRANSPORTATION: A CASE OF CIPINANG - TEBET AREA ROUTE

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ABSTRACT

Public transportation modes are one of the essential means of transportation and must be developed. However, today the phenomenon that exists, the selection of motorcycles, is more interesting than the use of public transport. This paper aims to examine how efficient motorcycles compare to public transportation. The research method was a questionnaire distributed to 100 respondents and interviews with Cipinang – Tebet (MT. Haryono). Data analysis is carried out using the Importance Performance Analysis method with the help of the Microsoft Excel application. The results showed that the importance-performance analysis was quite good. It was seen that the average importance level was 3.99, the satisfaction level was 3.56, and the GAP was -0.44. The highest GAP occurs in the Comport Capital parameter of -0.59. Meanwhile, based on the results of interviews shows that travelers prefer to use motorbikes instead of public transportation due to the mileage, travel time, and costs incurred.

INTRODUCTION

Transportation is one of the urban people's main problems because it directly impacts daily activities. As a developing country, Malaysia should prioritize development for the betterment of its people. In development, it is closely related to transportation. The success of the development is greatly influenced by the role of transport as the lifeblood of politics, economy, socio-culture, and security defense. Hong Kong is a densely populated and transit-oriented Chinese city, which provides an ideal urban environment to study various successful aspects of land use policy as a model for potential replication to curb increased car use in other Chinese cities (Santuri & Baharom, 2018); (Lu, Sun, Sarkar, Gou, & Xiao, 2018).

Indonesia is a vast country with a large population that is increasing daily. With a road ratio of just under 7%, high vehicle growth rates and poor public transport contributes to the use of high-density roads. This problematic situation is challenging to solve because more than 90% of the available modes of transportation are road-based. Advances in the complexity of large cities, highly complex systems, and intelligence science, intelligent city technology, have demonstrated remarkable capabilities in helping to reduce traffic congestion in developing cities. All ideas, from the development of intelligent transportation to cities that want to be built and transformed into smart cities, are based on parallel management and control systems (Soehodho, 2017); (Son, Warnars, Gaol, Soewito, & Abdurachman, 2018).

Jakarta is a city in great demand by regional people as a place to find a job. This has led to overcrowding of the capital, which impacts public transport. Therefore, three components must be

considered to realize sustainable transportation. Such components are a strong transport authority, an integrated master plan, sustainable resources, funding, and financing. (Farda & Lubis, 2018)

Few also prefer online transportation or motorcycle taxis, which are easy to access anywhere. People prefer to use public transportation because they do not have a motorbike or driver's license. Expecting cheaper transportation costs than other public transport, they can also rest to and from work. The workload makes them very hopeful of taking a break before they get home. Since 40% of correspondents stated, they should review their work today in preparation for tomorrow (Murad, Abbas, Trisetyarso, Suparta, & Kang, 2018).

This research is expected to be a reference for the community in choosing transportation policies. The amount of difference in the price of public and private transportation. The time spent on the destination is also different in comparison. Different distances can be ensured that private vehicles are faster. Private motorcycles are the most preferred option. This is also a consideration for workers to drive their vehicles after a day of activities, which will undoubtedly affect driving safety. The purpose of this study is to compare more efficiently using public transportation or private vehicles (Widyaningsih, Mohtar, Yussof, & Putri, 2022).

LITERATURE REVIEW

Public Transportation

Transportation is a system of community services that are accommodated as the movement of goods or people. Accessibility is clearly defined as the potential for interaction in the context of planning. In comparison, mobility is defined as the potential for a movement related to the impedance component of accessibility. Mobility determines the difficulty of accessing a destination. Public transport is the main goal in designing a large metropolitan. Defines the city's quality of life and each person's social life (Hernandez, 2018).

Transport services are considered essential elements that enhance the country's development due to the significant role of transport in different social, economic, and political aspects. In dealing with it, the DKI Jakarta Provincial Government and related agencies strive to provide safe, comfortable, efficient, and adequate transportation. Public transport can reduce city congestion and is cheaper than private cars. However, in reality, using public transport is more time-consuming. Therefore, the primary purpose of holding public transportation is to reduce congestion and can facilitate people in their daily activities. Therefore, organizing services and community needs well (Puan, et al., 2019)(Rifai, Rafianda, Isradi, & Mufhidin, 2021).

Most public transit systems run along fixed routes with pre-set departure/descent points, with services most often running towards a destination (for example: "every 15 minutes" as opposed to being scheduled for a specific time of the day). Qualifications become complex When considered from the perspective of society, and their perception of the qualitative characteristics of the service differs from the user - the user. User perceptions are heterogeneous for various reasons: the qualitative nature of the service aspect, the differences in the socioeconomic characteristics of users, and the diversity of tastes and attitudes towards public transport (Iclodean, Cordos, & Varga, 2020)(Dell´Olio, Ibeas, de Ona, & de Ona, 2017).

