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CYCLIST CLASS IN JAKARTA DURING THE COVID-19 PANDEMIC BASED ON CYCLING BEHAVIOR AND FACILITY PREFERENCES

Citra Widyaningrum[1*], Yori Herwangi[1], Ogawa Keiichi[2]

[1] *Department of Architecture and Planning, Faculty of Engineering, Universitas Gadjah Mada, Yogyakarta, Indonesia*
[2] *Graduate School of Science and Engineering, Ritsumeikan University, Shiga, Japan*

ABSTRACT

The Covid-19 pandemic affects many aspects, including transportation. Campaigns to reduce social distance have changed people's daily travel behaviors. Moreover, increased health awareness leads to increased bicycle usage, including in Jakarta. However, the lack of proper bicycle lanes along the road in Jakarta makes cyclists unsafe. Therefore, the Bicycle Level of Service method uses to evaluate the feasibility of a section of the bicycle lane in South Jakarta. As the number of cyclists in Jakarta grows, so do their characteristics. The diversity of cyclists may also reveal facility preferences. Hence, the Latent Class Analysis is carried out to determine a cyclist's class likelihood. A sample of bicycle users in Jakarta and its surroundings was studied using descriptive quantitative analysis. Lastly, this study performed the cross-tabulation analysis to examine the relationship between cycling classes in Jakarta and the preferences on cycling facilities during the pandemic. The study results indicate that daily mobility in Jakarta changed during the pandemic, with an increase in bicycle users and the emergence of three cyclist classes: Recreational, Sport, and True. In addition, the feasibility evaluation of the existing bicycle lane shows an increase in the bicycle level of service since the time prior to the pandemic.

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***Corresponding Author**

Citra Widyaningrum
Universitas Gadjah Mada
Email:
citra.widyaningrum@mail.ugm.ac.id

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1. Introduction

During the Covid-19 pandemic, cities worldwide implemented health protocols to prevent virus spread. For example, some countries have closed schools and restaurants while others have encouraged work-from-home systems. These actions are known as "social distance" and particularly effective for infections like COVID-19 that are spread by respiratory droplets and necessitate close human contact (Wilder-Smith and Freedman, 2020).

Due to reduced activities outside the home, the social distance may reduce travel demand (Vos, 2020) and vehicle traffic volume (Vingilis et al., 2020). The effect of social distance also affects people's transportation choices. People will avoid public transportation to avoid direct contact with others (Troko et al., 2011). Transport such as subway plays a role in virus transmission in densely populated areas (Zhang et al., 2021).

The campaign's implementation limits travel and require each country's government to impose travel restrictions. Short trips like walking and cycling will increase as travel restrictions increase (Vos, 2020). Policymakers and transportation planners can help promote walking and cycling by temporarily allocating less-used street space for these activities (King and Krizek, 2020).

The Covid-19 crisis has significantly altered people's mobility habits, reduced the use of aviation and public transportation while increased bicycles (Sung and Monschauer, 2020). As a result, cycling has become a simple mode of transport that allows travelers to maintain social distance.

The DKI Jakarta Provincial Government reduces public transportation capacity during Large-Scale Social Restrictions (PSBB) (DKI Jakarta Provincial Governor Regulation Number 33 of 2020). This policy encourages people in Jakarta and its surroundings to cycle. From October 2019, or when the bicycle lanes were optimized until June 2020, there was a tenfold or 1,000 percent increase in bicycle riders in Jakarta, according to ITDP Indonesia's annual cycling survey. Dukuh Atas (from south to north), specifically Bundaran Senayan to Bundaran HI, increased by over 1,000%, from 21 to 235 bicycles during morning rush hour. Gelora Bung Karno's (south to north) saw a 93% increase, from 129 to 249 cyclists (KumparanNEWS).

According to Dr. Michael Roshon, riding bikes outside

during the Covid-19 pandemic poses little risk of infection (Bicycle Colorado, 2020). However, Dicky Budiman, an epidemiologist at Griffith University, says cyclists in a pandemic should wear a mask, keep a 1.5 meters distance, and wash their hands (Dzulfaroh, 2020).

