UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, ATTITUDE AND PRACTICE RELATED TO THE USAGE OF MICROMOBILITY AMONG RESIDENTS IN CYBERJAYA

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BY

NUR IRDINA IZZATI BINTI JOMAIN

Thesis submitted in fulfilment of the requirement for the degree of Bachelor of Science in Environmental and Occupational Health with Honours from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

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ABSTRACT

KNOWLEDGE, ATTITUDE AND PRACTICE RELATED TO THE USAGE OF MICROMOBILITY AMONG RESIDENTS IN CYBERJAYA

NUR IRDINA IZZATI BINTI JOMAIN

Introduction: In order to solve the problems of air pollution produced by mobile transportation, especially in cities, micromobility transportation was invented. Micromobility is a lightweight vehicle used for short distance (8km) travel by one person. Micromobility is noted for enhancing public transit accessibility, lowering automotive emissions, and improving the environment. Because there is no research on micromobility knowledge, attitudes, and practises in Malaysia, it is uncertain whether all Malaysians are aware of the benefits and risks associated with micromobility.

Objectives: To determine the level of public knowledge, attitudes, and practices related to micromobility usage in Cyberjaya.

Methodology: A cross sectional study was carried out between October until December 2021 involving 400 respondents from Cyberjaya's residents using a convenience sampling. Online self-administered questionnaire has been distributed to the respondent. Data on the socio-demographics, knowledge about micromobility, attitudes towards micromobility, and practice of micromobility had been collected. Descriptive analysis, and Chi-square analysis had been used for data analysis by using SPSS.

Results and Discussion: The median knowledge score was 7.00 (IQR=2.0). Result shows that majority of the respondents (79.5%) had good knowledge on micromobility, and a less than a quarter of the respondents (20.5%) had poor knowledge. The median attitude score was 6.00 (IQR=2). About half of the respondents (54.8%) have positive attitude toward micro-mobility usage, and another half of the respondents (45.3%) had negative attitude about micromobility usage. Favourable attitude was among those aged <35 years old.

Conclusion: Study participants preceded good knowledge. However, positive attitude and good practice on micromobility usage is still not sufficient based on our survey. Further study on factors associated with the knowledge, attitudes and practice of the micromobility usage to prioritize the significant factors that should be tackled when implementing the micromobility.

Keywords: micromobility; knowledge; attitude; practice; Cyberjaya residents

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ABSTRAK

PENGETAHUAN, SIKAP DAN AMALAN BERKAITAN PENGGUNAAN MIKROMOBILITI DALAM KALANGAN PENDUDUK DI CYBERJAYA

NUR IRDINA IZZATI BINTI JOMAIN

Pengenalan: Bagi menyelesaikan masalah pencemaran udara yang dihasilkan oleh pengangkutan mudah alih, terutamanya di bandar, pengangkutan mikromobiliti telah dicipta. Mikromobiliti ialah kenderaan ringan yang digunakan untuk perjalanan jarak dekat (8km) oleh seorang. Mikromobiliti terkenal kerana ia dapat meningkatkan kebolehcapaian transit awam, mengurangkan pelepasan automotif dan menambah baik alam sekitar. Oleh kerana tiada penyelidikan mengenai pengetahuan, sikap dan amalan mikromobiliti di Malaysia, adalah tidak pasti sama ada semua rakyat Malaysia sedar tentang faedah dan risiko yang berkaitan dengan mikromobiliti.

Objektif: Untuk menentukan tahap pengetahuan, sikap dan amalan awam berkaitan penggunaan mikromobiliti di Cyberjaya.

Metodologi: Kajian keratan rentas telah dijalankan antara Oktober hingga Disember 2021 melibatkan 400 responden daripada penduduk Cyberjaya menggunakan pensampelan mudah. Soal selidik yang ditadbir sendiri telah diedarkan kepada responden melalui dalam talian. Data mengenai sosio-demografi, pengetahuan tentang mikromobiliti, sikap terhadap mikromobiliti, dan amalan mikromobiliti telah dikumpul. Analisis deskriptif, dan analisis Chi-square telah digunakan untuk analisis data dengan menggunakan SPSS.

Keputusan dan Perbincangan: Skor pengetahuan median adalah 7.00 (IQR=2.0). Keputusan menunjukkan bahawa majoriti responden (79.5%) mempunyai pengetahuan yang baik tentang mikromobiliti, dan kurang daripada satu perempat daripada responden (20.5%) mempunyai pengetahuan yang lemah. Skor median sikap adalah 6.00 (IQR=2). Kira-kira separuh daripada responden (54.8%) mempunyai sikap positif terhadap penggunaan mobiliti mikro, dan separuh lagi responden (45.3%) mempunyai sikap negatif terhadap penggunaan mobiliti mikro. Sikap yang baik adalah di kalangan mereka yang berumur <35 tahun.

Kesimpulan: Peserta kajian mendahului pengetahuan yang baik. Walau bagaimanapun, sikap positif dan amalan baik terhadap penggunaan mikromobiliti masih tidak mencukupi. Kajian lanjut mengenai faktor-faktor yang berkaitan dengan pengetahuan, sikap dan amalan penggunaan mikromobiliti untuk mengutamakan faktor penting yang perlu ditangani semasa melaksanakan mikromobiliti.

Kata kunci: micromobiliti; pengetahuan; sikap; praktis; penduduk Cyberjaya

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LIST OF ABBREVIATIONS

IEA	International Energy Agency
WHO	World Health Organization
S.D.G.	Sustainable Development Goals
ITF	International Transport Forum
DOE	Department of Environment
GHGs	Greenhouse gas emissions
KeTTHA	Ministry of Green Technology, Energy and Water
LCCF	Low carbon Cities Framework and Assessment System
MSCF	Malaysia Smart City Framework
USA	United States
PMD	Personal mobility device
UNECE	United Nations Economic Commission for Europe
FFES	Fossil Free Energy Scenario
LCA	Life Cycle Assessment

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CHAPTER 1

INTRODUCTION

This chapter describes background of this research. Following that, a problem statement, study justification, and research questions will be included. The last part of this chapter presents the research objectives and hypotheses.

1.1 Background

Traffic-related air pollution (TRAP) is a significant source of exposure in metropolitan areas and has been linked to a wide variety of severe health consequences in humans. Much of the Malaysian population is routinely exposed to TRAP as a result of daily activities like commuting and a sizable section of the population lives near major highways. Vehicle emissions have surpassed other sources of air pollution in many places, including carbon monoxide (CO), carbon dioxide (CO_2), volatile organic compounds (VOCs) or hydrocarbons (HCs), nitrogen oxides (NO_x), and particulate matter (PM) (TRB, 2002). In 2020, global carbon dioxide (CO_2) emissions decreased by 5.8%, or around 2 Gt CO_2, the largest drop on record and roughly five times the drop following the global financial crisis in 2009. Due to the pandemic of COVID-19, greater impact on oil and coal demand than on other energy sources, CO_2 emissions fell further than energy demand in 2020, while renewables increased. Despite the decline in 2020, global energy-related CO_2 emissions remained at 31.5 Gt, contributing to CO_2 reaching a record annual average concentration of 412.5 parts per million (ppm)

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in the atmosphere in 2020, more than 50% higher than at the start of the industrial revolution (International Energy Agency (IEA), 2021).

