

Analysis of the Selection of Transportation Modes for College Trips

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ABSTRACT

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The density conditions on the Universitas Muhammadiyah Yogyakarta (UMY) campus area and the high level of congestion on access routes to the campus during morning and evening peak hours have encouraged the need for a study related to the reasons why students choose particular transportation modes and the travel patterns they undertake every day. This study aims to describe the demographic characteristics of students and the characteristics of their travel to campus. The results show that the majority of respondents were male students aged 19–23 years, had an income above the Provincial Minimum Wage (UMP), and possessed a Class C driving license. Private motorcycles were found to be the most dominant mode of transportation among UMY students, both among male and female students and among students holding a Class C driving license. Based on travel time, private motorcycles were mostly used for short trips of 0–15 minutes, private cars for trips of 5–25 minutes, and Trans Jogja buses mainly for trips within the range of 16–25 minutes. Online transportation was more widely used for short to medium trips, although the number of users was lower than private modes. In terms of travel distance, private motorcycles dominated all distance categories, especially within 1–7 km, while Trans Jogja buses were more commonly used for medium distances of 8–14 km. Private motorcycles dominated the low-cost category, while Trans Jogja buses were preferred by students with limited transportation budgets. Safety, comfort, low cost, and ease of access were identified as the main factors influencing students' transportation mode choices.



Introduction

The Special Region of Yogyakarta is one of the provinces with high community activity and mobility (Purnomo, 2019) (Rahajeng et al., 2023). DIY can be known as a student area that is synonymous with educational institutes and campuses. The density of activities carried out by the community illustrates the need for the development of transportation and the selection of the right mode of transportation (Vuchic, 2017). Reporting from the Kompas.id page regarding the increase in citizen mobility accessed on March 28, 2024, it shows that mobility to work and school is observed to increase by 11.57% while mobility in public transportation centers increased by 8.86% while mobility in retail and recreation increased by 1.71%. The increase in the percentage means that

transportation is an important tool to support community activities so that the choice of transportation mode will arise as a result of the need for movement and the fulfillment of community needs. Yogyakarta has a variety of provincial roads in each district (Chotib & Huda, 2019).

Yogyakarta City with a section of 233.23 km, Kulon Progo with a section of 1309 km, Gunung Kidul with a section of 1136.66 km, Bantul with an area of 624.46 km and Sleman with a section of 699.5 km (DIY Transportation Agency, 2022). This data shows that Bantul Regency is one of the districts that has a relatively small road section compared to other districts in Yogyakarta. This fact is not in line with the dense activity of universities in Bantul Regency. One of the causes of the dense activity of universities in Bantul Regency is the large number of universities in the district, both national and private. The following is a picture related to the data on the number of universities in Bantul Regency when compared to other districts in Yogyakarta Province.

Data from BPS Yogyakarta (2020) shows that Bantul Regency has 25 universities, both public and private, so that it will increase transportation mode selection activities. University of Muhammadiyah

Yogyakarta as one of the largest higher education institutions in Bantul Regency, is the choice for prospective students who want to continue their studies in the Province of Yogyakarta. The growth in the number of students continues to increase, and this is also followed by an increase in the use of transportation every year (Akbar, 2023). The large number of students will lead to a variety of transportation modes to choose from.

The results of Irjayanti et al., (2021) show that the choice of transportation mode is influenced by socioeconomic status factors. Socioeconomic status according to Atika & Rasyid, (2018) is the position of each individual's special position in the environment that will be related to the dignity obtained and the rights that he will have. Meanwhile, according to Nurwati & Listari, (2021), socioeconomic status is a role owned by a person in a community group that is related to his ability to meet the needs of daily life based on the level of achievement that the individual has. Socio-economics can describe the position or position of individuals in classifying individuals in a certain social layer. According to research by Irjayanti et al., (2021), economic status will be assessed from monthly income or money and social factors will be seen from the distance traveled from residence to destination.

Economic factors are one of the determinants of the choice of transportation mode. Economic factors are related to income, which is the amount of money received every month to meet individual needs (Sumampouw et al., 2022). Research conducted by Bastarianto et al., (2019) which revealed that income or economic conditions have a significant effect on the choice of transportation mode that will be chosen by respondents. Individuals who have a higher income will choose to use a private vehicle. Meanwhile, the majority of individuals with low incomes prefer to use public transportation which is considered more economical. The income factor is important because each choice of transportation mode has a different tariff for the burden of making a move. The tariff for the use of private vehicles is considered more expensive compared to the tariff for the use

of public vehicles. This is because private vehicles require fuel charges and other operational costs such as service and other maintenance. In contrast to public transportation where most of the travel needs are subsidized by the central and regional governments (Supit et al., 2019).