Many countries support bicycle infrastructure to encourage outdoor activities and make it easier for commuters that do not want to use public transportation or drive. Technically, some of these new bicycle infrastructures are temporary. However, it is hoped that the network's popularity and success will continue.

Like other major cities, Jakarta adds a "pop-up" bicycle lane on Jalan Sudirman and Jalan Thamrin. Pop-up bike lanes are said to relieve public transit and roads (Intellegent Transport, 2020). The bicycle lane is intended for bicycles and electric bicycles, according to Governor Regulation 128 of 2019. A scooter, hoverboard, or unicycle can also cross this path.

According to the Transportation Agency, the bicycle lane will be 63 km long by early 2020 (two directions). The construction of the bicycle path has three phases. Jalan Medan Merdeka Selatan, MH Thamrin, Imam Bonjol, Pangeran Diponegoro, Proklamasi, Pramuka, and Jalan Pemuda are included in the first phase. The second phase includes Jalan Jenderal Sudirman, Sisingamangaraja, Panglima Polim, and RS Fatmawati Raya. Jalan Tomang Raya, Cideng Timur, Kebon Sirih and Matraman Raya, Jatinegara Barat and Jatinegara Timur are included in the third phase. The targets for 2021 and 2022 are 84.6 km and 89.1 km, respectively. The total length of the bicycle lane to be built from 2020 to 2030 is 578.8 km.

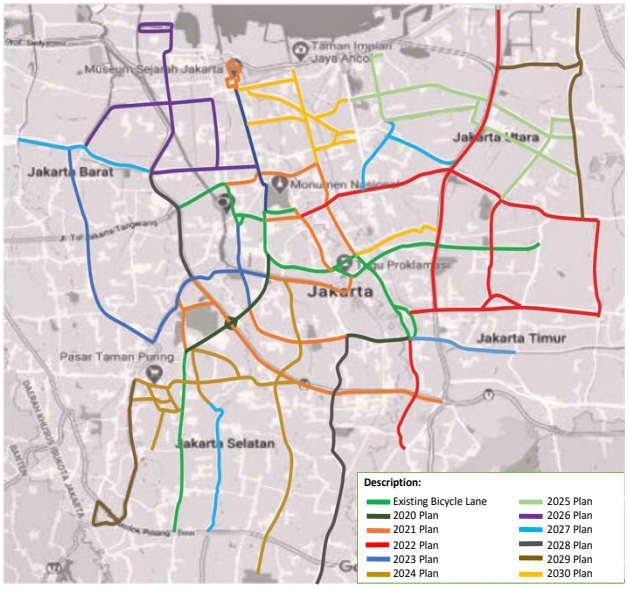

Figure 1. Bike Path Development Plan of DKI Jakarta 2019-2030
Source: Transportation Agency of DKI Jakarta Province, 2020

The consideration of bicycle lanes selection is based on the first-mile network, last-mile network, tourist areas, networks connected to existing bicycle lane networks, arterial paths, and protocols that are part of road sections with odd-even regulations and high vehicle volumes and speeds.

An eco-friendlier lifestyle promotes behavior change in transportation (Artiningsih, 2011). For example, taking public transportation or non-motorized transportation such as bicycles is an environmentally friendly option. According to a Jakpat report, mountain bikes were the most common bicycle used by Jakartans during the pandemic (59%). Whereas exercise bikes (32%) and city bikes (21%), BMX bikes (17%), road bikes (13%), fixie and touring (10%) are the most commonly used bikes (Christy, 2020).

In their journal, Griswold et al. (2018) discussed three types of cyclists: neighborhood, urban, and fitness. The journal states that every cyclist has different preferences for bicycle facilities. Diversification of cyclists could help understand cyclist preferences. While Portland, Oregon identified four types of cyclists based on their interest in cycling for transportation: “the strong and fearless,” “the enthusiastic and confident,” “the interested but concerned,” and “no way, no how” (Dill, 2013).

The people of Jakarta's mobility are severely limited due to the Large-Scale Social Restrictions (PSBB). As a result, people prefer driving to taking public transportation. Overall, public transportation passenger numbers fell significantly in January 2020 (Luthfiyah and Miro, 2020). There has also been an increase in health awareness, which has increased cycling.