The World Health Organization (WHO) reported that ninety-one per cent of the world's population now lives in areas with air pollution levels that exceed WHO guidelines limit. Annually, 4.2 million people die because of exposure to ambient air pollution. As carbon dioxide is one of the contributing factors in air pollution, there are several Sustainable Development Goals (S.D.G.) that have been developed to tackle the issues including S.D.G. target 3.9: mortality from environmental pollution and S.D.G. target 11.5: clean cities. Furthermore, the BreathLife campaign which was led by WHO, United Nations Environment, World Bank and the Climate & Clean Air Coalition was also created to coordinate communities to lessen the adverse effects of air pollution on human health and the environment. Under the BreathLife campaign, Walk21 Foundation, which Jim Walker founded, had been introduced that engaged with cities to make them more walkable, which prioritized pedestrians compared to motor vehicles users. A city will host the Walk21 conference every year, which strives to advance the global agenda on walking.

Air pollution is primarily caused by four types of sources: mobile sources, stationary sources, area sources, and natural sources. In this study, mobile sources generated from motor vehicle emission will be the highlight as it is one of the sources that can be tackled to improve the air quality. Besides, car emissions account for the majority of air pollution in urban areas. In Malaysia, a lack of interest in public transit

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has resulted in an increase in the number of private automobiles (Brohi et al., 2018). In 2020, the Malaysian Road Transport Department Malaysia had reported a total of 31.2 million motor vehicles in 2019, with an annual rise of more than 1 million new automobiles. Furthermore, the Malaysian Department of Environment (2010) also reported that transportation operations account for 97.1% of carbon dioxide emissions, with emissions from privately owned and commercially operated vehicles. Moreover, an excess of automobiles on the road will exacerbate environmental stress by releasing more pollutants into the atmosphere, resulting in global warming, traffic congestion, accidents, and increasing capacity demands on road and rail infrastructure. Therefore, a new trend of sustainable urban transportation called micromobility has been implemented, especially in other countries such as China, Singapore, South Korea, Europe, United States and many more.

The International Transport Forum report “Safe Micromobility" (ITF, 2020) defined micromobility as: “[...] the use of micro-vehicles: vehicles with a mass of no more than 350 kg (771 lb) and a design speed no higher than 45 km/h. This definition limits the vehicle’s kinetic energy to 27 kJ, which is one hundred times less than the kinetic energy reached by a compact car at top speed." Based on the definition, micromobility encompassed both human-powered and electrically assisted vehicles. There are several examples of micromobility such as walking, cycling, riding electric scooters, e-bikes, scooters, Segway, electric skateboards, electric water bikes and hoverboards, where it is focusing more on personal transport that require a short distance trip that less than five miles (8 kilometres). The usage of micromobility can

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solve many kinds of transport-related problems by reducing greenhouse gas emissions (GHGs), reducing the number of cars on the road, solving road congestion problems, providing a better connection to public transit, and many more.

China was the first country to establish a dockless bike-sharing network in 2015, and Asia has been a prominent pioneer in the micromobility industry. Micromobility firms in Asia benefited from less regulatory red tape than in Europe and North America, allowing for faster adoption throughout cities. However, due to a lack of control, the market became oversaturated, with millions of bicycles piling up on city streets. Nonetheless, on a continent plagued by dangerously high urban pollution levels and clogged streets, it's understandable that cities like Beijing and Shanghai are leading the way in reducing automobile mobility and switching to emissions-free alternatives. By the end of 2017, shared bikes have surpassed taxis as China's third most popular means of public transportation. Singapore, Taiwan, and South Korea are among the Asian countries that have seen success in the micromobility sector (CB Insights, 2021). In Singapore, footpaths for e-scooters had already been banned in 2019. The rules were prompted by fatal incidents involving e-scooter users in the country. A cyclist died in Singapore after colliding with an e-scooter rider on the pavement, among other tragic instances. Singapore's Land Transport Authority decided to restrict e-scooters on footpaths, in addition to the current ban on highways, to safeguard pedestrians. E-scooters are now limited to the 440-kilometer bicycle-lane network, signalling the end of the country's e-scooter sharing services (Land Transport Authority, 2019).

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Hence, in upper middle income countries like Malaysia, there are many challenges in implementing micromobility usage such as inadequate infrastructure, regulations, and safety reasons. In October 2019, the usage of micromobility had been recognized in Malaysia as the Road Transport (Amendment) Act 2020, defines ‘micromobility' as vehicles that are driven by electricity, internal combustion, or human power, or any combination of these, and have a top speed of 50 km/h. In addition, according to Transport Minister Datuk Seri Dr Wee Ka Siong, the regulation would also include mandatory registration and licenses and, if necessary, prohibition for certain types of micromobility vehicles on public roads to ensure safety of the micromobility users and road users. Moreover, Malaysia Smart City Framework (MSCF) has taken initiatives to implement smart cities in several cities in Malaysia such as Cyberjaya, Putrajaya, and Penang for various urban communities' well-being and quality of life are being improved as people will lived in a good air quality.

Cyberjaya is located in southern Selangor state's Sepang district, in the mukim of Dengkil, and has a population of approximately 127 421 residents (Setia Haruman, 2018). The area of the city is 28.16 km2, and 13.41533 km2 of it was reserved for public amenities and greenery. In addition, Cyberjaya is on a journey to Low Carbon City Action Plan 2025, which the Malaysian government guides through the Ministry of Green Technology, Energy and Water (KeTTHA) based on the Low carbon Cities Framework and Assessment System (LCCF) (Ministry of Energy, Green Technology and Water, 2011).

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1.2 Problem statement

It is very well known that micromobility can improve the public transportation accessibility, reduce vehicles emissions, and reduce environmental impact. However, it is not known how or to what extent the benefits and risks associated with the micromobility being fully understood by all the Malaysian as there literally no study on the knowledge, attitude, and practice regarding the usage of micromobility in Malaysia. Every human has the right to have clean air quality, but we are also the one that leading the causes of air pollution nowadays. In urban areas, people will always face problems related to transportation either due to traffic congestion, air pollution, accidents and many more. To solve the problem, it is impossible to get rid of automobiles completely, so micromobility usage has been introduced worldwide, including in Malaysia. If the number of motor vehicles can be reduced on the road, traffic congestion can also be reduced and at the same time reduction of the carbon emission could improve the air quality. McQueen et al. (2020) recommend that to understand further how micromobility influences GHG emissions, more study is needed, including life cycle analyses and the impact of expanding multimodal micromobility and transit travels. Other than that, for future study, maybe in the type of a health impact assessment, should be explicitly designed to look at the correlations between e-scooters and areas of health other than injuries, such as community severance among underprivileged populations or users' levels of physical activity (Glenn et al., 2020).