Distance is one of the aspects that can affect the choice of transportation mode. This factor can be seen from the distance traveled between the place of residence and the destination. Individuals with long travel distances will require a lot of effort and a long time, so there will be a high risk of wasting time (Aprilia et al., 2021). Research conducted by Irjayanti et al. (2021) shows that mileage has a significant effect on the choice of transportation mode. Individuals with much more distance prefer to use public transportation because the costs incurred will be cheaper compared to using private transportation. The distance traveled in each move is related to the time spent in the transfer process. This is one of the driving factors for the community in choosing a mode of transportation that is in accordance with the required travel time. Private transportation modes are considered to have a faster travel time compared to public transportation because public transportation has a special schedule and many stops so that it takes longer to travel than private transportation (Sugiyanto et al., 2021).

The results of research by Irjayanti et al., (2021) and Aprilia et al., (2021) indicate that in the selection of transportation modes, there are considerations between using public transportation and private vehicles based on certain priorities. The distance from the starting point to the destination point can be covered by different types of transportation, depending on factors such as cost, time value, and flexibility. If the top priority is low cost and low time value, then public transportation can be a better option (Prima, 2020; Warokka et al., 2020). Meanwhile, if what is more important is fast travel time, high time value, or flexibility in traveling, then private vehicles can be preferred. Another factor in choosing the mode can be seen from the availability of facilities and infrastructure. According to research conducted by Sugiyanto et al. (2021) explained that facilities and infrastructure will affect the choice of transportation mode because people will have transportation with a high level of safety, security, reliability, comfort, cleanliness, and accessibility.

The results of field observations show that UMY is a university located on the main road that has easy access to public and private transportation. One type of public transportation that is often used is Trans Jogja which began operating in 2008. The Yogyakarta government has provided facilities and infrastructure for Trans Jogja Buses spread across 21 lanes with a total of 140 fleets. Each Trans Jogja Bus is able to carry 41 passengers with 22 sitting passengers and 19 standing passengers. In the area of the object of research, namely the University of Muhammadiyah Yogyakarta, it already has a Trans Jogja Bus Stop facility which is right in front of the main entrance. UMY is located in the Trans Jogja Line Number 6B with a total of 5 fleets operating with a distance of 16.5 km and a waiting time of 30-60 minutes with a tariff based on the Decree of the Governor of Yogyakarta Number 361/KEP/2022 of IDR 3,600 for the public, IDR 2,700 for community card users and IDR 60 for special student card users (Sunartono, 2024).

Trans Jogja which is used as a form of transportation facilities for the community has been carried out optimally at a low price and a fairly short waiting time. This is a positive attraction for students of the University of Muhammadiyah Yogyakarta to have public transportation as the right choice of transportation. It is different from the results of observation of the use of private vehicles at the University of Muhammadiyah Yogyakarta. The use of private vehicles in a place with high activity requires adequate infrastructure such as a large parking lot and easy road access. Universitas Muhammadiyah Yogyakarta has provided infrastructure for private transportation users in the form of parking lots. However, the parking lot at UMY is overcrowded due to the large number of students with high activity so that the parking facilities at UMY are still considered to be lacking, which can be seen from the parking density. This indicates that the majority of UMY students prefer to use private transportation compared to public transportation. Meanwhile, until now there has been no policy from the campus related to the use of private vehicles on the UMY campus. On the other hand, paths and road access around the campus are also infrastructure that needs to be considered in the selection of transportation modes. UMY has road access from several directions, namely the east as the main route, the western route, the North route and the South route. There are paths that have a high level of density, especially on the southern route where many students use the southern route more than other routes. The high density often causes congestion during busy hours such as morning and evening.

The problem of full parking lots at UMY reflects a widespread issue in higher education institutions. The increase in the number of students from year to year, coupled with the tendency to use private vehicles such as motorbikes and cars, has resulted in a high need for parking spaces. However, the available parking spaces are often unable to keep up with this surge, leading to overcrowding and long queues in campus parking areas. The parking infrastructure at UMY, although it has been designed to accommodate a certain number of vehicles, has limitations in scale and flexibility. The inability to expand these facilities due to land limitations creates a situation where parking capacity is always full during peak hours, such as morning to noon. Students tend to choose private vehicles for reasons of convenience, time flexibility, and limited public transportation directly to campus. This increases the pressure on parking facilities, especially for students who come from outside the region who are not familiar with alternative modes of transportation. When the parking lot is full, students often have to spend time looking for parking in the area around the campus, which not only reduces their study time but can also lead to delays in attending classes. This problem also causes a domino effect in the form of congestion around the campus area.