Motorbike

The characteristic of transport in Vietnam is the dominant use of motorcycles. In Hanoi and Ho Chi Minh City, motorcycles account for more than 80% of total transport trips. The high percentage of motorcycle ownership and use in Vietnam is influenced by: climate, economy, infrastructure, population density, and culture. According to data from the Central Statistics Agency of West Java, there were around 2,906,286 units of motorcycles operating in Bandung in 2017. On the other hand, about 2,470,802 inhabitants inhabited the city (Chu, Nguyen, Ton, & Huynh, 2019); (Yunidar & Majid, 2018).

Motorcycles bring safety and environmental challenges to cities in the Global South. The Jakarta metropolitan area in Indonesia had a bus rapid transit (BRT) in 2004, but the growth in motorcycle ownership has continued ever since. Jakarta is a city of many motorbike users. It can be seen from the traffic jams that exist during work and commuting hours. Population density and travel distance have a more substantial effect on motorcycles. Workers tend to choose modes of transportation that can speed up road time and become the most economical. This is because the cost of using private vehicles is higher, especially cars. Workers with short and long travel times mostly use motorcycles, while workers with reasonable travel time usually use cars because motorcycles can use various alternative roads to reach their destination (Chiu, 2022); (Hansa & Susilowati, 2020).

The motorbikes user in Jakarta is very much, and one of the causes of congestion is also. Motorcycle users choose not to use public transportation because it is more efficient than the speed level. There is no need to queue and squeeze. The selection of this motorcycle is also more efficient than using a car. Now there is such a thing as an online-based motorcycle taxi. People will prefer this online motorcycle taxi over public transportation the government provides, in terms of price, which is also relatively inexpensive and still affordable.

Mode Choice of Transportation

Everyone has a different type in the selection of transportation. The selection of this transportation is divided into two categories. Firstly, users are forced to use public transportation because they do not have private vehicles. Secondly, users who own private vehicles. However, public transportation (bus) is Jakarta and Manila's second most preferred mode. Buses as the primary mode of choice are also preferred over most other modes in Kuala Lumpur (Ng, 2018).

Public transport services affect the choice of transportation modes, such as comfort, security, order, and others. In addition, the availability of infrastructure, ease of information, and reduced time and cost are essential factors in providing attractive public transport with door-to-door access and long-distance travel. The study developed a theoretical framework to cover the literature gap by investigating the relationship between the intention of choosing private transport over public transport, the quality of services provided for urban public transport systems, and the loyalty of services to urban public transport (Yatskiv, Budilovich, & Gromule, 2017); (Mugion, Toni, Raharjo, Di Pietro, & Sebathu, 2018).

The accessibility factor in designing public transport infrastructure is significant. The accessibility of public transport has been reviewed, and the relationship between various aspects of both transport systems, including mobility and sustainability of human life, employment level, public health, and social exclusion. However, it is more than just the performance of public transportation. The impact on social aspects must also be considered when planning public transportation facilities (Saif, Zefreh, & & Torok, 2019).

In the basic theory of transportation system planning, it is stated that the quality and quantity of services are a significant part of the development of public transport. Several factors influence people to prefer private transportation over public transportation. The amount of difference in the price of public and private transportation. The time spent on the destination is also different in comparison. Third, different distances can be ensured that private vehicles are faster. Therefore distance travel limits or increases the influence of social influences on the choice of mode of transportation. We view distance because of the importance of distance and related variables (time and travel costs) in travel behavior (Rifai A. I., 2021)(Pike & Lubell, 2018).

METHOD

The systematic scientific research process must begin with identifying the right problem. (Rifai, Hadiwardoyo, Correia, & Pereira, 2016). Therefore, this study was conducted to analyze the efficiency of driving between using public transportation or motorbikes in Jakarta (Cipinang-Tebet). The research method used in this study is to use surveys that are part of quantitative assessment. The population in this study was 100 respondents.