There is a polemic and friction on the road between motorized and bicycles as cycling activity grows. The lack of bicycle lanes and unprotected existing bicycle lanes are some of the issues cited. According to Ravenscroft (2004), issues of perception and infrastructure, traffic management, road maintenance, and the threat of accidents due to mixed traffic still limit public participation in bicycling use today. The current bicycle lane construction has some flaws, and bicycle parking spaces in urban areas are still scarce and expensive (Artiningsih, 2011). The lack of separation on the road means that cyclists in Jakarta generally feel unsafe and uncomfortable. Safe bicycle parking in public places is also a problem for cyclists.

Consider the sustainability of bicycle lane routes planned based on community behavior and travel needs to integrate social, economic, and cultural factors (Artiningsih, 2011). Deficits in crossing signs and lights, particularly at intersections, can reduce cycling safety and comfort.

As the number of cyclists in Jakarta grows, so does their profile. When planning road infrastructure, cyclists' diversity must also be considered (Griswold et al., 2018). Diverse categories of cyclists often have distinct preferences for riding facilities. A person's or movement actor's characteristics influence travel classification; according to Tamin (2000), society's movement is closely linked to transportation modes. It is common for cyclists in Jakarta to cycle in groups, disrupting other road users (Dzulfaroh, 2020).

2. Literature Review

Jakarta, like several other large cities worldwide, saw changes in travel behavior during the pandemic. Travel behavior is the process of making complex decisions about a trip, such as the destination, mode of transportation, route, and departure time (Li et al., 2019). Axhausen (2007) defines travel behavior as the study of unusual human movements for any reason.

Numerous factors, including household characteristics,

the built environment, and mode of transportation, can influence travel behavior patterns (2017 National Household Travel Survey, 2019). Other studies have found a link between mobility and virus spread (Shakibaei et al., 2021). Work from home systems for several offices have increased in almost all countries. As a result, fewer people used public transportation, while more people drove. However, active modes like walking and cycling have grown in popularity.

A travel behavior survey is required to obtain Jakarta's mobility changes during the pandemic. Similar to Shakibaei et al. (2021), they compared travel behavior prior to and during the pandemic by comparing activity patterns, travel frequency, and modes of transportation over a week.

2.1 Bicycle Activities

Due to the decline in public transportation use during the pandemic, community mobility shifted to private vehicles. Urban mobility is essential to a city's resilience to epidemics. Cycling is a resilient urban mobility system (ITDP Indonesia, 2020) and one of the daily activities that are determined by the first departure from home (origin) to the last return (Axhausen, 2007).

The Federal Highway Administration (1992) in Dill et al. (2008) describes three factors that can directly or indirectly influence cycling behavior. The first is the objective or environmental factor, which includes cycling infrastructure. The second is subjective, relating to individual perceptions and behaviors about cycling and the environment. Finally, demographic factors include age, income, gender, and health.

Griswold et al. (2018) compared facility preferences and evaluated responses to open-ended questions to understand cyclist preferences better. Suitable bicycle infrastructure requires multiple riders' experience with various built environments. Based on the previously proposed journals, this study formulates several preferences on cycling facilities. These attributes' variables are adjusted for Jakarta's cycling conditions.

According to Hanson & Hanson (1977), one factor that is believed to have a significant impact on bicycle use as a mode of transportation is the weather. Temperature and cloud cover influence daily bicycle trips. Jakarta is also located in the tropical zone, affecting the air temperature. Therefore, bicycling is more complex and energy-intensive in the dry season than in the rainy season (Suhardi et al., 2018).

In order to increase the use of bicycles as a daily mode of transportation, it is essential to consider the barriers. Cycling barriers are factors that prevent cycling (Manaugh et al., 2017). Understanding why people cycle or not is hoped to be a bridge to facilitating people's desire to cycle. Climate and hilliness are some of the issues that affect cycling (Parkin et al., 2007; Gonzalo-Orden et al., 2014). Long-distance travel on a bicycle is also a deterrent. Jakarta's tropical climate causes cyclists to sweat easily. Convenience and climate, like cycling, are deterrents (Piatkowski et al., 2015). Perception of risk in heavy traffic is also a deterrent for inexperienced cyclists.