Some large campuses such as the University of Indonesia or the State University of Jakarta provide internal shuttle buses or transportation services that are integrated with the city's public transportation. UMY does not have facilities like this. Access to public transportation to UMY is very limited and does not cover many areas where students live, while other campuses, such as the University of Indonesia (UI), are connected by commuter trains and city transportation designed to reach students. The use of UMY as a

research object is a form of novelty in this study because there has never been a research related to the selection of transportation modes for UMY students. This research can be used as a literature contribution related to students' preferences for the selection of transportation modes for the development of policies for the University of Muhammadiyah Yogyakarta campus related to the use of private vehicles (Lubis et al., 2022; Nova & Widiastuti, 2019).

Irjayanti et al., (2021) stated that the results of this study show that the selection of the main mode of commuter workers in Greater Jakarta is influenced by socio-economic and demographic factors, travel characteristics, and transportation quality. In general, the factors that affect the choice of commuter mode of work are gender, education, distance, length of travel, speed, and practicality.

The purpose of this study is to further analyze the selection of transportation modes for college trips and possible preferences that affect the selection of these modes. The objectives of this study are as follows to analyze the demographic characteristics of students on the selection of transportation modes for college trips at UMY locations and to analyze student preferences in choosing transportation modes for college trips at UMY locations. The benefits or uses that can be obtained from the implementation of this research include theoretically the results of this research are expected to be useful for adding literature, references and theories of transportation mode selection that can be used for future researches. This research is expected to be useful for the government and related institutions in designing more effective and efficient transportation policies.

Method

This study uses a quantitative research design which is a series of research methods carried out by explaining phenomena that occur through the aspect of objective, systematic measurement of parts of phenomena and relationships that occur. The quantitative research design used in this study is a cross sectional research design (Ghozali, 2018). The use of cross sectional design because this study aims to find out the demographic characteristics and travel characteristics of transportation mode selection in students of the Faculty of Engineering, University of Muhammadiyah Yogyakarta.

In this study, the scope of the research population is S1 and S2 students of the Faculty of Engineering, University of Muhammadiyah Yogyakarta. The total number of active students at the University of Muhammadiyah Yogyakarta in 2023 is 25,438 students spread across 8 faculties, namely the Faculty of Economics, Faculty of Engineering, Faculty of Agriculture, Faculty of Medicine, Faculty of Physics, Faculty of Law, Faculty of Religion, and Faculty of Language Education.

In this study, the technique used to determine the sample is non-probability with the purposive sampling technique. The purposive sampling technique is a technique for determining samples with certain considerations so that this technique can be suitable for quantitative research or studies that do not generalize (Sugiyono, 2018b). According to Bougie & Sekaran, (2019), the purposive sampling method is a sampling method with

characteristics that have been determined by the researcher in accordance with the inclusion criteria. The sample criteria in this study are as follows:

1. Active S1 and S2 students of the Faculty of Engineering, University of Muhammadiyah Yogyakarta.
2. Using motorbike or car transportation mode to campus
3. Be willing to be a respondent.

The determination of the number of respondents in this study was calculated using the Slovin formula in determining the number of samples with a known population. The data collection method used to collect data in this study was carried out through literature studies, observations, documents, and questionnaires. The data source of this study uses primary data and secondary data. This primary data is to obtain the opinions of respondents about the influence of socio-economic status, mileage and condition of infrastructure facilities in

The selection of transportation modes for college trips obtained directly by the respondents, based on the distribution of questionnaires to students of the University of Muhammadiyah Yogyakarta. Meanwhile, secondary data is data whose source is indirect or data obtained from other sources, for example through other people or documents (Sugiyono, 2018a). It can be said that secondary data is the result of data obtained from company, government documents, journal references, books and other data.

Data Analysis Methods

The analysis method of this study explains the type of method used to analyze each target. This study has two objectives, namely identifying and analyzing socio-economic characteristics and movement patterns of public and private transportation users, identifying and analyzing respondents' perceptions of fares and travel times and identifying and analyzing the selection of public or private modes for travel to/from campus.

a. Descriptive Statistical Analysis

Descriptive statistical analysis is related to the application of statistical methods to collect, process, present, and analyze quantitative data descriptively, in this case data collected in the field through questionnaire surveys. After obtaining raw data, the data will be processed using frequency distribution tables and graphs. In this case, demographic characteristics (gender, age, income, driver's license ownership) and travel characteristics (time, cost, mileage) will be seen on the choice of mode of transportation (private car, private motorbike, Transjogja Bus, Motorcycle online transportation, Car online transportation).

b. Crosstab Analysis

This study uses crosstab analysis (cross-tabulation as the main method to analyze the relationship between two categorical variables, namely demographic characteristics and travel characteristics), with the selection of transportation modes. This approach was chosen because of its ability to provide a clear picture of how the two variables are interconnected and influence the choice of transportation mode used by respondents (Budiman et al., 2022).