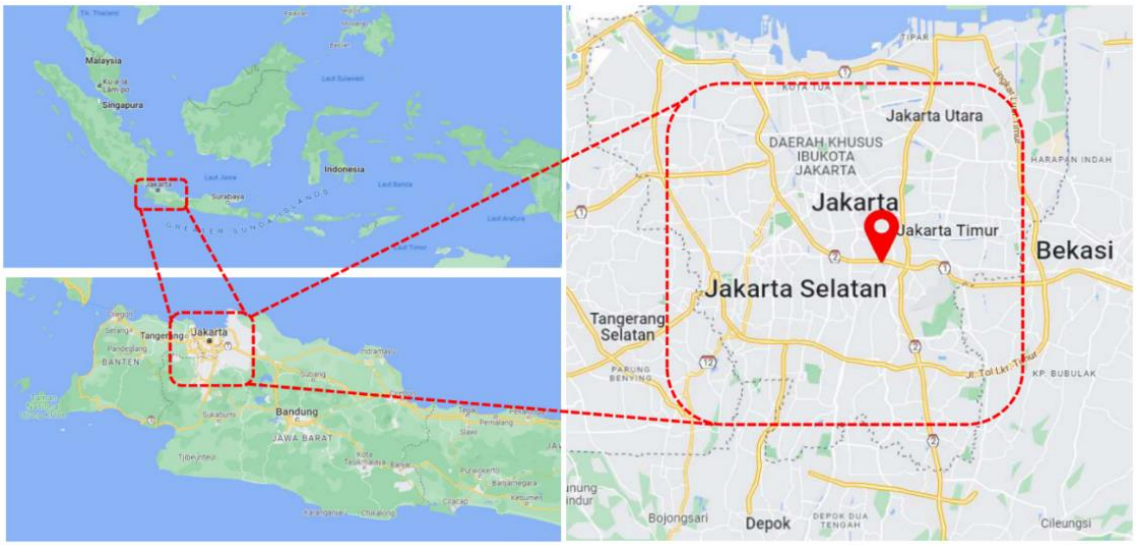

Figure 1. Research Location

The data collection technique carried out in this study is by distributing a questionnaire in the form of a google form that will be distributed to the public through online media. Also, interviews with three people who have used public transportation and also have motorized vehicles for those who are active in the Cipinang - Tebet area. This survey will be carried out in the form of an interval scale. Data was captured in this interval scale with a 5-point scale.

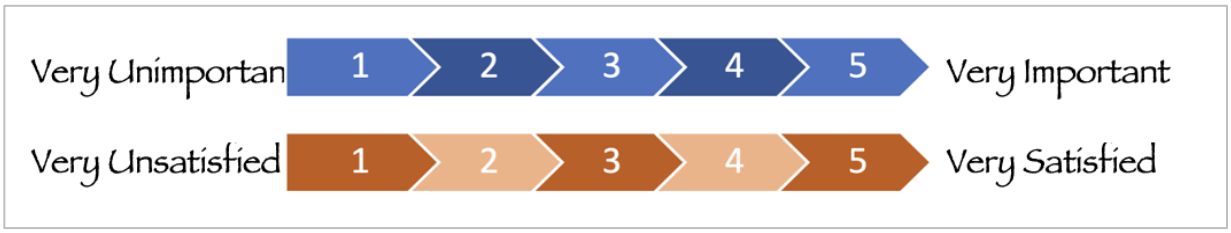

Figure 2. Scoring Range

Data is one of the leading forces in compiling scientific research and modeling. The data obtained through the questionnaire (Google Form) will be analyzed using the Importance Performance Analysis (IPA) method. This method aims to measure the opinions or perceptions of consumers and the priority of quality (the level of satisfaction of services or services). The IPA maps of each attribute offered and the gap between performance and the expectations of that attribute. IPA has four quadrants for all predetermined variables. The division of the Importance Performance Analysis (IPA) quadrant can be seen below (Rifai, Hadiwardoyo, Correia, Pereira, & Cortez, The data mining applied for the prediction of highway roughness due to overloaded trucks, 2015).

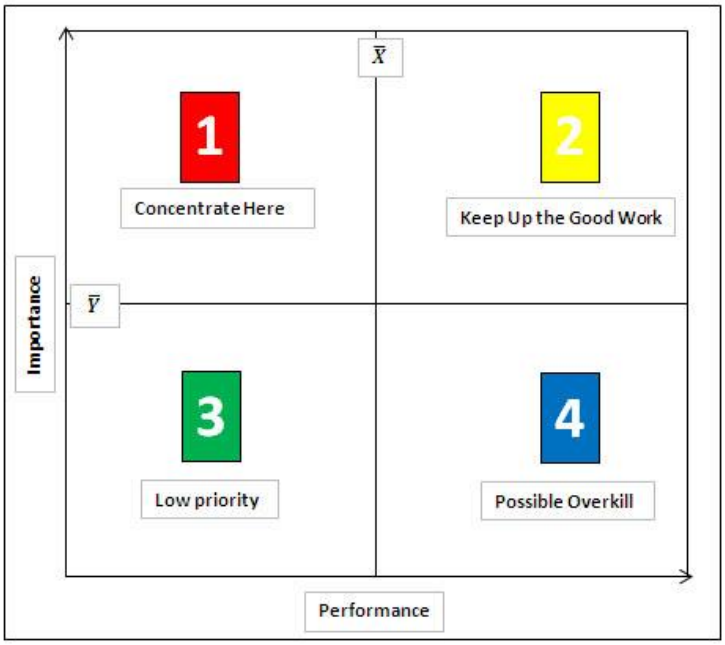

Figure 3. Importance Performance Analysis Diagram

In the I Concentrate Here quadrant region, this has a statement that the level of expectation is high, but the performance is low. Society considers areas necessary but has yet to be as expected (high expectations, low performance). Then, this quadrant should be corrected and improved. In the second quadrant region, Keep Up The Good Work has a statement that the level of expectations and performance is high. Areas considered necessary by society and are already following the expected (high expectations, high performance). Then, this quadrant II must be maintained. In this quadrant III, the Low Priority region, it has a statement that is considered less important by the community, and its performance could be more unique (low expectations, low performance). Thus, this quadrant III can be reconsidered or can be ignored. In the quadrant IV regions, Possible Overkill has a statement that the level of expectation is low but high performance. Areas that are considered less critical by society but which are perceived to be excessive. Thus, this IV quadrant can be reduced or allocated to other factors with a high priority.

