Modelling of Bicycle Use For Transportation Sustainability in Putrajaya

Permodelan Penggunaan Basikal Kearah Kelestarian Pengangkutan di Putrajaya

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ABSTRACT

This study aims to examine the modeling of the use of bicycles towards transportation sustainability by the community of the Federal Territory of Putrajaya. A total of 383 respondents from the Federal Territory of Putrajaya will be involved in this study. This study will use linear regression to identify the demographic relationship and bicycle use of Putrajaya residents. This analysis will be conducted using Statistical Package for the Social Sciences (SPSS) software. The results obtained show that gender, education level, economic status, age, monthly income, weather and distance have a significant effect on the frequency of cycling. In addition this study found that if a cycling facility is built completely in Putrajaya and 79% of Putrajaya residents agree to change daily transportation to active transportation.

Keywords: *bicycles, active transportation, facilities, modeling, frequency*

ABSTRAK

Kajian ini bertujuan untuk mengkaji permodelan penggunaan basikal kearah kelestarian pengangkutan oleh masyarakat Wilayah Persekutuan Putrajaya. Seramai 383 Responden dar Wilayah Persekutuan Putrajaya akan terlibat dalam kajian ini. Kajian ini akan menggunakan regresi linear untuk mengenalpasti hubungan demografi dan penggunaan basikal penduduk Putrajaya. Analisis ini akan dijalankan menggunakan perisian Pakej Statistik untuk Sains Sosial (SPSS). Hasil kajian yang diperolehi menunjukkan jantina, tahap pendidikan, status ekonomi, umur, pendapatan bulanan, cuaca dan jarak memberi kesan signifikan terhadap kekerapan berbasikal. Selain itu kajian ini mendapati bahawa jika fasiliti berbasikal dibina secara lengkap di Putrajaya dan 79% penduduk Putrajaya bersetuju menukar pengangkutan harian kepada pengangkutan aktif.

Kata kunci*: basikal, pengangkutan aktif, fasiliti, permodelan, kekerapan*

1. Introduction

Cycling is a healthy activity. That is the conclusion that can be drawn from the increasing number of scientific studies evaluating the effects of cycling on levels of physical activity, obesity rates and cardiovascular health. According to the MyHealth portal (Ministry of Health Malaysia) cycling is a safe and effective way to maintain health compared to pills and exercise in the gym. An increase in the rate of cycling will increase the low level of physical activity in a developing country thus the level of public health will increase (Buehler & Pucher 2017). In this regard, the government must play a role in the campaign and the provision of safe and suitable infrastructure for this activity. Consumption rates will certainly increase and further enhance transportation sustainability (Asli, Pajouh & Babamohamadi 2017).

Motorized transportation systems are no longer sustainable due to environmental pollution and lack of natural fuels. Based on the national transportation policy, 60 percent of the 87 million barrels of oil are used by the transportation sector worldwide. Motor vehicles, especially cars, are considered to be the most attractive mode of transportation and part of society is heavily dependent on cars. However, the increasing use of motor vehicles has caused many problems to the environment and health, which are related to greenhouse gas emissions, air pollution and noise pollution. Apart from these problems, dependence on motor vehicles also drives an inactive lifestyle, which is a major risk factor for non -communicable diseases (Xia et al. 2017). The use of motor vehicles by the local community is a factor that causes traffic and transportation problems are no longer sustainable which has a negative impact on health (Haslina et al. 2020). Berita Harian (2020) reports that active transportation contributes to the reduction of air pollution and active transportation can conserve the environment.

Thus , this study conduct to identify the tendency of the people of Putrajaya to cycle. Then to analyze the variables that influence the Putrajaya community to cycle and applying the method of modeling the use of cycling in the Putrajaya community.

2. Literature Review

Transportation sustainability is increasingly emphasized around the world, especially in Malaysia today. Passive or motorized transport is the choice of road users as the main choice compared to active transport. Acheampong (2017) states in his writing that the ownership and willingness to ride a bicycle is very low, and requires enlightenment about the motivations and barriers to cycling. The purpose of this study was to encourage for more cycling and to apply modeling of the influence of behavior on society for cycling. To apply the theory of planned behavior, the first method used was The salien belief elicitation survey was conducted to obtain the general perception of the population with respect to cycling to the workplace. A clear or assessable response is a response that comes to mind when a respondent is asked an open -ended question with respect to a behavior or action of interest**.**

Lack of availability of facilities for active transportation in an area and lack of community exposure to active transportation as noted in the study of Mat Yazid et al. (2017) who identified the factors that drive and hinder motor vehicles, applied the theory of planned behavior to study society's desire to use non-motorized vehicles and proposed urban design concepts for non-motorized vehicles.