Crosstab is used to map data based on specific categories, so that researchers can identify patterns and trends in the selection of transportation modes. In the context of this study, crosstab analysis was carried out to connect variables such as gender, age, income, driver's license ownership, and travel characteristics (time, cost, mileage) with the type of transportation mode used, such as private cars, private motorbikes, TransJogja buses, online motorcycle transportation, and online car transportation (Ferdila & Us, 2021).

In crosstab analysis, the data is arranged in the form of a two-dimensional table, with one variable as a row and the other variable as a column. Each cell in the table indicates the number or proportion of respondents who chose a particular mode of transport based on the category in the analyzed variable. In this way, crosstab analysis provides insights into how demographic and travel characteristics affect the choice of mode of transportation.

Results and Discussion

From the analysis of the respondent characteristic data that has been carried out, the following results are obtained:

Demographic Characteristics

Demographic characteristics, consisting of perceptions based on gender, age, income, and driver's license ownership.

Travel Characteristics

The travel characteristics of the respondents, consisting of the type of mode used to go to campus, the reason for using transportation, the estimated travel time, the distance traveled, and the costs incurred.

a. Types of Modes Used on Campus

The characteristics of respondents based on the type of mode used to go to campus, to get a diversity of travel time answers, are differentiated into 5 time options consisting of private cars, private motorbikes, Transjogja buses, motorcycle online transportation and car online transportation, which can be seen in Table 1 below.

Table 1. Types of Modes Used on Campus

Types of Moda	Sum	Percentage
Private Car	16	16,3
Personal motorbike	58	59,2
Bus Transjogja	12	12,2
Motorcycle online transportation	9	9,2
Car online transport	3	3,1
Total	98	100

Source: Survey results, 2024

Data on transportation modes used by respondents to go to campus provides an overview of mobility preferences and habits in the campus environment. A total of 58 respondents used private motorbikes to go to campus. This shows that private motorbikes are the most chosen mode of transportation by students. This is due to factors such as

flexibility, time efficiency, and relatively low operational costs. In addition, private motorbikes are also easier to use on congested roads and make it easier for students to find parking spaces. Private cars were used by 16 respondents, although more expensive in terms of operational and parking costs, some students chose private cars because of convenience, the need to transport more goods, or to travel with friends. The Transjogja bus was used by 12 respondents, showing that some students still chose public transportation. Transjogja buses offer suitable routes and cheaper costs, although the travel time can be longer compared to private vehicles. Online transportation, both motorbikes (9 respondents) and cars (3 respondents), is used by a small number. Motorcycle online transportation is more popular than cars because it is faster and more economical, especially for short distances or during heavy traffic (Dodi & Nahdalina, 2019).

The data shows that the majority of respondents prefer to use private transportation modes (motorbikes and private cars), compared to public transportation (Transjogja buses) or online transportation. This shows that private vehicles, both motorcycles and cars, provide more comfort because users can choose the departure time, travel route, and vehicle conditions as desired. They do not have to arrange waiting times or depend on public transportation schedules. Private vehicles make it easy for students to travel at any time without being tied to a public transportation schedule. This is especially important for students who have flexible lecture schedules or often have to attend campus activities outside of lecture hours.

b. Reasons to Use Transportation

The characteristics of respondents based on the reasons for using the transportation they choose, to get a diversity of answers to the reasons for the election, it is distinguished into 3 time options consisting of low cost, ease of access, safety and comfort, and other reasons, which can be seen in Table 2:

Table 2. Reasons to Use Transportation

Reasons touse Transportation	Sum	Percentage
Safe and secure	12	12,2
Low cost	25	25,5
Ease of access	61	62,2
Total	98	100

Source: Data Processed

The mode of transportation chosen by respondents to go to campus is influenced by various factors which include cost, ease of access, as well as safety and comfort factors. The majority of respondents, namely 61 respondents, chose the mode of transportation because of the ease of access. Easily accessible and well-available modes of transportation around the place of residence or campus are an important factor in facilitating mobility to the place of study. A total of 25 respondents chose a mode of transportation based on low-cost considerations. This factor is very important in

influencing transportation choices. A total of 12 respondents chose the mode of transportation due to safety and comfort considerations, this aspect includes a safe travel experience in terms of traffic and comfort during the trip, which is a priority for some respondents.