Table 1. Attributes of research

No.	Attributes		References				
			(Han, Wei, & Zhang, 2018)	(Chen & Li, 2017)	(He, Yang, & Li, 2021)	(Ni, Zhang, Hu, Lu, & Li, 2020)	(Munawar, Irawan, Fauziah, & Belgium, 2022)
1	Convenience	A1	√	√	√		√
2	Personal Safety	A2	√	√		√	√
3	Service Environment	A3		√		√	
4	Capital Comfort	A4		√			
5	Flexibility (Time)	A5	√				√
6	Fare Information	A6				√	
7	Distance	A7	√				
8	Satisfaction of Public Transit	A8			√		
9	Pro-Environment	A9		√			√
10	Vehicle Ownership.	A10		√			

RESULT AND DISCUSSION

The distribution of this questionnaire was carried out digitally to respondents by distributing the questionnaire through social media. From the questionnaires that have been distributed, 100 answers can be processed. The questionnaire results were processed and obtained in three parts. The first is the characteristics of the respondents. The second is the characteristics of travel using public transport, and the third is the characteristics of travel using a motorcycle. The survey also interviewed three people who had used public transportation and motorbikes.

Respondent Characteristics

Each respondent has different characteristics, including choosing a mode of transportation. Each respondent also has their reasons for choosing what transportation to use. The results of this questionnaire can be seen in Table 2. Of the 100 respondents, all of them have used public transportation. For gender among them, 48% are men, and 52% are women. For the highest age, it is 21-30 years old, with a percentage of 60%. Most jobs are for private employees. Judging from the respondents' monthly income, the most is 3,000,000-6,000,000/month, with a percentage of 37%. The most travel destination is to work with a percentage of 50%. Respondents who owned a private motor vehicle were 38%, a car was 7%, both were 28%, and did not have a motor vehicle 27%.

Table 2. Respondent Characteristics

Variables	Category	Frequency	Relatively Frequency
Gender	Male	48	48%
	Female	52	52%
Age	Under 20 years old	12	12%
	21 – 30 years old	60	60%

Variables	Category	Frequency	Relatively Frequency
	31 – 40 years old	18	18%
	41 – 50 years old	7	7%
	Above 51 years old	3	3%
Occupation	Student	24	24%
	Housewife	7	7%
	Government Sector	16	16%
	Private Sector	34	34%
	Entrepreneur	16	16%
	Other	3	3%
Personal Monthly Income	Without income	19	19%
	Under 1 Million IDR	3	3%
	1 – 3 Million IDR	9	9%
	3 – 6 Million IDR	37	37%
	Above 6 Million IDR	32	32%
Trip Purpose	School/University	19	19%
	Works	50	50%
	Recreation	15	15%
	Other	16	16%
Vehicle Ownership	Motorbike	38	38%
	Car	7	7%
	Two Ownership	28	28%
	No Ownership	27	27%

Analysis of Public Transportation

In this section, the respondent's interest and satisfaction with the use of public transportation are based on a questionnaire distributed online. From the analysis results, which are high expectations but low performance will be found. So, this must be improved in order to get optimal performance.

Table 3. Customer Satisfaction Score

No.	Attributes		Mean Performance	Mean Importance	GAP
1	Convenience	A1	3.66	3.92	-0.26
2	Personal Safety	A2	3.27	3.78	-0.51
3	Service Environment	A3	3.52	4.07	-0.55
4	Capital Comfort	A4	3.33	3.92	-0.59
5	Flexibility (Time)	A5	3.58	4.08	-0.50
6	Fare Information	A6	3.85	4.00	-0.15
7	Distance	A7	3.52	3.85	-0.33
8	Satisfaction of Public Transit	A8	3.37	3.84	-0.47
9	Pro-Environment	A9	3.92	4.48	-0.56
Mean			**3.56**	**3.99**	**-0.44**

Based on the table, the average importance level is 3.99, the satisfaction rate is 3.56, and the average GAP is -0.44. From the table, it is found that all attributes get a negative value which means that the specified attribute has not met the expectations of society or customers. From the data obtained, it is necessary to analyze the priority scale of improvement efforts from the attributes set using the Importance Performance Analysis (IPA) method.