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In Malaysia, cycling and the usage of micromobility are perceived as a nuisance due to public misconception and authorities lack understanding on the benefits of the micromobility (Tamrin, 2020). On 1st January 2021, e- scooters were banned from being used on the road in Kuala Lumpur. Yahya (2021) mentioned that the action taken after the public has lodged several objections over the usage of e-scooters on the road to the police. Hence, implementing micromobility usage in Malaysia is quite tricky due to the lack of infrastructure or road quality that can allow safe rides for micromobility users, lack of street connectivity, lack of facilities for pedestrian safety, and many more. Local authorities played a significant role in providing more friendly streets for pedestrians than motor vehicles users, which aligns with the motive of MSCF. However, residents should also know, that micromobility usage and practicing it as cooperation from both sides can enhance the quality of life by improve the public transportation accessibility, reduce wasteful automobile journeys, and reduce environmental impact.

1.3 Study Justification

Cyberjaya is on a journey to Low Carbon City Action Plan 2025. The Malaysian government guides through the Ministry of Green Technology, Energy and Water (KeTTHA) based on the Low carbon Cities Framework and Assessment System (LCCF). This study that involved the knowledge, attitude, and practice related to micromobility has the same insight as Cyberjaya city, which is to reduce carbon emissions in the environment by increasing the public awareness on the environmental-friendly transportation named micromobility.

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From this study, the finding will provide a baseline for knowledge, attitudes, and practices on micromobility usage among residents in Cyberjaya. By understanding and identifying the public's knowledge, attitudes, and practice in Cyberjaya, further interventional studies can be done using the data obtained from this study. People would become more aware of the current transportation trend and the benefits of micromobility toward the environment. This study may encourage them to participate and become a micromobility user in the future. Regular practice of micromobility to reduce the amount of carbon footprint requires awareness along with good knowledge and attitudes towards micromobility transportation. Besides, any misconception on micromobility can be solved, and authorities may play their part in enhancing road quality and providing pedestrian-friendly streets to promote micromobility usage. In addition, this study also can fill the gap of knowledge about micromobility in Malaysia.

1.4 Research Questions

i. What is the sociodemographic status of residents in Cyberjaya?
ii. What is the level of knowledge, attitudes, and practices related to the micromobility usage of residents in Cyberjaya?
iii. Is there any association between sociodemographic and level of knowledge, attitudes and practices on micro mobility usage among residents in Cyberjaya?
iv. Is there any significant relationship between the level of knowledge, attitudes and practices on micromobility usage among residents in Cyberjaya?

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1.5 Research Objectives

1.5.1 General Objectives

The general objective of this study is to determine the level of knowledge, attitudes, and practices related to micromobility usage among residents in Cyberjaya.

1.5.2 Specific Objectives

i. To identify the socio demographic status of residents in Cyberjaya.

ii. To determine the level of knowledge, attitudes, and practices regarding micromobility usage of residents in Cyberjaya.

iii. To investigate the association between demographic variables and level of knowledge, attitudes, and practices on micromobility usage among residents in Cyberjaya.

iv. To assess the association between the level of knowledge, attitudes, and practices on micromobility usage among residents in Cyberjaya.

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1.6 Research Hypothesis

i. There is a significant association between demographic characteristics and level of knowledge, attitudes and practices on micromobility among residents in Cyberjaya.

ii. There is a significant association between the level of knowledge, attitudes and practices on micro mobility usage among residents in Cyberjaya.

1.7 Conceptual Framework

Figure 1 shows the variables related to the study. The target population was residents of Cyberjaya. Air pollution is primarily caused by four types of sources: area sources, stationary sources, natural sources, and mobile sources. It is impossible to solve the air pollution caused by natural sources, however, other sources can be used to tackle the air pollution problem including the mobile sources that include the transportation sector. Micromobility usage is one of the strategies used to reduce carbon emission as it is environmentally-friendly transport, and it also can promote physical activity that improves a healthy lifestyle. The level of knowledge, attitudes, and practices related to the micromobility usage need to be determined as it is important to know the current level of awareness regarding micromobility among residents in Cyberjaya.

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Knowledge, Attitude, and Practices Related to the Usage of Micromobility among Residents in Cyberjaya.