c. Estimated Travel Time

Table 3. Estimated Travel Time

Estimated Wof Travel	Sum	Percentage
0 – 15 minutes	70	71,4
16 – 25 minutes	25	25,5
26 – 35 minutes	1	1,0
36 – 45 minutes	2	2,0

Source: Data Processed

Based on the data above, it is known that as many as 70 students need less time between 0-15 minutes to travel from home or boarding house to campus. This shows that more than most students live very close to the campus, which is located within a very close radius. Only 2 respondents with a travel time of 36 – 45 minutes and 1 respondent with a travel time of 26 – 35 minutes. This shows that very few students live far from campus. Thus it can be said that most students have a short commute time from home or boarding house to campus, which gives them flexibility and convenience in managing their daily activities.

d. Mileage

Table 4. Mileage

T DistanceTraveled	Sum	Percentage
1 - 7 Km	68	69,4
8-13 km	20	20,4
14-19 km	6	6,1
20- 25 Km	4	4,1
Total	98	100

Source: Survey results, 2024

Based on the data above, it is known that as many as 68 respondents need 1 - 7 Km to travel from home or boarding house to campus. This shows that more than most students live very close to campus.

Furthermore, there were 20 respondents with a distance between 8-13 Km, while 6 respondents with a distance of between 14-19 Km. This shows that a number of students live a little farther from the campus, but are still quite close. Only 4 respondents with a distance of between 20-25 Km. This shows that very few students live far from the campus. These results show that some students live in locations close to campus, but it still takes a long time to arrive due to heavy traffic and traffic conditions, especially during peak hours. This congestion causes the travel time to be not in accordance with the distance that should be covered in a short time.

In addition, there are also students who use public transportation such as the Transjogja Bus to reach the campus. Although the actual distance between the residence and the campus is quite close, the travel time becomes long due to the Transjogja Bus route that detours and passes through many stops. This bus must follow a predetermined route, so that the student's journey becomes longer than if using a private vehicle or other alternative transportation that can go directly to campus without many stops.

e. Costs Incurred

The characteristics of respondents based on the cost of round-trip to campus show quite diverse variations, depending on the type of transportation used. Students who use private vehicles such as motorcycles or cars, incur operational costs in the form of fuel and vehicle maintenance costs. The average motorcycle has a gasoline consumption of around 30-40 km per liter. For example, the distance from home to campus is 10 km (one-way trip), if students go to campus 5 days a week, then the total trip is 100 km per week (10 km x 2 for round trip x 5 days). So, in a month, students will travel 400 km (100 km x 4 weeks). Using 1 liter of gasoline consumption for 35 km, then for 100 km per week, students need around 2.86 liters of gasoline. Gasoline cost per week = 2.86 liters x IDR 10,000 = IDR 28,600. While the cost of gasoline per month = 11.43 liters x IDR 10,000 = IDR 114,300. Then for the cost of car gasoline per week = 9.09 liters x IDR 10,000 = IDR 90,900 and the cost of car gasoline per month = 36.36 liters x IDR 10,000 = IDR 363,600.

The cost of maintaining personal vehicles (such as motorcycles and cars) involves routine service costs to keep the vehicle in top condition. This service fee usually does not occur every day, but is influenced by mileage, usage time, and vehicle condition. Light service (oil change, engine check) is usually done every 2-3 months or every 1,000-1,500 km. The cost of light service for motorcycles is around IDR 50,000 - IDR 100,000 per service, while the cost of light service for cars can range from IDR 200,000 - IDR 500,000 per service. Thus, it can be assumed that the cost of servicing the motorcycle in 1 month is IDR 100,000 (for 1 month of normal use, even though maintenance is only done every few months, the cost is divided equally per month). While the cost of car service in 1 month is IDR 200,000 (the average cost if the service is carried out every 3 months, then the service fee per month is around IDR 200,000).

For more details on the distribution of fees incurred by students per day, can be seen in Table 5.8 and Figure 5.8 below.