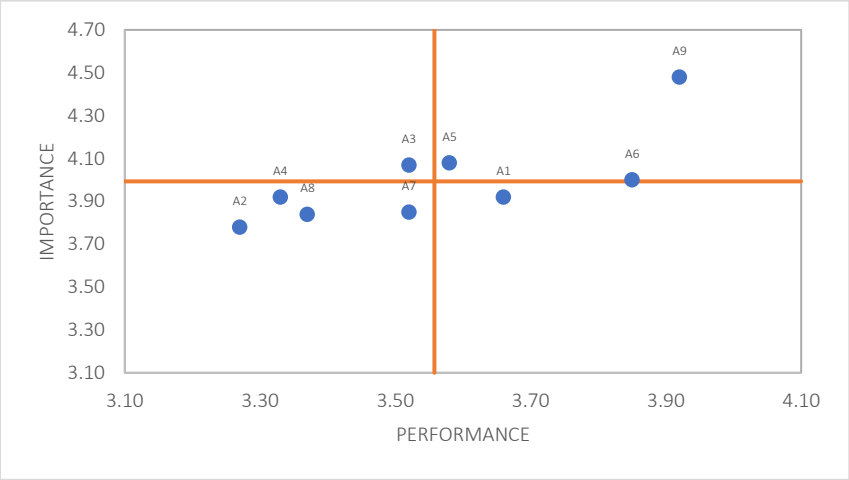

Figure 4. Importance Performance Analysis (IPA) Diagram

The diagram above can be found in quadrant one: environmental services with hygiene indicators, cool air, how the driver serves passengers, and overall satisfaction with the vehicle environment. These attributes are considered necessary but must be better executed in the diagram obtained. The services provided by the company still need to be higher, not following what the community expects. So, these attributes must be paid more attention to by the company so that the public can get good service. In quadrant two, it is found that pro-environment, flexibility time, and fare information are as expected with high expectations and high satisfaction, so they must be maintained. In quadrant three, it was found that personal safety, capital comfort, satisfaction with public transit, and distance with low priority expectations and low performance. Therefore, this statement is not considered exceptional by the customer and can be ignored. In quadrant four, it is found that the convenience of expectations is low, but the performance given is high, whereas customer expectations are low, but the performance obtained is high. It is better that these attributes can be reduced and can be allocated to attributes expected by high customers.

Analysis of Motorbike

In this section, there are several reasons why people prefer to use motorbikes instead of public transportation. For the most reasonable, the time given is more efficient with a value of 70.2%, the second is less cost incurred with a value of 64.3%, and the third mileage is closer or faster with a value of 59.5%.

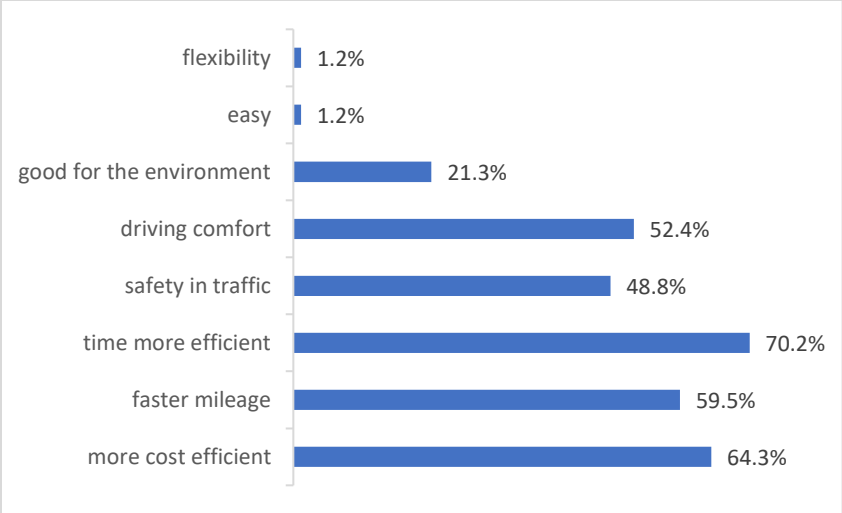

Figure 5. Diagram Based On The Reasons Motorbike Users

Based on Interviews

The survey results are based on interviews with people who have used public transportation and motorcycles. In developed countries, it is usually easier to use public transportation because the timeliness and service level is excellent, and the fare is relatively cheaper than private transportation. However, the opposite is happening in developing countries. People still use private vehicles to go to work, even though they are more expensive, because of punctuality and others that cannot be met by public transportation. When there is movement, if we want to move in the middle of the night, we need a private vehicle because, at that time, public transportation does not or rarely operates. Based on motorcycle users, there are three most reasons why users prefer motorcycles compared to public transportation. The time used is more efficient (70.2%), the costs incurred are more efficient (64.3%), and the distance traveled is faster than public transportation that must pass through several points (59.5%). Based on the interview results, three main parameters are very influential. The distance traveled with an average distance difference of ± 6.7 km. The time traveled with an average difference of ± 45 minutes, and the fare or costs incurred when using public transportation and motorbikes with an average difference of ± 25,000 rupiah / five days.