Putrajaya is a developing city and is pursuing a strategic plan towards a green city by 2025. Various plans are underway, including increasing the number of cyclists and pedestrians by providing shady paths for cyclists and pedestrians. The plan also states that authorities need to play a role in ensuring the safety of children who cycle and walk to school (Ho, Matsuoka & Hashim

2012). Noor, Azlima & Rosmiza (2018) stated in their study that motivation is needed to encourage the use of cycling. This research has concluded that health factors are the main factors that motivate consumers to cycle. Cycling has various benefits to the community such as cost savings, improving the level of public health through cycling activities. Cycling is also able to prevent a number of chronic diseases and is able to reduce emotional stress for certain individuals and increase cardiovascular rates, cholesterol reduction and rheumatoid arthritis. Cycling can also plan schedule arrangements more accurately than using a bus for close distances. Infrastructure and safety are the main pillars to influence the community to cycle.

The Malaysian authorities began enforcing Section 42 of the Road Transport Act (APJ) 1987 in Putrajaya due to the increase in accidents and the number of cyclists. Pursuant to section 42 also every cyclist must have brakes, bells and lights. Cyclists in groups also cannot pedal across the road by pedaling in a row. Failure to comply with this law may result in a compound. Riders can also be prosecuted under Section 54 (1) of the Road Transport Act 1987 for reckless riding (Road Transport Act 1987)

3. Methodology

This chapter will describe about the research methods that will be conducted by the researchers who will carry out this research. This chapter also covers study design, data collection methods, sampling methods, research process and data analysis methods.

The design of this study is to use survey method. This study is a quantitative study. This study focuses on the research problems to gather data, gaining a high understanding of the study. Questionnaires were used as a method of data collection. The survey questionnaire is divided into two main parts, the first part is the personal information of the respondents. The second part is the part that contains questions to identify the tendency of the Putrajaya community to cycle. This second part contains questions that are divided into four parts.

This study is a quantitative study. The population of the Federal Territory of Putrajaya is 93,100 people consisting of 20 precincts with an area of 49 〖Km〗^2. Cluster sampling method is used based on 5 precincts of the Federal Territory of Putrajaya, namely Precinct 1, Precinct 5, Precinct 11, Precinct 13 and Precinct 18. The questionnaire was conducted using survey questions on all elements involved to all respondents. According to Krejcie & Morgan's (1970) table if the population is 93,100 people then the respondents needed to represent the group are at least 383 respondents then the sample size (n) is 383.

This study involved the collection of secondary data and primary data. Secondary data is the collection of data and information from existing sources. Primary data is a field survey method or data obtained directly from the study and not from previous studies. Secondary data consisted of data and information obtained from published and unpublished manuscripts. Published materials are such as journals, proceedings and newspapers. Unpublished manuscripts are like referenced websites, such as the E-Census website and the MyHealth portal. Secondary data were collected at an early stage of the study aimed at further refining the initial study. Primary data were obtained through field surveys. The survey method was conducted to identify the variables of the Putrajaya community to move towards active transportation. This method was conducted by distributing survey forms to the residents of the Federal Territory of Putrajaya.The respondents of the study included users who used active transportation in Putrajaya during the study period. Respondents were randomly selected in Putrajaya. Distribution of questionnaires was done online through Facebook, WhatsApp and Telegram applications. Respondents were explained about the purpose of the study on the sentences distributed along with the questionnaire form link.The data collected was analyzed using Statistical Package for the Social Sciences (SPSS) to obtain the results of the study

4. Results and Discussion

Demographic analysis of respondents was conducted on 383 respondents who are residents of Putrajaya selected at random. Respondents' demographics include the distribution and frequency of respondents based on gender, age, education level, economic status, monthly income, health level, mode of daily travel, distance to the place of focus and frequency of bicycle use. Table 4.1 below shows the total frequencies and percentages for each respondent background.

