

## **Perceptions of Cyclists on the Cycling Infrastructure in East Jakarta**

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**ABSTRACT:** *The continued spread of the Covid-19 pandemic throughout the world, including Indonesia, has increased the awareness of East Jakarta residents about the importance of healthy living behavior. This causes the creation of healthy lifestyle behaviors such as regular cycling sports. Field observations show that the number of cyclists is increasing individually and in communities. However, the increase in cyclists in the East Jakarta area has not been matched by adequate infrastructure. The study aimed to determine the factors influencing cyclists' desire to use bicycle lanes on Pemuda Street, East Jakarta. The method used in the data collection technique is a google form-based questionnaire. While the data processing method uses descriptive statistics to describe the profile and characteristics of cyclists as well as multiple linear regression equations to determine the factors that influence the desire to ride a bicycle using a bicycle lane. The results showed that the factor that influenced the desire of cyclists to use the bicycle lane was the availability of traffic lights and the most negligible influential factor was the absence of no parking signs along the bicycle lane.*

**Keywords:** *Pemuda street in East Jakarta, Multiple Linear Regression, Bike Lane; Cyclist's desire, Profile and Characteristics of Cyclists.*

### **I. INTRODUCTION**

The COVID-19 pandemic has spread across the world, including Indonesia. The community, particularly the people who live in Jakarta, has been profoundly affected. During the pandemic, many Jakarta residents were affected by COVID-19 (Putra et al., 2021; Soebandrio et al., 2021; Venkatachalam et al., 2021); as a result, tight health protocols and regular physical activity, such as cycling, are recommended. COVID-19 has spread across the world, including Indonesia. It has had a significant impact on the community, particularly on the people who live in Jakarta. Many Jakarta citizens exposed to COVID-19 during the COVID-19 pandemic (Putra et al., 2021; Soebandrio et al., 2021; Venkatachalam et al., 2021); consequently, strict health protocols and regular physical activity, such as cycling, are recommended. During the COVID-19 pandemic, Jakarta citizens were more aware of the importance of exercise. The bicycle community has experienced this phenomenon (Budi et al., 2021; Buehler & Pucher, 2021; Kraus & Koch, 2021; Nikitas et al., 2021). Both small and large communities were represented. Cycling is one of the most expressed ways of recreation, the purpose of the cyclist is not only for sports, but many

people use the bicycle as a transport daily tool for going to the job as a healthy way of physical activity (Biernat et al., 2020; Fioreze et al., 2019; Rérat, 2019). According to Bixhaku et al. (2017), cycling is: fun, economical, ecologic, safe and healthy and improves the quality of life. Cycling in the cities is a more effective and ecological way. Various assessments of the impacts of bicycling on levels of physical activity, obesity rates, cardiovascular health, and morbidity have concluded that cycling is a healthy activity (Oja et al., 2011; Olmedillas et al., 2012; Sá et al., 2016).

One of the problems of using bicycles as a mode transportation in Jakarta is the lack of infrastructure facilities, the necessary infrastructure for the cyclist was not properly addressed (Feng & Dibben, 2018). If there is no special lane for bicycles, then cyclists join other vehicles, this will be dangerous for cyclists (Okraszewska, 2019), (Figure 1).



Figure 1. Lane of bicycle on Pemuda Street

It is known that Jakarta has several special bicycle lanes, both on sidewalks and roads. The length of these bicycle lanes will remain limited (Sunandar & Tia, 2020). The limited amount of infrastructure, such as signs, road markings, street lighting, and information boards that are poorly maintained, is a condition of the area. One of the bicycle lanes on the roadways is on Pemuda Street, East Jakarta (Figure 2).

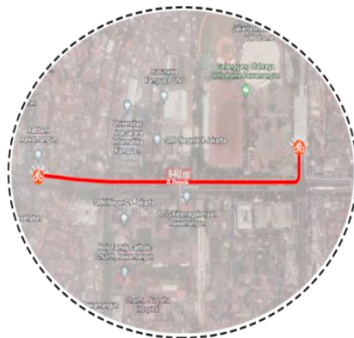


Figure 2. Location of Research

This lane is often used by cyclists because this lane is close Velodrom, designed and built by the DKI Jakarta Provincial Government to make it easier for cyclists. However, in reality, the bicycle lane is often used by motorists because there is no dividing lane. In addition to the above factors, other factors reduce cyclists' desire to use the special route. Therefore, this study was conducted to determine what factors influence the desire of cyclists to use a particular bicycle lane on Pemuda Street, East Jakarta.

The research (Bixhaku & Sopi, 2018) showed that the quality of facilities strongly influences respondents' assessment, followed by perceptions of reliability, convenience, accessibility, and

security. On physically separated bicycle lane, bicyclists' perception of comfort was mainly influenced by road geometry and surrounding physical conditions. In the case of on-street bicycle lanes, bicyclists paid attention to the practical riding space and traffic conditions.

The results of this research are expected will be of interest to promote cycling on the road as an ecological and sustainable form of transport.