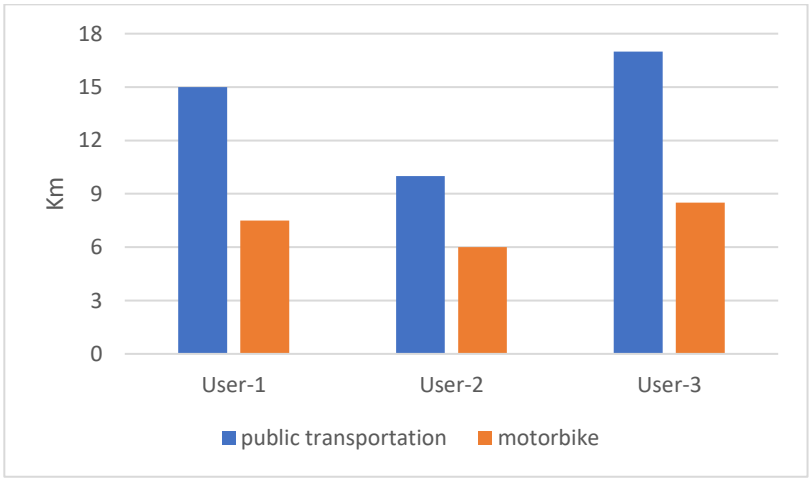

Figure 6. Diagram Based on Interview by Distance

However, from the interview results (Figure 6) about travel distance, the farther the trip, the more we choose public transportation compared to private transportation. For example, to travel from Jakarta to Surabaya, even if we have a private car, we tend to use public transportation (plane, train, or bus) because the distance is very long. For trips in urban areas, public transportation is only used for longer distances than the reach of motorbikes.

Based on the results of the interview regarding the time required to cover the same travel distance can be seen in Figure 7. Travel time, waiting time at the bus stop, walking time to the bus stop, time while moving, and so on. Transportation costs (fare, fuel, etc.): space availability and parking rates. Qualitative factors include comfort and safety, reliability and regularity, and others. The interviews show that the travel time using public transport is still longer than by motorbike.

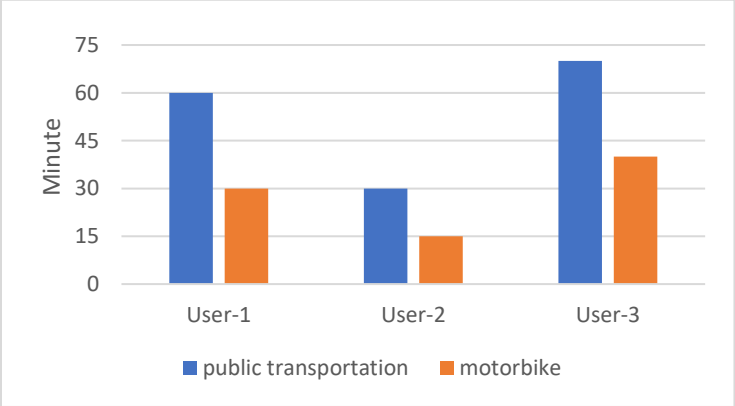

Figure 7. Diagram Based on Interview by Time

If viewed from the aspect of the costs incurred for travel, public transportation is undoubtedly cheaper than a motorbike because public transportation users do not have to pay for motorbike maintenance (service, washing, and other needs) as well incurred by motorbike users. However, motorbikes are still the primary preference to accommodate people's travel movements. However, the results of the interviews show different things (Figure 8). Weekly expenses using public transport are considered more expensive.

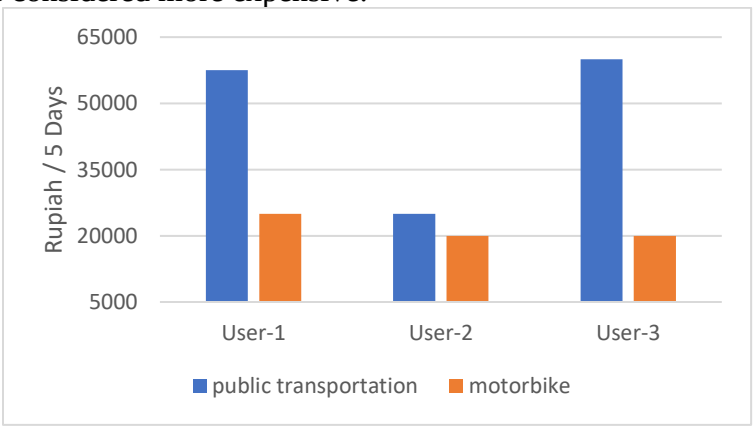

Figure 6. Diagram Based on Interview by Fare

The fact is that motorbikes are currently the primary mode of choice because they are considered cheaper than public transportation. However, the impact that occurs results in transportation problems. The number of vehicles on the road needs to be commensurate with the infrastructure's readiness, and increasing congestion is happening. Based on this, further research

on modes and general costs of motorcycles and public transportation as modes of transportation for travel in urban areas is significant. The results can be used as reference material for further studies to be carried out on aspects that should be given more attention to intervene in the use of private vehicles and improve public transport services.

CONCLUSION

From this study, it is concluded that the parameters determined in selecting transportation modes are very influential with different characteristics of society. Research-based on surveys of public transportation users that must be improved in quadrant one, environmental services with hygiene indicators, cool air, how drivers serve passengers, and overall satisfaction with the vehicle environment. These attributes are considered necessary in the diagram obtained but must be better executed. The services provided by the company still need to be higher, not following what the community expects. So, these attributes must be paid more attention to by the company so that the public can get good service. Meanwhile, based on the results of interviews shows that travelers prefer to use motorbikes instead of public transportation due to the mileage, travel time, and costs incurred

REFERENCE

Andriyani, A., Philanthropist, W. B., Isradi, M., & Rifai, A. I. (2021). Operational Performance Analysis of Rapid Transit Bus (BRT) Corridor 11 in Pulogebang Bus Station. *World Journal of Civil Engineering*, 2(2), 71-80.