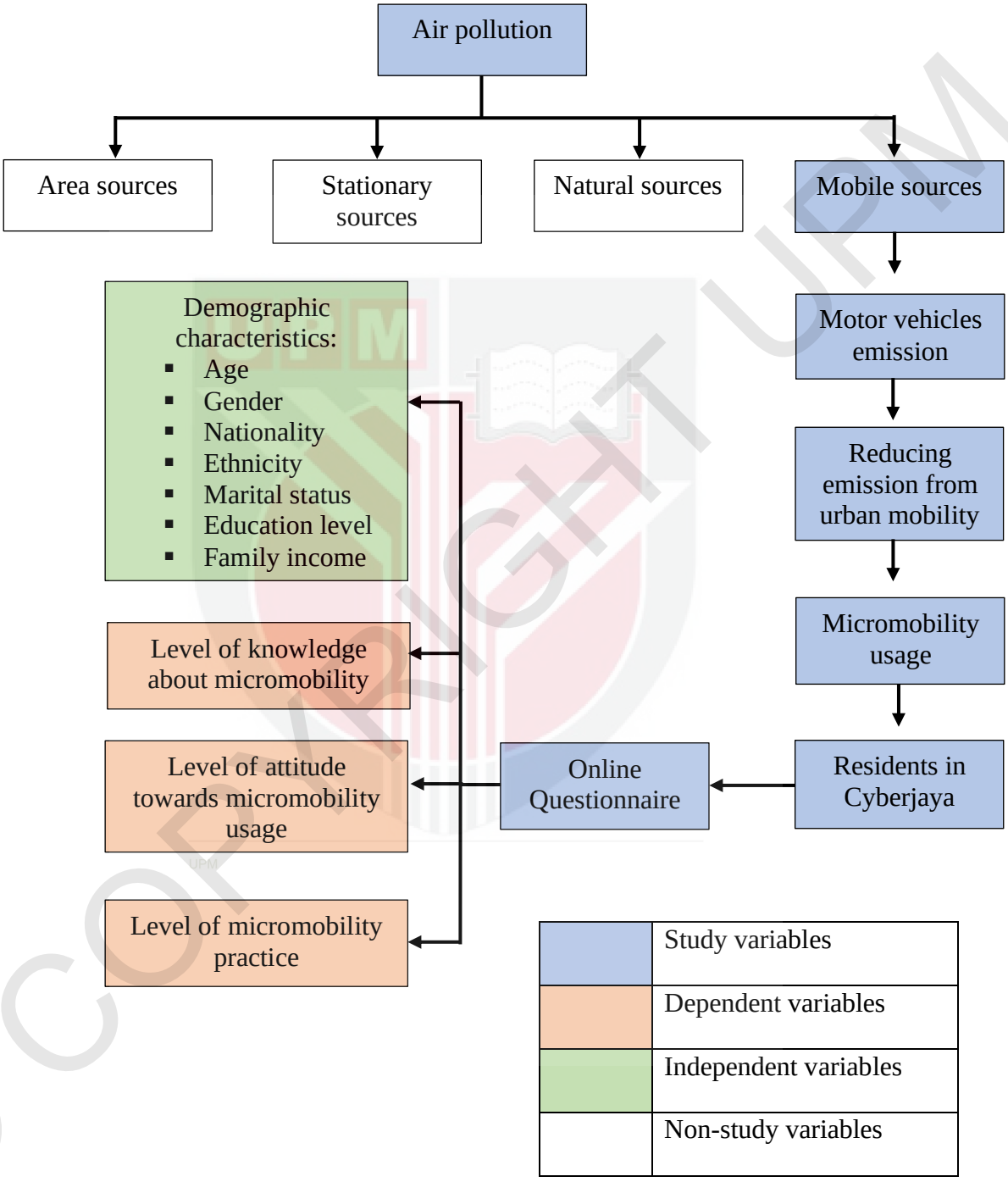

Figure 1.1: Research flowchart

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CHAPTER 2

LITERATURE REVIEW

This chapter shows some previous studies on the micromobility definition, micromobility development, micromobility classification, global warming and carbon dioxide emission, micromobility environmental performance, micromobility integration impact, and sustainable urban development.

2.1 Micromobility

2.1.1 Definition

'Micromobility' term is still considered as a new thing as it was barely used for the past four years ago, which USA business analyst Horace Dediu initially started in 2017. The definition is still evolving, and there is no clear definition for the 'micromobility' term. Micromobility refers to small, lightweight vehicles that are frequently shared via digital apps. Shaheen et al. (2020) defined micromobility as an advanced urban transport system that enables short-distance travel, and micromobility is intriguing because it gives a flexible, sustainable, cost-effective, and on-demand transportation option.

Moreover, the International Transport Forum (ITF) report “Safe Micromobility" (ITF, 2020) defined micromobility as vehicles that weigh no more than 350 kilograms (771 pounds) and are not capable of reaching a top speed of 45

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kilometres per hour. This definition caps the vehicle's kinetic energy to 27 kJ, a hundred times less than a smaller car's max speed kinetic energy. The kinetic energy of a vehicle is determined by its speed and weight combined, and it is linked to the probability of death or catastrophic injuries (Khorasani-Zavareh et al., 2015). Based on the definition, micromobility encompassed both human-powered and electrically assisted vehicles. Walking, riding bicycles, riding electric scooters, e-bikes, scooters, Segway, electric skateboards, electric water bikes, and hoverboards are all examples of micromobility, which focuses on personal transportation that requires a short distance trip of fewer than five miles (8 kilometres).

2.1.2 Development of micromobility

According to Dediu (2019), there are three eras of micromobility. The first era began in Europe, with bicycle sharing as the catalyst for the first era of on-demand micromobility. That would have begun in 1975, when Luud Schimmelpennink developed a community cycling programme in partnership with the Amsterdam-based group Provo. The second phase is the "free-floating" or dockless period, which began in China in 2000 with Deutsche Bahn's Call-a-Bike service, which enabled consumers to unlock a bike via an SMS text message. Around 2016, there was expansion (unsustainable growth). This was a problem since it made them highly invasive in public spaces.

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Figure 2.1: First Micromobility Era- The replica of the original Witte Fietsenplan that exhibit in Provo at the Amsterdam Museum

Figure 2.2: Second Micromobility Era- Deutsche Bahn Call-a-Bike

Figure 2.3: Third Micromobility Era- Evolution of Micromobility in urban environments.

Next, the third era which is the current era that started from 2017 until now, where electric vehicles are a kind of free-floating micromobility that started in the United States. These free-floating micromobility were not shared e-Bikes but shared "scooters," sometimes known as electric stand-ups or kick-scooters. In late 2017, with Bird in Santa Monica, these specifically created throttle-operated devices became a massive success.

Cyberjaya has implemented micromobility through the 3rd startup of E-scooter sharing in Malaysia which is from the local itself named TRYKE. TRYKE is Malaysia's first urban transport provider of ride-sharing micromobility services, and they are launching the TRYKE electric scooter (e-scooter) service in Cyberjaya as part of the Smart City RAP Programme 2019. TRYKE's ride-sharing micromobility service is consistent with our Prime Minister's National Transport Policy 2019-2030, as highlighted in Policy Thrust 4: 'Advance Toward a Green Transport Ecosystem', which

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aims to achieve green growth through low-carbon mobility and a shift toward environmentally sustainable transportation (Dayangku et.al, 2019).

Cyberjaya was chosen as TRYKE's first city launch in the Klang Valley for a multitude of reasons such as superior infrastructure (bike lanes and sidewalks), reduced road traffic results in decreased accident chances, strong support from stakeholders and the local government for innovative and novel technology used in smart city pilot/test projects, and a thriving community made up of students, young professionals, and visitors (Timothy W., 2019).

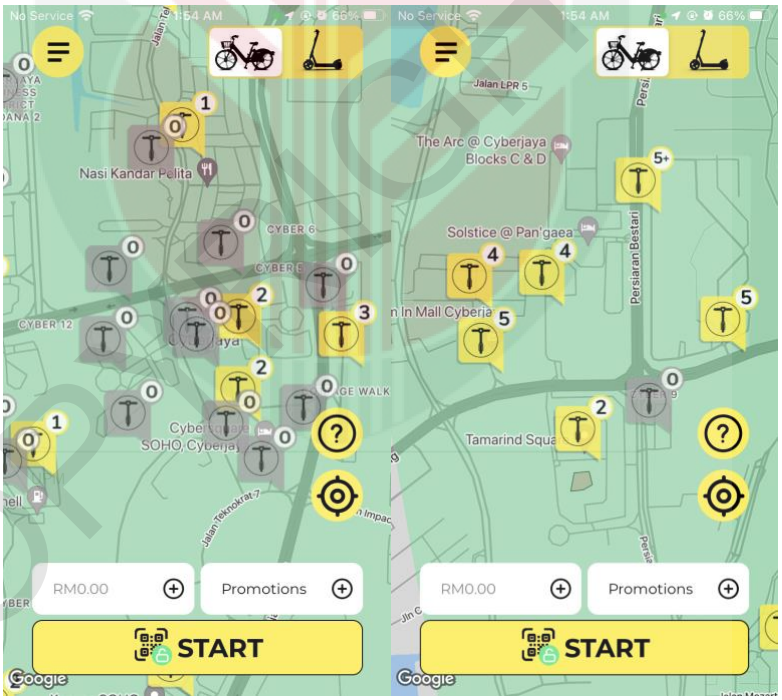

Figure 3.2: Map of TRYKE station in TRKE Apps

2.1.3 Micromobility classification

ITF (2020) stated that micro-vehicles could be categorized into four types which are Type A, Type B, Type C, and Type D, which are primarily based on their maximum speed, and it also can further be classified by weight. (As shown in Figure 2.2).