Bicycles are efficient alternatives to cars for many reasons, including convenience on short routes and flat areas (Kamiyama, 2003). However, an existing cycling route would not be adaptable to different users or purposes. In promoting comprehensive bicycle network planning, it is necessary to understand the determinants of bicycle routes' choices to increase the number of bicycle users. Per Stinson and Bhat (2003), bike lanes or paths separated from traffic are essential factors influencing commuter cyclists' route choices. It recommends separating bicycle lanes with bollards or vegetation and direct routes that connect all land uses (Hull et al., 2014).

When designing bicycle lanes, consider how cyclists move from point A to point B. It depends on the purpose and mode of transportation used by each individual. Thus, origin-destination studies help plan transportation routes (Shields, 2020). Other than cycling, some cyclists choose to continue their journey by bus or train. Cycling and public transportation are complementary modes of transport. Using public transportation by bicycle saves time (Kager and Harms, 2017 in Veryard and Perkins, 2018).

Bicyclists in Jakarta tend to ride in groups (Dzulfaroh, 2020), which affects the proportion of bicycle lanes. A typical bicycle lane can only accommodate one or two cyclists. However, using the lanes at different speeds will cause issues. Cycling in a row and at different speeds often disturbs other road users. Tino Latuheru, a professional road cyclist, says cyclists are safer in groups and move quickly (Pinandhita, 2021). So, before designing a bicycle lane, planners should know the users' habits.

2.2 Bicycle Level of Service

There are several ways to measure the existing path for bicycle comfort and safety. According to Klobucar and Fricker (2007), the Bicycle Compatibility Index (BCI) and Bicycle Level of Service (BLOS) are the two most commonly used methods for assessing bicycle facility safety. The Transportation Research Board's new Highway Capacity Manual (HCM) also includes a Bicycle Level of Services (BLOS) approach for measuring bicycle traffic's perceived comfort and safety. So, the BLOS method was chosen for this study's analysis. This study will also test the BLOS attribute on a sample of Jakarta residents to see if it is appropriate and can be implemented in Jakarta.

To enrich the type of BLOS attributes in this study, the attributes of the BLOS and other methods are combined into three groups.

Table 1. Three Groups for the Level of Bicycle Lane Service

Attribute Code	Supporting Factors for Safe and Comfortable Cycling
A. Bicycle Lane Facilities	
A1	Width of Bicycle Lane
A2	Width of Shoulder
A3	Presence of Curb or Physical Median
A4	Bicycle Parking
A5	Pavement Condition
A6	Lighting
A7	Bicycle Signage or Presence of a Marked Area for Bicycle Traffic
A8	Traffic Calming Features
A9	Bike Box
A10	Dashed Intersection Bicycle Lane
A11	Connectivity of Bicycle Lanes

B.	**Geographical Condition of the Road**
B1	Road Elevation
B2	Storm Drain Grates
B3	Frequent Curve
B4	Left-turn Volumes
C.	**Neighborhood and Environmental Factor**
C1	Width of Outside Lane
C2	On-street Parking
C3	Vehicle Traffic Volume
C4	Number of Lanes
C5	Speed Limit
C6	Percent Heavy Vehicles
C7	Adjacent Land Use
C8	Restricted Sight Distance
C9	Bus Facilities
C10	Vegetation or Green Space
C11	Signalized Intersection or Crossing Traffic

2.3 Latent Class Analysis

Transport planners should better understand cyclists' needs (Motoaki et al., 2015). Because not only the Level of Service is required, but also the preferences of various cyclists. Griswold et al. (2018) used a latent class choice model to measure the level of bicycle service. Observable cyclist characteristics determine class membership. Lazarsfeld developed latent Class Analysis in 1950 to develop typologies (or groupings) based on dichotomous observed variables (Vermunt and Magidson, 2004).