Asadulhaq, S. P., Rifai, A. I., & Handayani, S. (2022). Passenger Occupancy Phenomena of Trans Jakarta due to COVID-19: A Case Corridor X (2019-2021). *Citizen: Indonesian Multidisciplinary Scientific Journal*, *2*(5), 766-775.

Chen, J., & Li, S. (2017). Mode choice model for public transport with categorized latent variables. *Mathematical Problems in Engineering*, 2017.

Chiu, B. Y. (2022). Does the bus rapid transit reduce motorcycle use? Evidence from the Jakarta metropolitan area, Indonesia. *Case Studies on Transport Policy, 10(3),* 1767-1774.

Chu, M. C., Nguyen, L. X., Ton, T. T., & Huynh, N. (2019). Assessment of motorcycle ownership, use, and potential changes due to transportation policies in Ho Chi Minh City, Vietnam. *Journal of Transportation Engineering, Part A: Systems, 145(12),* 0501900.

Dell´Olio, L., Ibeas, A., de Ona, J., & de Ona, R. (2017). *Public transportation quality of service: Factors, models, and applications.* United Kingdom: Elsevier.

Dewantoro, R. B., Rifai, A. I., & End, A. F. (2022). The Satisfaction Analysis of Bus Double Decker Passengers: A Case Bekasi-Semarang Route. *Citizen: Indonesian Multidisciplinary Scientific Journal*, *2*(5), 720-728.

Farda, M., & Lubis, H. A. (2018). Transportation system development and challenge in jakarta metropolitan area, Indonesia. *International Journal of Sustainable Transportation Technology, 1(2),* 42-50.

Fauziawati, R., Rifai, A. I., & Handayani, S. (2022). Passengers Satisfaction Analysis of Quality and Schedule of Commuter Line Service: A Case Citayam-Tebet Route. *Citizen: Indonesian Multidisciplinary Scientific Journal, 2*(5), 833-842.

Han, Y. L., Wei, S., & Zhang, T. (2018). Research on Passenger's travel mode choice behavior waiting at bus station based on SEM-logit integration Model. *Sustainability* , 10(6), 1996.

Hansa, F., & Susilowati, M. H. (2020). Transportation mode choice of workers in Cikupa Village, Cikupa Sub-district, Tangerang Regency, Banten Province. *In IOP Conference Series: Earth and Environmental Science*, (Vol. 561, No. 1, p. 012017).

Hasan, M., Rifai, A. I., & Djamal, E. Z. (2022). Phenomena of Online Transportation Mode Choice as an Alternative Public Transport in South of Jakarta. *Citizen: Indonesian Multidisciplinary Scientific Journal*, *2*(5), 776-784.

He, L., Yang, D., & Li, J. (2021). Improving the Service Quality of Public Transit with Exclusive Bus Lanes: A Perspective from Passenger Satisfaction. *Journal of Advanced Transportation*, 2021.

Hernandez, D. (2018). Uneven mobilities, uneven opportunities: Social distribution of public transport accessibility to jobs and education in Montevideo. *Journal of Transport Geography, 67*, 119-125.

Iclodean, C., Cordos, N., & Varga, B. O. (2020). Autonomous shuttle bus for public transportation. *A review. Energies, 13(11)*, 2917.

Kurniawan, A. N., & Rifai, A. I. (2022). Phenomena of Transportation to Work Mode Choice, Due to The Increase of Oil Prices in Indonesia: A Case Light Rail Transit Depot Project Office-Jakarta. *Citizen: Indonesian Multidisciplinary Scientific Journal*, *2*(5), 785-793.

Lu, Y., Sun, G., Sarkar, C., Gou, Z., & Xiao, Y. (2018). Commuting mode choice in a high-density city: Do land-use density and diversity matter in Hong Kong? *International journal of environmental research and public health, 15(5)*, 920.

Mugion, R. G., Toni, M., Raharjo, H., Di Pietro, L., & Sebathu, S. P. (2018). Does the service quality of urban public transport enhance sustainable mobility?, 174. *Journal of cleaner production*, 1566-1587.

Munawar, A., Irawan, M. Z., Fauziah, M., & Belgium, P. F. (2022). Why Do Students Choose Buses over Private Motorcycles and Motorcycle-Based Ride-Sourcing? A Hybrid Choice Approach. *Sustainability*, 14(9), 4959.

Murad, D. F., Abbas, B. S., Trisetyarso, A., Suparta, W., & Kang, C. H. (2018). Development of smart public transportation system in Jakarta city based on integrated IoT platform. *In 2018 International Conference on Information and Communications Technology (ICOIACT)*, 872-878.

Ng, W. S. (2018). Urban Transportation Mode Choice and Carbon Emissions in Southeast Asia. *Transportation research record, 2672(2),* 54-67.