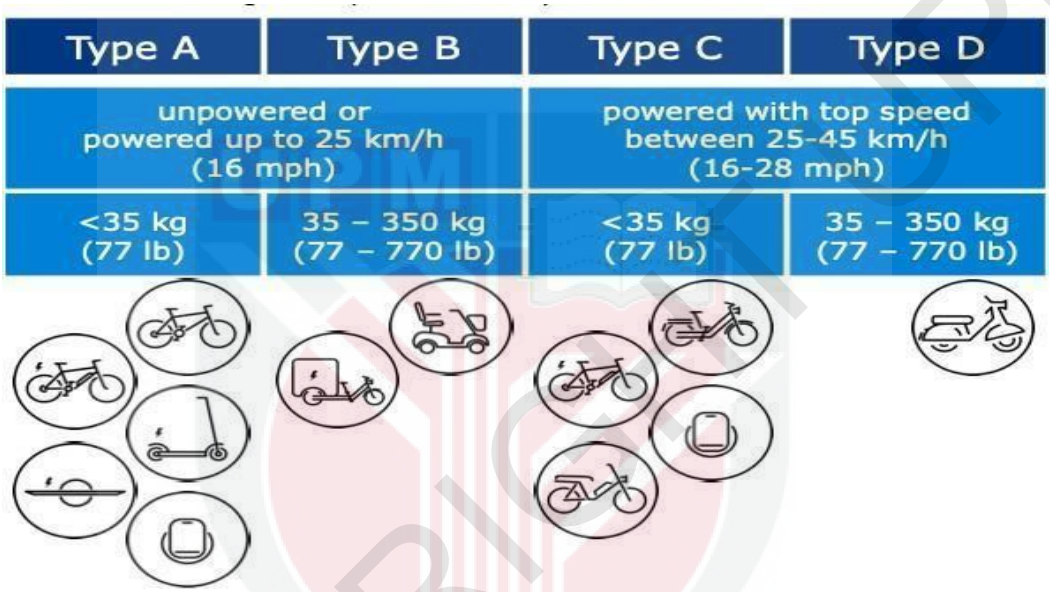

Figure 2.4: Classification of micromobility (ITF, 2020)

However, for international vehicle classification systems, the micromobility classification can be different worldwide, where Europe, the United States, Asia, and Latin America will have their classification of micro-vehicles. In Asia, China, Singapore, and South Korea will also have their ways of categorizing micromobility. Electric bicycles are categorized as bicycles in the Republic of China. Electric bicycles must have functional pedals, a maximum design speed of 25 km/h, a weight (with battery) of up to 55 kg, motor power of up to 400 W, and a battery voltage of up to 48 V, according to the most updated regulation (Large, 2019).

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Singapore used the term "personal mobility device" to describe a new type of vehicle (PMD). This category includes e-scooters. It distinguishes PMD from automobiles, as well as bicycles and e-bikes (SLA, 2019). In addition, all power-driven vehicles are classified as motor vehicles in South Korea (KMVSS, 2019). The diverse vehicle kinds, on the other hand, are not classified in any way. Besides, the United Nations Economic Commission for Europe (UNECE) regulation and safety criteria are now being used as guidelines by their authorities (UNECE, 2019).

Furthermore, The J3194TM Standard, issued by SAE International, defines powered micromobility as a category of powered vehicles that may be characterized based on four primary characteristics (SAE, 2019):

- vehicle weight of up to 227 kg (500 lb)
- vehicle width of up to 1.5 m (5 ft)
- top speed of up to 48 km/h (30 mph)
- power source by an electric motor or a combustion engine.

Powered bicycles, powered standing scooters, powered sitting scooters, powered self-balancing boards, powered non-self-balancing boards, and powered skates are the six forms of powered micro-vehicles defined by the (trademarked) J3194 standard. It only applies to vehicles primarily meant to transport people and are intended to be driven on paved roads and pathways.

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	Powered Bicycle	Powered Standing Scooter	Powered Seated Scooter	Powered Self-Balancing Board	Powered Non-Self-Balancing Board	Powered Skates
						
Center column	Y	Y	Y	Possible	N	N
Seat	Y	N	Y	N	N	N
Operable pedals	Y	N	N	N	N	N
Floorboard / foot pegs	Possible	Y	Y	Y	Y	Y
Self-balancing[2]	N	N	N	Y	N	Possible

Figure 2.5: Types of powered micromobility vehicles as defined by SAE

2.2 Environment

2.2.1 Global warming and carbon dioxide emission

Global warming is expected to cost the economy as much as U$ 1.2 x 1010 every year. In addition to natural reasons, human energy use is the primary driver of global warming (BP oil disaster). Controlling CO_2 emissions and other greenhouse gases like nitrogen oxides (NO_X) and sulfur oxides (SO_X) makes it easier to eliminate the adverse effects on the economy and society (Cao Yijie & Shen Dan, 2019). According to the Intergovernmental Panel on Climate Change, greenhouse gases produced by city traffic accounted for 13% of total worldwide emissions, with CO_2 accounting for 30% to 40% of that. Based on the data issued by China's National Bureau of Statistics, the average growth rate of the number of automobiles in China over the last 15 years has been 17 percent.

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The automobile industry's development has been accelerated by the fast expansion in mobile vehicle demand. Unfortunately, because of this expansion, traffic congestion and cloudy weather have become more common. In the growth of a city, overcoming these issues is a typical concern. The rise of the sharing economy has had a significant influence on our mentality. That is, efficient resource allocation may alleviate transportation congestion while also lowering CO_2 emissions.