3. Research Method

To achieve the objective of the research, this study conducted a Bicycle Level of Service Survey based on experience and behavioral characteristics of cyclists. The respondents were cyclists in Jakarta and the surrounding area. Pre-test sample sizes of 30 or more are preferred to achieve a reasonable power to detect reasonably common problems (Perneger et al., 2014).

For the first and second objective, to find out the changes in people's mobility and to evaluate the feasibility of an existing bicycle lane behavior during the pandemic, descriptive quantitative analysis was needed. And then, for the third objective, to examine the relationship between the Cyclist Class and Cycling Facility Preferences during the pandemic, first thing to do was to identify the characteristics of cyclists in Jakarta by classes through the Latent Class Analysis method. Afterward, the Cross-Tabulation Analysis between Cyclists Class and Bicycle Activities during the pandemic was conducted.

The initial stage of this research was to conduct a preliminary study on the existing bicycle lanes on Fatmawati – Panglima Polim route to find out what attributes match the characteristics of the bicycle lanes in South Jakarta. A combination of Bicycle Level of Service attributes and other attributes was performed by categorizing these attributes into three groups (Table 1).

The Bicycle Level of Service Survey evaluates an existing bicycle lane during the pandemic. The Fatmawati – Panglima Polim bike lane in South Jakarta was evaluated. The bicycle lane was chosen as an evaluation material because it was close to residential areas and was an odd-even area for motorized vehicles. Also, the required attributes are the highest score results from the preliminary study.

The survey then asks about cyclist characteristics. This survey seeks to identify Jakarta's cyclists and will be analyzed using Mplus Software's Latent Class method. The latent class analysis seeks to classify people, identify and describe classes. The LCA results can be used to improve bicycle service levels based on cyclists' preferences.

4. Results and Discussions

4.1 Preliminary Study

An initial 30 respondent study revealed 14 attributes that can help improve cyclists' safety and comfort in Jakarta. A new attribute was identified due to the open-ended question in this preliminary study survey: 'Additional Bicycle Facilities.' Additionally, temporary bicycle shelters equipped with bicycle workshops, public restrooms, changing rooms, and locker facilities are mentioned in this preliminary study. According to Hull and O'Holleran (2014) in Urban, Planning, and Transportation Research, end-of-route facilities such as showers and bike storage should be considered when designing cycle infrastructure.

4.2 User Experience Analysis

The results show that 77.9% of respondents are male. Most cyclists are in the age range of 25 to 34 years (40.6%) and work as civil servants and private employees (38.8%). Bicycles are becoming more popular in homes. According to data collected before and during the pandemic, almost every household has three or more bicycles. During the pandemic, daily modes of transportation changed. While car use increases, the pandemic effect increases bicycle use. Changes in transportation modes are driven by health and safety concerns. During this pandemic, bicycling has increased to twice weekly. Some of it is cycling five times per week. They usually ride bikes for exercise, but a few ride bikes for work and socializing. Cycling in the morning can cover over 20 km during the pandemic, and the number of cyclists participating in the Cycling Community has increased.

4.3 Bicycle Level of Service Analysis

Bicycle signages are already installed on the Fatmawati – Panglima Polim route to inform other road users of the whereabouts of cyclists on this route based on the results of the feasibility evaluation. Although the Fatmawati – Panglima Polim bicycle lane is still uneven due to utility holes, the survey results show that the bicycle lane is sufficient. A bicycle sign crossing line is also available at the Fatmawati – Panglima Polim intersection. The 1.5-3-meter-wide bicycle lane and street lighting along the route also help cyclists. Although bicycle parking is limited as of now, cyclists can easily park their bikes at MRT stations. They will then be able to continue their journey using other modes of transport. The Fatmawati – Panglima Polim route has well-connected bicycle lanes with bicycle facilities like cafes for cyclists to rest. Because the Fatmawati – Panglima Polim route is an odd-even area, the number of heavy vehicles passing through this route does not increase (less than 50%). The pandemic also has limited mobility. The route also has greenery in the form of pots or shrubs on the roadside. However, the survey found that the bicycle traffic

sign at the Fatmawati – Panglima Polim intersection is inadequate.

4.4 Latent Class Analysis

The first step in LCA is identify the LCA indicator. Identifying the indicator is by determining the indicators or items to measure and identify cyclist behavior and the type of class that is likely to have.