Table 6. Costs Incurred (per day)

Cost	Sum	Percentage
IDR 0 – IDR 15,000	57	58,2
IDR 16,000 – IDR 27,000	25	30,6
IDR 28,000 – IDR 39,000	9	7,1
IDR 40,000 – IDR 51,000	7	4,1
Total	98	100

Source: Survey results, 2024

Transportation costs are an important consideration for students in choosing their daily mode of transportation from their residence to campus. Survey data shows that as many as 57 respondents who spend between Rp. 0 – Rp. 15,000 to travel to campus, including students who live very close to campus, only need to pay for gasoline to ride a motorcycle. A total of 25 respondents spent between Rp. 16,000 – Rp.

27,000 for a trip to campus, and 9 respondents spent Rp. 28,000 – Rp. 39,000 including students who use private cars or regular car online transportation, or those who live far enough from campus so that transportation costs become more expensive. As well as 7 respondents who spent Rp. 40,000 – Rp. 51,000 including students who used private cars and lived quite far from campus, students in this group had a preference for comfort and flexibility, even though they had to spend higher costs.

Crosstab Analysis

a. Gender, Age and Alternative Mode Selection

Table 7. Gender, Age and Alternative Mode Selection

Information	Car online transport	Motorcycle online transportation	Bus Trans Jogja (public transportation)	Private car	Personal motorbike	Total
Gender						
Man	1	3	6	11	39	60
Woman	2	6	6	5	19	38
Age						
19-27	3	9	12	15	57	96
28-32	0	0	0	1	1	2
Total	3	9	12	16	58	98

Source: Survey results, 2024

The majority of UMY students choose private motorbikes as the main mode of transportation, with 39 men and 19 women, because of their flexibility, time efficiency, and lower operational costs, especially in the face of heavy traffic conditions. Private cars are the second choice for men (11 people) and women (5 people) who prioritize comfort, flexibility, and the ability to carry more goods, even though the number of users is less than private motorbikes due to higher operational costs. Public transportation modes such as the Trans Jogja bus are used in a balanced manner by 6 men and 6 women, driven by affordable fares and routes that are integrated with various important points, including the UMY campus. Meanwhile, online motorcycle transportation is more in demand by women (6 people) than men (3 people) because of comfort and safety considerations, especially for medium-distance travel. In contrast, car online transportation is only chosen by 1 man and 2 women, showing that higher fares are an obstacle for students.

Overall, male students rely more on fast and flexible modes of transportation such as motorbikes and private cars, while female students have more varied options with comfort and safety considerations. Although public transportation and online

transportation modes are still relevant for students who do not have access to private vehicles, private motorbikes remain the dominant choice for UMY students.

b. Income, Driver's License Ownership and Alternative Mode Selection

The cross-tabulation between income and driver's license ownership in UMY students is presented as follows:

Table 8. Driver's License Income and Ownership					
Income (student monthly money)	YES A	YES A, YES C	YES C	None	Total
Less than UMP (Rp.2,125,897.61)	0	1	21	17	39
More than UMP (IDR 2,125,897.61)	8	20	26	5	59
Total	8	21	47	22	98

Source: Survey results, 2024

Student driver's license ownership is influenced by the level of monthly income. Of the 39 students with incomes less than UMP, the majority have SIM C (21 students), while none have SIM A, and 17 students do not have driver's licenses, indicating limited access to private vehicles. On the other hand, of the 59 students with an income of more than UMP, there was an increase in SIM ownership, with 8 students having SIM A, 20 having SIM A and SIM C, 26 having SIM C, and only 5 without a driver's license. This shows that higher-income students tend to have wider access to private vehicles, both cars and motorcycles, while low-income students rely more on motorcycles as the main mode of transportation or even do not have a driver's license at all due to financial limitations.

Furthermore, the cross-tabulation between SIM ownership and alternative selection of student transportation modes to the UMY campus is presented as follows:

Table 9. Driver's License Ownership and Alternative Mode Selection						
Driver's License Ownership	Car online transport	Motorcycle online transportation	Bus Transjogja (public transportation)	Private car	Personal motorbike	Total
YES A	0	0	0	8	0	8
YES A, YES C	0	0	1	7	13	21
YES C	0	3	0	1	43	47
None	3	6	11	0	2	22
Total	3	9	12	16	58	98

Source: Survey results, 2024

The table above is known that private motorbikes are the most dominant mode of transportation, especially among students with SIM C and SIM A+C. Then private cars are more widely used by students who have SIM A or a combination of SIM A and C.