Abe Martin (2021) examines the environmental and congestion benefits associated with reduced gasoline car use as a result of micromobility adoption. The researcher concludes that widespread adoption of powered scooters in the United States' main 52 cities might result in a positive externality worth $2.75 million in environmental benefits and $6.01 billion in congestion benefits. Hsieh et al. (2018) conducted a system dynamics approach to assess the possibility for reducing air pollution in Taiwan by switching from gasoline seated scooters to electric seated scooters and discovered a reduction in emission factors related with the changeover.

2.2.2 Micromobility environmental performance

Hollingworth et al. (2019) evaluated the impact of Fossil Free Energy Scenario (FFES) on climate change in US settings, ignoring the effects of infrastructure, based on local surveys and a material inventory of the micro-vehicle generated by the deconstruction of a famous Chinese e-scooter model: the Xiaomi M365. Based on their findings, results show an average carbon footprint equal to 126g CO_2 eq/pkt where an uncertainty analysis is included in the paper and a Monte Carlo simulation using

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assumed parameter distributions. The city of Brussels was also assessed for dock-less and private E-Scooter on four midpoint indicators using attributional LCA and the ReCiPe2016 characterization factors, with the shared version reporting 131 g of CO2eq/pkt and the private version reporting 67g of CO_2 eq/pkt (Moreau, H. et al., 2020).

2.3 Impacts

2.3.1 Impacts of micromobility integration

Oeschger et al. (2020) concluded that the most critical impacts of combining micromobility and public transportation includes modal shifts, impacts on social access and equity, increase in public transportation passenger numbers, increase in micromobility demand, economic benefit for the local community, health effects, safety and livability, energy/fuel consumption, environmental impacts such as carbon footprint, emissions, air, and noise pollution reduction. In Chicago, Schwieterman, J. and Smith, C. S. (2018) investigated the mobility benefits of E- scooters. Their research anticipated that E-scooters might be used to replace private vehicles for short excursions soon. Their findings also revealed that some locations might have an advantage over others because of the differences in public transit. Moreover, Hardt and Bogenberger (2019) investigated the use of E-scooters and discovered that they could replace 86 percent of commuting trips and at least 28 percent of leisure excursions in their pilot study.

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2.3.2 Sustainable urban developments

Several pieces of research studied micromobility from the environmental sustainability perspective. The present lifespan of E-scooters has prompted questions regarding the direct environmental advantages of E-scooters (Hollingsworth et al., 2019). Another research claimed that E-scooters' lifespan should be extended by 9.5 months, making them a more environmentally friendly mode of transportation (Moreau et al., 2020). Furthermore, each sustainable development design for active transportation and public transportation is shaped by a variety of elements and tactics, including the presence of sidewalks, bike lanes, and public transit service, as well as other elements like street connection and mixed land use (Frank et al., 2008; Zlatkovic et al., 2019).

Ableу (2005) defined sustainable urban development as the things that can encourage people to take public transportation, ride their bikes, or walk to significant locations such as schools, employment, bus stations, businesses, and entertainment. Walkability is a crucial component of sustainable communities and a desirable attribute for those looking to live, shop, and spend time in a neighborhood. Walking is sustainable because it reduces emissions and enhances social connections (Leyden, 2003; Rogers et al., 2013). Besides, bicycling instead of driving a car also contributes to sustainability since it is linked to reduced gas emissions and fewer traffic accidents (Hodges, 2010).

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2.4 Regulation, authorities, or organizations of the urban area

Several studies addressed issues regarding regulation, authorities, or organization of urban areas. Janssen et al. (2020) reported that there are standard policies in the cities, such as limitations on timings and designated parking locations for e-kick scooters. However, all cities maintain the right to remove unlawfully parked e-kick scooters. Besides, each owner must pay a registration fee, get permission, and have designated places where e-kick scooters can be circulated. Furthermore, the data-sharing platform is not used by all e-kick scooter manufacturers.

Regarding the organization of urban spaces, Gossling S. (2020) indicated that in locations where they operate, e-PMVs cause problems due to differences in speeds and safety. Irresponsible riding, unrest, and vandalism are all too common, especially in metropolitan cities. Butrina et al. (2020), on the other hand, illustrated how various authorities respond to shifting sidewalk pressures because congestion on sidewalks overflows in lanes, which has a particularly severe impact on public road safety. Data is being analyzed in real-time by government agencies in order to control the flooring dynamically.

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2.5 Effects of micromobility to healths

In cities, a long-term increase in the use of e-PMVs is projected, and these modes of mobility have the potential to deliver significant health advantages, particularly through increased physical activity. Additionally, e-PMVs can contribute to the common good by offering inexpensive access to all, adhering to strict maintenance and safety requirements, and reducing overall car fleets and their related negative externalities, such as air and noise pollution and public space use (Lopez Doriga, I., et.al, 2021).

Exercise has been shown to be a guaranteed way to achieve physical fitness and a substantial contribution to overall health status (O'Brien, 2005; Adeogun & Dansu, 2006). According to (Biddle, Fox, and Boutcher, 2000), exercise has a greater potential to improve human happiness, posture, mood, anxiety, depression, and self-esteem. Similarly, (Fox 1999) asserts that exercise has the potential to be utilised to prevent some diseases and to enhance the positive enjoyment of life associated with healthy living. Regular exercise has been related to increased lifespan, with those who stay physically active or fit in their middle years living longer than their inactive counterparts (Karmisholt & Gotzche, 2005). It is also suggested for secondary prevention of numerous diseases (Okuneye, 2002). (Benzer, Adams, and Whistler 1999) shown in their research that an active lifestyle is a critical component of psychological, mental, social, intellectual, and spiritual wellbeing. All of them indicate the critical nature of physical activity for human health.

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2.6 Knowledge, attitude, and practice of micromobility

According to Brown (2005), knowledge is the facts, information, comprehension, and abilities that a person acquires via experience or education. In this study, knowledge refers to familiarity, awareness, or comprehension of physical activities received by experience, study, or particular information. Thus, knowledge of physical activities refers to familiarity, awareness, or comprehension of planned and selected bodily activity generated by muscle contractions that needs low, moderate, or high energy expenditure and strives to improve an individual's physical fitness. Not only is an individual's physical activity practice impacted by his knowledge of physical activities, but also by his attitudes about involvement in physical activities (Aniodo et al.,2014).

An attitude is a hypothetical construct that encapsulates an individual's level of like or disliking towards a certain thing or item. Attitudes are a person's typically good or negative perceptions of a place, object, or event (Obi-keguna and Isidore, 2004). Each attitude, whether good or negative, acceptable or unsuitable, is constructed with a specific objective in mind (Aniodo et al., 2014). This is consistent with Eyo (2005), who asserted that when one comes into touch with an attitude object, an attitude is generated either favourably or negatively. Lambert and Lambert (2004) defined attitude as a systematic and consistent way of thinking, feeling, and reacting to individuals, groups, societal concerns, or any event occurring in one's surroundings. Additionally, attitude may be defined as the outcome of either direct experience or

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observational learning from one's surroundings, which can be either good or negative (Aniodo, Eskay, and Ezeudu, 2014).