Table 2. Latent Class Indicator

No	Item Label
Item 1	I use a bicycle as the main means of transportation
Item 2	I use a bicycle as a means of exercising
Item 3	I participated in the bike community
Item 4	I can bike at night
Item 5	I will only use the bike if the weather is good
Item 6	I can bike in a high traffic
Item 7	I can only cycle on a separate track with a motor vehicle

Second step is estimating the LCA Models. To determine the most appropriate number of latent classes, four kinds of class modelling were made. There are 2-class model, 3-class model, 4-class model and 5-class model, and run the syntax command for each class in the Mplus program.

```
INPUT INSTRUCTIONS

   TITLE:    Latent Class Analysis for Cyclists;
    DATA:     FILE IS C:\Users\kogawa\Documents\CITRA\Thesis\7
Item_2Lab\LCA_7item_2.txt;
    VARIABLE:
    names           = id item1 item2 item3 item4 item5 item6 item7;
    usevariables    = item1 item2 item3 item4 item5 item6 item7;
    categorical     = item1 item2 item3 item4 item5 item6 item7;
    classes = c(2);
    Analysis:
      Type=mixture;
    Plot:
      type is plot3;
      series is item1 (1) item2 (2) item3 (3) item4 (4) item5 (5)
      item6 (6) item7 (7);
    Savedata:
      file is lca2_save.txt ;
      save is cprob;
      format is free;
    output:
      tech11 tech14;
```

Figure 2. Syntax for 7 Items with 2-Class Model

Source: Mplus Analysis, 2021

The output generated from the Mplus program will then be evaluated. By determining the best number of classes by looking at the results of BIC, ABIC, LMR, and Bootsrap LRT. The smallest BIC or ABIC will be the chosen model. To ascertain further the number of classes used, evaluation through LMR and Bootstrap LRT was carried out. The p-value states that the 3-class model is significantly better than the other class model.

Table 3. AIC, BIC, and ABIC Values

LCA Models	AIC	BIC	ABIC
2-Class	1993.042	2047.618	2000.053
3-Class	1861.883	1945.565	1872.633
4-Class	1852.466	1965.255	1866.955
5-Class	1855.984	1997.880	1874.212

Table 4. Lo-Mendell-Rubin and the Bootstrap Likelihood Ratio Test

LCA Models	*p* for LMR	*p* for Bootstrap
2-Class vs 1-Class	0.0011	0.0000
3-Class vs 2-Class	0.0000	0.0000
4-Class vs 3-Class	0.0028	0.0000
5-Class vs 4-Class	0.0868	0.2667

The final step in LCA is interpreting the LCA Models. Class 1 as Recreational Cyclist, Cyclists that can only cycle on separate tracks with motorized vehicles and prefer to cycle with less heavy traffic. They only use the bike if the weather is good. Compared to other classes, cyclists in this class are the least cyclists who can cycle at night. Class 2 as Sport Cyclist who participate in the bicycle community. They use the bicycle as a means of exercising and are capable of driving in high traffic. Almost all of the cyclists in this class can cycle in mixed traffic. Class 3 as True Cyclist, generally use bicycles as their primary means of transportation and can cycle during heavy traffic in any weather. They can drive at night and ride a bicycle on the track along with motorized vehicles. However, compared to other cyclist classes, the cyclists in this class participate in the bicycle community the least.

4.5 Cross-Tabulation Analysis

4.5.1 The Cycling Activities and Cyclists Class

The results of the cross-tabulation analysis indicates that the number of bicycle users is dominated by men as much as 77.9%, and the most significant number of men are in Class 2. The number of female cyclists tends to be less, and the number of female cyclists is mainly in Class 1 as many as 32 respondents.

The age range of bicycle users also varied in each class. Cyclists aged 35-44 years dominate in Classes 1 and 2. Not only that, in Class 2, there are some cyclists over 65 years old. However, for cyclists in Class 3, the age of 25-34 years seems to dominate.

The types of work of the respondents also varied, from students to housewives. The bureaucrat and private employees almost dominate in all classes. Both has many respondents of 38.8%. Students are the smallest number of respondents in this survey; this was influenced by the source of respondents from cycling communities dominated by office workers.