Ni, A., Zhang, C., Hu, Y., Lu, W., & Li, H. (2020). Influence mechanism of the corporate image on passenger satisfaction with public transport in China. *Transport Policy*, 94, 54-65.

Pike, S., & Lubell, M. (2018). The conditional effects of social influence in transportation mode choice. *Research in transportation economics*, 68, 2-10.

Primary, A., Rifai, A. I., & Thole, J. (2022). The Analysis of Pedestrian Service in Railway Station Area: A Case Tanah Abang Station, Jakarta A Case Tanah Abang Station, Jakarta. *Citizen: Indonesian Multidisciplinary Scientific Journal*, *2*(5), 794-803.

Puan, O. C., Hassan, Y. A., Mashros, N., Idham, M. K., Hassan, N. A., Warid, M. N., & Hainin, M. R. (2019). Transportation mode choice binary logit model: A case study for Johor Bahru city. *In IOP Conference Series: Materials Science and Engineering*, (Vol. 527, No. 1, p. 012066).

Sons, A. S., Warnars, H. L., Gaol, F. L., Soewito, B., & Abdurachman, E. (2018). A Proposed surveillance model in an Intelligent Transportation System (ITS). *In 2018 Indonesian Association for Pattern Recognition International Conference*, 156-160.

Rifai, A. I. (2021, December). Evaluation of Performance and Services of Integrated Transportation System (Case Study: Connecting Line between MRT Dukuh Atas Station and KRL Sudiran Station). In *Proceedings of the International Conference on Industrial Engineering and Operations Management* (pp. 496-507).

Rifai, A. I. (2021). How did the COVID-19 Pandemic Impact Passenger Choice toward Public Transport? The Case of Jakarta, Indonesia. *Design Engineering*, 6816 - 6824.

Rifai, A. I., Hadiwardoyo, S. P., Correia, A. G., & Pereira, P. A. (2016). Genetic Algorithm Applied for Optimization of Pavement Maintenance under Overload Traffic: Case Study Indonesia National Highway. *Applied Mechanics and Materials (Vol. 845) (* pp. 369-378). Trans Tech Publications Ltd.

Rifai, A. I., Hadiwardoyo, S. P., Correia, A. G., Pereira, P., & Cortez, P. (2015). The data mining applied for the prediction of highway roughness due to overloaded trucks. *International Journal of Technology, 6(5),* 751-761.

Rifai, A. I., Putra, M. G. D., Isradi, M., Mufhidin, A., & Prasetijo, J. (2022). Evaluation of Selection of Public Transport Mode Corridor Blok M–Bundaran Hotel Indonesian in the New Normal Era with Stated Preference. *IJEBD International Journal Of Entrepreneurship And Business Development eISSN 2597-4785 pISSN 2597-4750, 5*(4), 792-805.

Rifai, A. I., Rafianda, D. F., Isradi, M., & Mufhidin, A. (2021). Analysis of Customer Satisfaction on The Application of The COVID-19 Protocol at The Inter-City Bus Terminal. *International Journal of Engineering, Science and Information Technology*, 75-81.

Rulianto, B., Rifai, A. I., Isradi, M., & Mufhidin, A. (2021). A Comparative Analysis of the Effectiveness of Airport Public Transport System in Jakarta. *World Journal Of Business, Project And Digital ManagementT, 2*(01), 22-31.

Saif, M. A., Zefreh, M. M., & & Torok, A. (2019). Public transport accessibility: A literature review. *Periodica Polytechnica Transportation Engineering, 47(1),* 36-43.

Santuri, T. P., & Baharom, N. A. (2018). The public perception of public transportation in Malaysia. *Sumatra Journal of Disaster, Geography and Geography Education, 2(2),* 135-140.

Saraswati, M., Rifai, A. I., & Yudhistira, P. (2022). Review of Customer Satisfaction Index by INACA for Pattimura International Airport Ambon, Indonesia. *Citizen: Indonesian Multidisciplinary Scientific Journal, 2*(5), 865-872.

Soehodho, S. (2017). Public transportation development and traffic accident prevention in Indonesia. *IATSS research, 40(2),* 76-80.

Sony, S., Rifai, A. I., & Handayani, S. (2022). The Effectiveness Analysis of Bus Rapid Transit Services (A Case Trans Semarang, Indonesia). *Citizen: Indonesian Multidisciplinary Scientific Journal, 2*(5), 712-719.

Widyaningsih, N., Mohtar, W. H., Yussof, N. I., & Putri, M. D. (2022). Impact Of Large-Scale Social Restrictions On Transportation Modes. *International Journal on Technical and Physical Problems of Engineering*, 216-221.

Yatskiv, I., Budilovich, E., & Gromule, V. (2017). Accessibility to Riga public transport services for transit passengers, 1187. *Procedia Engineering*, 82-88.

Yunidar, D., & Majid, A. Z. (2018). What Drives The Riders Do Personalizing Activity Toward Their Motorbike? *In 3rd International Conference on Creative Media, Design andTechnology (REKA 2018),* pp. 175-178