While Trans Jogja and online buses are the main choice for students who do not have a driver's license, Due to limited access to private vehicles. Thus, it can be said that students without a driver's license tend to rely on public transportation and online transportation. The main choice on Trans Jogja buses shows a preference for more economical modes, while online transportation offers convenience even at a higher cost. Interestingly, there are two students without a driver's license who use a private motorcycle, which can show use without official permission.

c. Estimated Travel Time and Alternative Mode Selection

The cross-tabulation between the estimated travel time and the alternative selection of student mode to the UMY campus is presented as follows:

Table 10. Estimated Travel Time and Alternative Mode Selection

Estimate d Travel Time (minutes)	Car online transpo rt	Motorcycle online transportatio n	Transjogja Bus (public transportatio n)	Privat e car	Personal motorbik e	Tot al
0-15	1	4	0	6	38	49
16-25	2	4	12	7	16	41
26-35	0	0	0	3	3	6
36-45	0	1	0	0	1	2
Total	3	9	12	16	58	98

Source: Survey results, 2024

Based on table 10, it is known that private motorbikes are the main mode of transportation for students in all travel time ranges, especially for short trips of 0-15 minutes with 38 students, because of their speed and efficiency. Private cars were also significantly used (6 students), reflecting a preference for comfort despite the relatively close proximity. Online transportation, both motorbikes and cars, is used in certain situations, such as urgent conditions or convenience reasons, while Trans Jogja buses are not chosen for short trips because they are more suitable for trips with longer travel times. In the 16-25 minute range, the distribution of mode use was more even, with private motorbikes remaining dominant, but there was a significant increase in the use of Trans Jogja Bus (12 students), indicating that buses are more preferred for longer journeys.

Private cars remain an option for those who prioritize convenience, while online transportation is also quite useful. In the 26-35 minute travel span, only private modes of transportation are used, both motorbikes and cars, each with 3 users, indicating that students tend to avoid public transportation or online for longer trips for flexibility. In the longest range of 35-45 minutes, the modes used are private motorbikes and motorbike online transportation with 1 user each, emphasizing the importance of flexibility and time efficiency. Overall, private motorcycles are the most widely used mode of transportation in all time spans, especially for short trips. Private cars are quite popular on trips with a travel time of 5-24 minutes because of their convenience. Trans Jogja buses are more effective for medium-sized trips in the range of 15-24 minutes, while online

transportation, both motorbikes and cars, are more often used in short to medium-sized trips but with a smaller number of users than private modes.

d. Distance and Alternative Mode Selection

The cross-tabulation between the distance traveled and the alternative mode of choosing the mode of students to the UMY campus is presented as follows:

Table 11. Distance and Alternative Mode Selection

Distance Traveled (km)	Car online transport	Motorcycle online transportation	Transjogja Bus (transportation) general)	Private car	Personal motorbike	Total
1-7	2	6	1	6	42	57
8-14	1	2	10	9	14	36
15-21	0	1	1	0	1	3
22-28	0	0	0	1	1	2
Total	3	9	12	16	58	98

Source: Survey results, 2024

Table 11 shows that private motorcycles dominate students' choices within a distance of 1-7 km, with 42 users. This mode allows for fast and flexible travel with low operational costs. Private cars are also quite popular (6 students), showing a preference for comfort despite the relatively short distance. For online transportation, motorcycles (6 students) and cars (2 students) are alternatives for students who do not have a personal vehicle or are in certain conditions. As for the Trans Jogja Bus used by 1 student, it shows a low preference for this mode in short-distance travel.

Within a distance of 8-14 km, the choice of transportation modes is more varied. Private motorbikes are still a widely used mode (14 students), but the number of users of private cars (9 students) and Trans Jogja Bus (10 students) is increasing. Then the Trans Jogja Bus became more popular than shorter distances, due to cost efficiency and routes that cover a wider area. Meanwhile, online transportation (cars and motorcycles) remains an option for a small number of students.

Furthermore, within a distance of 15-21 km, the use of transportation modes is more balanced with each mode (online transportation motorbike, Trans Jogja Bus, and private motorbike) used by 1 student. There are no private car users or car online transportation, perhaps because this trip requires higher operational costs or longer time with the mode. Likewise with a distance of 22-28 km, only private cars and private motorbikes are used, each by 1 student. Students who live far from campus tend to use private transportation modes that provide better flexibility and comfort for long-distance travel.