## II. RESEARCH METHOD

Descriptive research was used in this study, and the research design used is causal and conclusive, namely research by distributing questionnaires and testing the independent variables on the dependent variable using multiple linear regression (Albi, 2020; Hermawan, 2021).

The number of independent variables was 6 (six), representing the factors in determining the desire of cyclists to use bicycle lanes (table 1). The dependent variable is the desire of cyclists to use the bicycle lane on Jalan Pemuda, East Jakarta (Y).

The type of data used is interval data with the Successive Interval Method. The measurement scale technique uses a Likert scale with statements in 5 answer categories, consisting of (1 = strongly disagree, 2 = disagree, three = do not know, 4 = agree, and 5 = strongly agree) (Douven, 2018; Joshi et al., 2015). The data source of this study used primary data, which were obtained through questionnaires distributed to cyclists who used the route on Pemuda Street, East Jakarta. The sampling method used in this research was purposive sampling. Respondents sampled were cyclists who used the bicycle lane at least 2 times on Pemuda street in East Jakarta. The number of samples studied was 103 samples. The data analysis technique used in this study was multiple linear regression.

**Table 1** Independent variables

Bicycle lanes are easily reached from home ( $X_1$ )
Road markings of bicycle lanes are not visible or peel off ( $X_2$ )
Bike lanes are being misused for other things, such as temporary car parking ( $X_3$ )
There are adequate traffic lights around the bicycle lane ( $X_4$ )
There is available bicycle parking space on the bike path ( $X_5$ )

There is a sign prohibiting parking on other modes at the bicycle path ( $X_6$ )

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6$$

Which is:

$Y$  = the desire of cyclists to use the bicycle path

$b_0$  = Constant

$b_1$ - $b_6$  = independent variable regression coefficient

$X_1$  = bike path easy to reach

$X_2$  = the boundary line is no longer visible

$X_3$  = bicycle lane abuse

$X_4$  = good traffic light

$X_5$  = bicycle parking available

$X_6$  = there are signs prohibiting parking for other modes.

### III. RESULT AND DISCUSSION

There are many reasons why cyclists use bicycle lanes.

#### 3.1 Demographic Characteristics Of Respondents

The demographic characteristics of respondents (n=103) are according to Gender and Age.

##### a. Gender

The most number of participants, 55 men, represented 53% of the entire group, while women accounted for 47% of the total.

##### b. Age

All respondents were split into five different age groups, displayed in Table 1. These age categories include all respondents aged under 15, 15 to 35, 36 to 45, and more than 45 years old.

Table 1. Age of the respondents

Respondents' age (years)	Percentage (%)
under 15	6
15 to 25	45
26 to 35	24
36 to 45	19
more than 45	6

Based on the data in table 1, most respondents (45%) are between the ages of 15 to 25. The fewest respondents were in this age demographic (6%), ranging from 15 to 45 years old.

#### 3.2 Profession

As shown in Table 2, respondents come from many different backgrounds and professions, including those working in the public and private sectors as public employees or entrepreneurs.

Table 2. Profession of respondents

Profession	Percentage (%)
student	15
university student	22
public employees	1
private employees	35
Entrepreneurs	15
others	12

Most respondents worked in the private sector (35%), followed by those studying in higher education institutions, and those in the last position are those working in the public sector (see table 2).

#### 3.3. The Reason for Bicycling

There are various reasons to ride a bicycle, including commuting to work, developing hobbies and interests, participating in recreational activities, and going to school. The results of the survey show that the most common reason for bicycle riding is to gain practical experience (66%), the second most common reason is to participate in a hobby (18%), and the basis with the slightest common sense is to commute to work (1%). These results are shown in Table 3.

#### 3.4. Cycling Duration

As seen in Table 4, their time spent cycling varied from less than 10 minutes to more than 30 minutes.

Table 4. Cycling duration

Duration (minutes)	Percentage (%)
less than 10	1
10 to 20	31
20 to 30	40
more than 30	28

Most respondents ride bikes for between 20 and 30 minutes, and the shortest time is less than 10 minutes.

### 3.5. Cycling Period

Table 4 shows each respondent who has used a bike at different times during different months.

Table 5. Cycling period

Period (in monthly)	Percentage (%)
1 to 3	61
4 to 6	29
7 to 12	6
more than 6	4

Each respondent has a varied monthly period for which they can report. The range between one and three times per month represents the most significant percentage of the total monthly periods. Based on Table 5, the period with the lowest percentage is more than six different periods.

### 3.6. Validity and Reliability Test

Table 6 shows seven independent variables (X) that can be used to rate the research instrument test.

Table 6. Validity test of the independent variables (X)

Variable s	rxv (r count)	r table (df 6; 5% )	Status
X1	0.77951276 1	0.7067	valid
X2	0.78990312 6	0.7067	valid
X <sub>3</sub>	0.78137509 2	0.7067	valid
X <sub>4</sub>	0.80356667 9	0.7067	valid
X <sub>5</sub>	0.82421102 5	0.7067	valid
X <sub>6</sub>	0.72602884 5	0.7067	valid
X <sub>7</sub>	0.32815718 2	0.7067	invalid

After testing the validity of all variables, it is discovered that only six independent variables are valid (r\_count is more significant than r\_table), and X7 is invalid. After testing the reliability of the seven independent variables, the Cronbach Alpha value of each independent variable was found to be 0.879, which meant that all seven independent variables were reliable.