TABLE 1. Respondent demographic table

No	Category	Frequency	Percentage (%)
1	Gender		
	Male	163	42.6
	Female	220	57.4
2	Age		
	12 Years - 15 Years	6	1.6
	16 Years - 20 Years	18	4.7
	21 Years - 24 Years	132	34.5
	25 Years - 29 Years	89	23.2
	30 Years - 34 Years	49	12.8
	35 Years - 40 Years	50	13.1
	40 Years ke atas	39	10.2
3	Acedemic level		
	Does not go to school	0	0
	UPSR	6	1.6
	PMR or equivalent	0	0
	SPM or equivalent	6	1.6
	Diploma or equivalent	155	40.5
	Ijazah sarjana muda	170	44.4
	Ijazah PhD atau Sarjana	46	12
4	Economy status		
	Unemployed	37	9.7
	Employed	233	60.8
	Retire	6	1.6
	Student	107	27.9
5	Income		
	No income	106	27.7
	RM1 - RM1199	12	3.1
	RM1200 - RM2500	33	8.6
	RM2501 - RM4000	131	34.2
	RM4001 - RM5000	31	8.1
	RM5001 - RM10000	44	11.5
	RM10000 and above	26	6.8
6	Health level		
	Have chronic illness	25	6.5
	Don’t have chronic illness	358	93.5

8	Cycling frequency		
	1 - 2 times/week	111	29
	3 - 4 times/week	43	11.2
	5 - 6 times/week	13	3.4
	7 times or more/week	12	3.1
	Never	204	53.3

4.1 Gender

Cycling frequency was measured based on the influence of gender. A total of 42.6% of respondents were male, and 57.4% of respondents is the female gender. Researchers found that the percentage of male users who stated they ride bicycles per week higher than female users, which is 57.7% male users compared to 40% of users women. The results of the study found that gender has a significant effect on the frequency of cycling because 51.1% of male respondents who ride a bicycle more than 3 times a week and only 13.6% of female respondents who ride a bicycle more than 3 times a week.

4.2 Age

Cycling frequency was measured based on the influence of age, and outcome the study found that cycling frequency was significant. The percentage of adult respondents who are 21 years to 40 years old is the highest at 69.5%. As many as 44.7% of them ride bicycles. The percentage of respondents aged 12 to 20 years is the lowest 6.2%, and 100% of them ride bicycles. Respondents aged 40 years and above have 39 respondents and 30.8% of the respondents ride bicycles.

4.3 Academic level

Cycling frequency was measured based on the influence of education level, and outcomes the study found that cycling frequency was significant. The percentage of respondents with a university degree is the highest at 84.9%. As many as 46.7% of them ride bicycles. The percentage of respondents with a primary school degree is the lowest 1.5%, and 100% of them ride bicycles. Respondents with master's and PhD degrees had 46 respondents and 26% of those respondents ride bicycles.

4.4 Weather

Cycling frequency was measured based on the influence of weather, and results the study found that cycling frequency was significant. A percentage of respondents of 59.5% states that weather is the most influential factor for cycling. A total of 79.7% of respondents stated important factors in determining the use of active transportation and the possibility of cycling if weather factors can be overcome.

4.5 Income

Cycling frequency was measured based on factors influencing economic status. Results the study found that the economic status of respondents is significant to determine the frequency of cycling because 66% of respondents who have no income ride more than 1 time a week in residential areas

while 0% of respondents with income 10000 and above who cycling. For income below 5000, namely the B40 group, 42.6% of respondents cycled while for income of 5000 and above only 30% of the total respondents cycled.

4.6 Distance

Cycling frequency was measured based on the influence of distance, and results the study found that cycling frequency was significant. A percentage of respondents of 58.7% stated that distance is the most influential factor for cycling. This can also be seen from the percentage of respondents cycling at close range, which is 37.2% of the total respondents who ride a bicycle.

5. Conclusion

The main objective of this study was to identify the tendency of the Putrajaya community to cycle and identify the variables that influence the Putrajaya community to cycle. From the results, the following conclusions are drawn:
1. Gender affects the level of bicycle use.
2. Economic status plays a role on the level of bicycle use.
3. The level of education and exposure to transportation sustainability play a role on the level of bicycle use.
4. Age has a significant effect on the level of bicycle use
5. The level of health and weight affect the level of bicycle use
6. Destination distance plays an important role in determining the level of bicycle use.
7. Weather plays an important role in determining the frequency of bicycle use.
The results of this study suggest that facility improvements to reduce the influence of weather factors and accidents could attract more communities that will use active transportation. The distance between the house and the convenience store also plays a role because if the focal point is further away then fewer people will use active transportation. Disclosure of the importance of active transportation is also important to create awareness in the community.

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