Thus it can be said that private motorcycles are the most popular mode of transport in all distance categories, especially within a distance of 1-7 km. Trans Jogja buses are more widely used in medium distances (8-14 km), reflecting the effectiveness of this mode in medium-distance travel at an affordable cost. For private cars, it shows stable

use, especially in short and medium distances. Then online transportation, both motorbikes and cars, is more often used over short distances, due to its flexibility and ease of access. Over long distances (22-28 km), private modes of transport (cars and motorcycles) are preferred due to convenience and speed on long-distance travel.

e. Travel Costs and Alternative Mode Selection

The cross-tabulation between the cost (cost) and the alternative mode of choosing students to the UMY campus is presented as follows:

Table 12. Travel Costs and Alternative Mode Selection

Fee (Rp)	Car online transport	Motorcycle online transportation	Transjogja Bus (public transportation)	Private car	Personal motorbike	Total
0-15000	0	0	12	1	44	57
16000-27000	3	7	0	1	14	25
28000-39000	0	1	0	8	0	9
40000-51000	0	1	0	6	0	7
Total	3	9	12	16	58	98

Source: Survey results, 2024

Table 12 states that private motorcycles are the most dominant mode of transportation among students, especially in the low-cost category (Rp0 - Rp15,000), due to their low efficiency and operational costs, while the Trans Jogja Bus is the second choice for students with a limited budget, but is not used in the middle to high cost category. In the cost range of IDR 16,000 - IDR 27,000, the use of private motorbikes has decreased, and online transportation (motorbikes and cars) has begun to be in demand by students who prioritize comfort even at a higher cost. In the cost category of Rp28,000 - Rp39,000, private cars are the main choice, reflecting a preference for comfort for students who can afford to allocate more money, while online transportation for motorbikes is still used even though it is limited. At the cost of a trip of Rp40,000 - Rp51,000, private cars still dominate, while other modes such as the Trans Jogja Bus and private motorbikes are not used, indicating that this mode is not suitable for high-cost travel. Thus, the choice of student mode of transportation is greatly influenced by the balance between cost, convenience, and flexibility, where private motorbikes are the main choice for low costs, online transportation is preferred in the middle category, and private cars are the main option for students with larger transportation budgets.

f. Reasons for Choosing Moda and Alternative Moda Selection

The cross-tabulation between the reasons and the alternative mode of student selection to the UMY campus is presented as follows:

Table 12. Reasons and Alternatives for Choosing Moda

Reason	Car online transport	Motorcycle online transportation	Transjogja Bus (public transportation)	Private car	Personal motorbike	Total
Safe and secure	3	1	0	8	0	12
Low cost	0	3	12	1	9	25
Ease of access	0	5	0	7	49	61
Overall Total	3	9	12	16	58	98

Source: Survey results, 2024

Based on the table of 12, private cars are the main mode of transportation for students who prioritize safety and comfort (8 students), followed by online transportation by car (3 students), while private motorbikes and Trans Jogja buses are not chosen due to limited space and comfort. For reasons of low cost, Trans Jogja Bus is the main choice with 12 users, followed by private motorbikes (9 users), while online transportation motorcycles are used by 3 students, and private cars and online car transportation have only 1 or no users in this category. Private motorbikes dominated in terms of ease of access with 49 users, reflecting high flexibility compared to other modes, followed by private cars (7 users) and motorbike online transportation (5 users), while Trans Jogja Bus was not chosen due to route and schedule limitations. Overall, private cars are the most dominant for safety and comfort reasons, Trans Jogja buses and private motorbikes excel in the cost factor, while private motorbikes are the top choice in terms of ease of access (Kristyanto et al., 2022).

Conclusion

Based on the results of the analysis, the findings of the study showed that the majority of respondents aged 19-23 years, male, earning above UMP, had a driver's license C, with a travel time between 0-15 minutes, a distance of 1-7 km, and transportation costs between Rp 0 - Rp 15,000. Private motorcycles are the most dominant mode of transportation among UMY students, both men and women, as well as students with SIM C. Private motorcycles are more widely used for trips with a travel time of 0-15 minutes, while private cars are used for travel times of 5-25 minutes, and Trans Jogja buses are more widely used for travel times of 16-25 minutes. Online transportation, both motorbikes and cars, is used more often for short to medium distances, although the number of users is smaller than private modes. Private motorcycles are most popular in all distance categories, especially 1-7 km. Trans Jogja buses are more widely used for medium distances (8-14 km), while private cars are used stably for short and medium distances. Online transportation is more often used for short distances, but at a higher cost compared to private modes. Over long distances (22-28 km), private modes of transport are preferred due to convenience and speed. Private motorcycles are dominant in the low-

cost category (Rp 0 - Rp 15,000), while Trans Jogja is more popular among students with a limited budget. Online transportation (motorbikes and cars) is an option in the cost range of Rp 16,000 - Rp 27,000, and private cars are used more in the high-cost category (Rp 28,000 and above) for convenience. Trans Jogja and private motorcycles are preferred for reasons of low cost, while private motorcycles are also more chosen for ease of access.

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