Table 7. The result of the Reliability test

Rxy	0.878847093
Reliability	very high

Because the Alpha Cronbach value was relatively high (Rxy = 0.879), it can be determined that the correlation of all of the independent variables (X) had a solid linear relationship with the dependent variable (Y).

### 3.7. Multiple Regression Analysis

Multiple linear regression is a method used to figure out how different things affect bikers who use bike lanes. The equation for the equation of linear regression looks like this:

$$Y = 0.185 + 0.035 X_1 - 0.087 X_2 - 0.007 X_3 + 0.456 X_4 + 0.302 X_5 + 0.251 X_6$$

If all of the independent variables remain the same, the multiple linear regression equation will yield a positive answer of 0.185 for the result of the constant.

The value of the regression coefficient for the bike path that is easily accessible is 0.035, t\_count = 0.484, and sig (α) = 0.675, all of which are greater than 0.05. This indicates that the variable has a significant impact on cyclists' desires. According to these results, the number of cyclists who want to use the bike lane increases by 3.5% for every ten percentage point improvement in its accessibility.

The linear regression coefficient on the path boundary variable is -0.087, t count = -0.466, and sig (α) = 0.642, which is larger than 0.05. This research shows that bikers are less willing to use the bike lane 8.7%, when the bicycle boundary line is not visible.

The linear regression coefficient for the path variable misused as a parking lot for other modes is -0.007, t\_count = -0.76, and sig (α) = 0.940 greater than 0.05. These results indicate that the greater the abused lane, the lower the cyclist's desire to use the bicycle lane by 0.7%.

The regression coefficient for the variable representing the traffic light equipment is 0.456, the t\_count is 4.281, and the sig (α) value of 0.000 is less than 0.05. Based on these studies, the number of traffic lights in an area resulted in a 45.6% increase in cyclists who desired to use bicycle lanes in that area.

The regression coefficient for the variable related to bicycle parking is 0.302, the t\_count value is 2.795, and the sig (α) value of 0.042 is less

than 0.05. According to these results, the proportion of cyclists who want to use bicycle lanes increases by 30.2% for every additional bicycle parking space that is made accessible.

The parking prohibited signs (other modes) variable has a regression coefficient of 0.251, a  $t$ -count of 2.101, and a sig ( $\alpha$ ) value of 0.038, which is less than 0.05. This indicates that the significance level is low. According to these results, the percentage of cyclists who want to utilize bicycle lanes increases by 25.1% if there is an increase in parking prohibition signs.

According to the other research, Bixhaku et al. (2017) concluded that the results of their study could assist inform the design and planning of cycling infrastructure. Engineers, urban planners, and those who work in public health are interested in learning how the environment can support cyclists and how increasing cycling activity may affect environmental and public health. Therefore, those responsible for urban planning and infrastructure development, such as engineers and planners, will find valuable information regarding plans for developing cycling infrastructure.

Because there are not enough good bike lanes, specific individuals would ordinarily ride bicycles but have decided not to do so alternatively.

Biking is made more dangerous by a lack of signaling and by motor traffic. The findings of their study will be of interest to promote riding on the road as an environmentally friendly and sustainable mode of transportation. Additionally, the results can serve as a resource for urban planners who are creating urban planning to take into account the building of cycling infrastructure and safety conditions for accommodating cyclists in the urban road network

### **3.8 Cycling is a Healthy Activity**

Bicycles do not consume fuel and do not produce carbon emissions. Bicycles have a reputation for being a healthy mode of transportation that is also highly efficient. Cycling may minimize pollution, which can lower the amount of global warming that occurs on earth. This is possible because cycling can reduce the number of lead pollutants produced by 5 million motor vehicle exhausts by 1200 tons per year. The relevant authorities should make a more significant effort to discourage and take enforcement action against risky conduct exhibited by motorists, and they should prioritize this work. It is possible to

reduce fuel consumption, which will positively impact the environment, and people will save money doing so. Furthermore, it has the potential to ease traffic congestion in the metropolis.

## **IV. Conclusions**

The following is a conclusion that can be drawn from the results of the results and findings:

- a. Most cyclists in the East Jakarta region are men, the average age range is 15 to 25 years old, and the vast majority are employed in the private sector.
- b. Individuals who pedal bicycles for recreation typically do so anywhere from once to three times per week, for twenty to thirty minutes at a time, alone, without displaying rash behavior, respecting traffic signs and road markings, and wearing protective gear at all times. They also limit their speed to no more than thirty miles per hour.
- c. On Pemuda Street in East Jakarta, the availability of good traffic lights is the factor that influences the desire of cyclists to use bicycle lanes the most, while the availability of no parking signs is the factor that has the most negligible effect on this desire.
- d. Cycling at the velodrome is one of the attractions for cyclists to conduct other sports activities, such as jogging and bike riding, so according to field observations on Pemuda Street. Other sports activities include cycling at the velodrome.

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