An person's attitude is determined by his behavioural beliefs (what the individual believes will occur if he engages in a certain activity) and the consequences (good or negative) of engaging in that behaviour. Positivity toward the bicycle enhances the possibility of commuting using this method of transport (de Souza, Sanches, Ferreira, 2014). With relation to attitudes that favour the bicycle as a means of transport, some authors emphasise environmental concerns, the pleasure of riding a bike, and a dislike for driving (Dill and Voros, 2007; Heinen et al, 2011; Xing et al 2010, Handy and Heinen, 2012). On the other side, some negative attitudes include the notion that driving is a sign of independence and freedom, the enjoyment of driving, and the conviction that an individual need a vehicle to execute his or her tasks (Jensen, 1999; Xing et al 2010, Handy et al, 2010).

The findings from Huang, F. H. (2021) show that while the model components of habit, social influence, and environmental preservation may all have a positive effect on users' behavioural intentions toward shared scooters, performance and effort expectations may have a negative effect on intention to use. Attitudes and user experience had no discernible influence on intent to use. Another study from Singapore that studies on the perceptions and attitudes towards micro e-scooters in Singapore found that the majority of respondents view e-scooters as harmful and a hindrance to walkers. However, one's level of experience/familiarity with these gadgets influences one's attitude about e-scooters. While the majority of respondents favour the ban, some

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personal factors such as "age group," "having a personal unpleasant encounter with an e-scooter," and subjective norms such as "having family/close friend(s)" are found to influence support for the ban (Wee, T. C. D., 2020).

2.7 Recommendations and suggestions

Previous studies give many recommendations and suggestions for future research. McQueen et al. (2020) recommend that to understand further how micromobility influences GHG emissions, more study is needed, including life cycle analyses and the impact of expanding multimodal micromobility and transit travels. Other than that, for future study, maybe in the type of a health impact assessment, should be explicitly designed to look at the correlations between e-scooters and areas of health other than injuries, such as community severance among underprivileged populations or users' levels of physical activity (Glenn et al., 2020).

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CHAPTER 3

METHODOLOGY

This chapter describes the methodology to conduct this study. A detailed explanation on study location, study design, study population, sampling, study instrument, variables and operational definition for the variables studied, data collection methods, data analysis strategies, and ethical considerations are discussed.

3.1 Study Location

Selangor comprises nine districts which consist of Gombak, Hulu Langat, Hulu Selangor, Klang, Kuala Langat, Kuala Selangor, Petaling, Sabak Bernam, and Sepang. In this study, the study location was located in Cyberjaya, Sepang, Selangor. Cyberjaya is located in the Sepang District in southern Selangor state, in the mukim of Dengkil, roughly 26 kilometres south of downtown Kuala Lumpur. It is adjacent to the Federal Territory of Putrajaya, the administrative capital of Malaysia's government. Cyberjaya had been chosen as the study location because it is one of the cities that is in progress for low carbon city and the varied socio-demographic which consist of both Malaysian and Non-Malaysian. There are 12 zones separated in Cyberjaya, which are Cyber 1, Cyber 2, Cyber 3, Cyber 4, Cyber 5, Cyber 6, Cyber 7, Cyber 8, Cyber 9, Cyber 10, Cyber 11, Cyber 12. All of the zones included in this study except Cyber 2, Cyber 4, Cyber 8, and Cyber 10.

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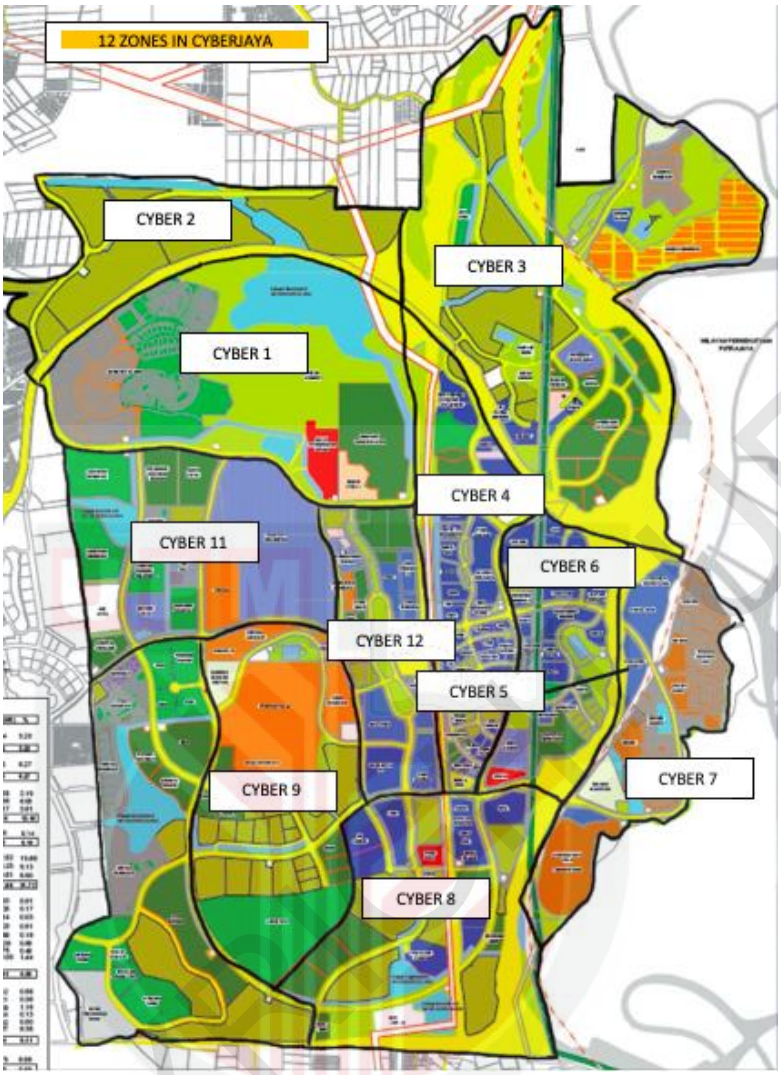

Figure 3.1: Map of Cyberjaya

Cyberjaya has implemented micromobility through the 3rd start-up of E-scooter sharing in Malaysia which is from the local itself named TRYKE. TRYKE is Malaysia's first urban transport provider of ride-sharing micromobility services, and they are launching the TRYKE electric scooter (e-scooter) service in Cyberjaya as part of the Smart City RAP Programme 2019. TRYKE's ride-sharing micromobility service is consistent with our Prime Minister's National Transport Policy 2019-2030, as

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highlighted in Policy Thrust 4: 'Advance Toward a Green Transport Ecosystem', which aims to achieve green growth through low-carbon mobility and a shift toward environmentally sustainable transportation (TRYKE Transportation, 2019).