Recreational Cyclists generally use cars as the primary mode of transportation used in daily activities (51.2%). They ride bicycles 1-2 times a week and usually use bicycles to exercise and leisure with a distance of fewer than 20 km. They also do not participate in the bicycle community. As many as 30.8% of Sport Cyclists can cycle three times a week. More than half of the class respondents use a bicycle to exercise and cycle for more than 20 km. Almost all cyclists in this class participated in the cycling community. As True Cyclists, they use bicycles as their primary transportation, usually in the morning. Cyclists in this class can cycle five times a week. Apart from exercising, they also used bicycles as a means of transportation to work and can cycle more than 10 km.

4.5.2 The Cycling Facility Preferences and Cyclists Class

Cross-tabulation was carried out to examine the relationship between the preferences on cycling facilities and cyclists' classes based on the user's perspective during the Covid-19 Pandemic. Several preferences on cycling facilities that can support and affect cycling activities include Weather Conditions, Bicycle Features, Bicycle Barriers, Origin to Destination, and Cyclist Companion.

Cross-tabulation analysis in SPSS software shows that the five factors above related to the class of cyclists were Cyclist Companions. In addition, the Chi-Square test also showed a significant level of 0.05, indicating that the Cyclist Companion and Cyclist Class variables are related. As many as 35.9% of bicycle users in Jakarta generally cycle in a small group of fewer than five people. It is not uncommon for them to cycle alone.

4.6 Research Findings

The study's findings indicated that bicycle usage increased during the pandemic, followed by a Bicycle Level of Service increase on the existing bicycle lanes. In addition, the increase in bicycle users during the pandemic resulted in the formation of three distinct groups of cyclists based on facility preferences.

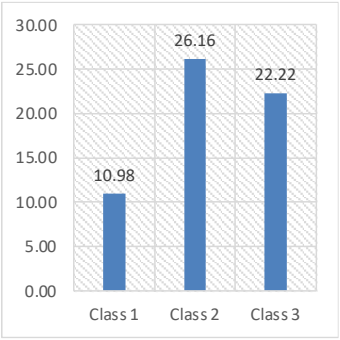

Figure 3. Proportion of Increase in Cyclists During the Pandemic
Source: Author Analysis, 2021

The largest increase in the number of cyclists during the pandemic occurred in Class 2 or Sport Cyclist by 26.16%. A total of 45 people out of 172 people changed modes of transportation from non-bikes to bicycles during the pandemic.

According to the findings of a study on facility preferences during the pandemic, cyclist companions show positive values that can influence people to cycle. This can be seen because the cyclist class and the cyclist companion both have an influence or relationship. The cyclist class will affect the number of bicycle companions. This shows that the number of cyclists in the cyclist companion will have an impact on increasing the bicycle level of service.

Table 5. Cyclist Class in Jakarta During Pandemic Based on Cycling Behavior and Facility Preferences

Class 1 Recreational Cyclist	Class 2 Sport Cyclist	Class 3 True Cyclist
- Bicycle for leisure - Separate track - Less heavy traffic - Good weather - Prefer not to cycle at night - Less than 20 km/day - Cycle 1-2 times a week - Cycle in small group	- Bicycle for exercise - Capable in mixed traffic - Good weather - More than 20 km/day - Cycle 3 times a week - Cycle in small to medium group	- Bicycle for transportation - Capable in heavy traffic - Any weather - Able to cycle at night - More than 20 km/day - Cycle 5 times a week - Single cyclist

5. Conclusion

The classification of cyclists in Jakarta during this pandemic is based on the findings of the study's interpretation using the Latent Class Analysis method, and the classification of these classes cannot encompass all possible classes. The research findings have implications for Jakarta's spatial planning, serving as input for future bicycle lane planning that takes behavioral cyclist characteristics into account as one of the transportation developments supports in Jakarta. This research is the initial result of the behavioral characteristics of cyclists during the pandemic, which is expected to be a further consideration in planning bicycle infrastructure to increase the number of cyclists in Jakarta in the future.

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