Cyberjaya was chosen as TRYKE's first city launch in the Klang Valley for a multitude of reasons such as superior infrastructure (bike lanes and sidewalks), reduced road traffic results in decreased accident chances, strong support from stakeholders and the local government for innovative and novel technology used in smart city pilot/test projects, and a thriving community made up of students, young professionals, and visitors (Timothy W., 2019).

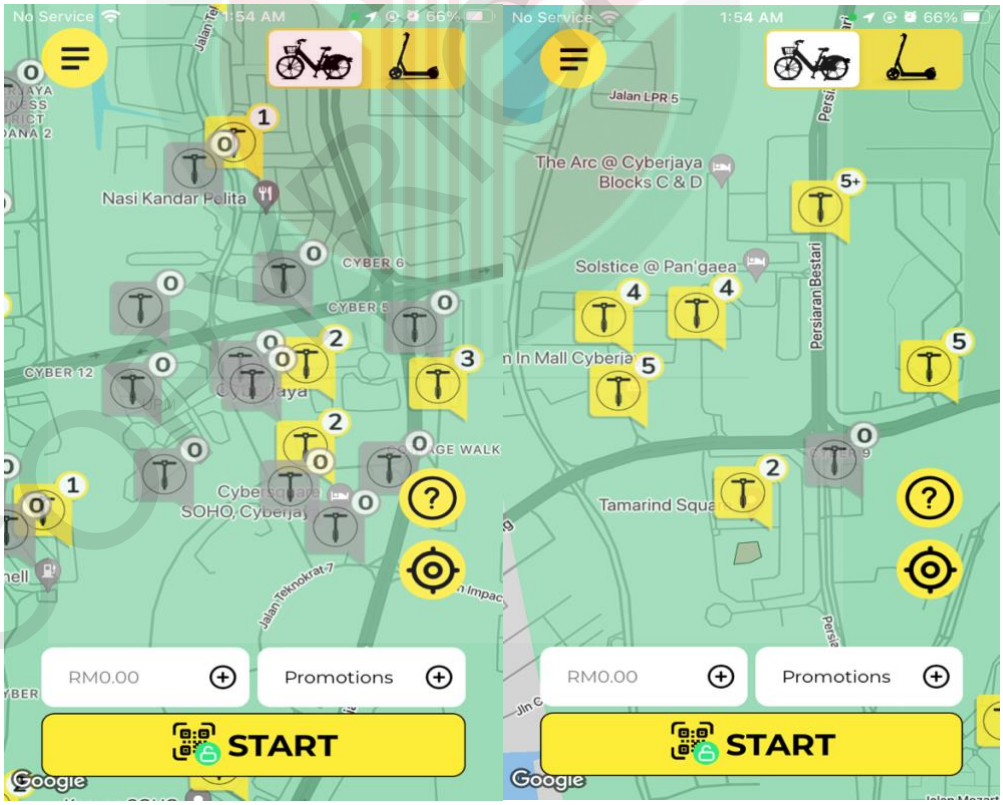

Figure 3.2: Map of TRYKE station in TRKE Apps

3.2 Study Design

The study design of this research was a cross-sectional study where it will determine the level of knowledge, attitude and practice related to the usage of micromobility among residents in Cyberjaya.

3.3 Study Duration

The study was conducted over a period of three months, from October 2021 until December 2021 among Cyberjaya residents.

3.4 Study Population

The study population in this study was the residents in Cyberjaya from 8 zones which were from Cyber 1, Cyber 3, Cyber 5, Cyber 6, Cyber 7, Cyber 9, Cyber 11, Cyber 12. The total population of Cyberjaya residents is 39,431 (City-facts, 2019).

3.5 Sampling

3.5.1 Sampling Population

The sampling population consisted of all the residents in Cyberjaya from aged 18 until 54 years old.

3.5.2 Selection Criteria

3.5.2.1 Inclusion Criteria

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The inclusion criteria for this study includes residents aged 18 until 54 years old and living in Cyberjaya.

3.5.2.2 Exclusion Criteria

Residents who were under 18 years old and above 54 years old would be excluded in this study. Individuals who lived in the area for less than 6 months in a year will also not be included in the study sample.

3.5.3 Sampling frame

The sampling frame for this study was from a list of the residents in Cyberjaya.

3.5.4 Sampling Unit

An individual who meets all the inclusion and exclusion criteria.

3.5.5 Sample Size Estimation

The study was designed to estimate the prevalence of knowledge, attitude, and practices on micromobility usage among residents in Cyberjaya within 5% of the true prevalence with 95% confidence interval by using OpenEpi software. Determination of sample size calculation was based on objectives of this study and the prevalence of knowledge, attitude, and practices on micromobility usage were based on previous study. (Refer Appendix A).

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Based on the sample size calculation, the highest number of sample sizes required is 364. To take into consideration the percentage of non-response, 15% were added to the total sample size. Actual sample size = 110% of 364 = 400 respondents.

3.5.6 Sampling Method

The sample was chosen from the population by using convenience sampling. The sampling method was non-random sampling whereby the samples were not selected randomly. Convenience sampling was used to collect the data as the questionnaire was distributed via the online platform such as through Whatsapp chain, Instagram post, twitter post, and Telegram chain. Besides, an infographic about this research had also been distributed hand to hand to the residents of Cyberjaya and were placed in some places in Cyberjaya such as on the bus station, board, and many more.

3.6 Study Instrument

The research instrument is a Semi Structured self-administered questionnaire prepared in both English and Malay language that consist of four section which are explained as follow;

- Section A: Socio-demographic and socio-economic information;
- Section B: Knowledge on micromobility usage;
- Section C: Attitudes towards micromobility; and
- Section D: Practice of micromobility usage.

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Furthermore, the questionnaire will be distributed through multiple ways such as social media like WhatsApp, Instagram, Twitter, and Telegram in order to reach the respective respondents of residents in Cyberjaya.

Figure 3.3: Chain message distributed via WhatsApp and the poster that was distributed via social media platform (i.e Telegram and Instagram). The QR-code was embedded in the poster to distribute the questionnaire.


Knowledge, Attitude and Practice Related to the Usage of Micromobility Among Residents in Cyberjaya/ Pengetahuan, Sikap dan Amalan yang Berkaitan dengan Penggunaan Mikromobiliti Di Kalangan Penduduk di Cyberjaya

Dear Respondent,

Greetings, my name is Nur Irdina Izzati binti Jomain, a degree student in the Department of Environmental and Occupational Health, Faculty of Health and Medical Science, University Putra Malaysia. I am currently conducting a research project titled Knowledge, Attitude and Practice Related to the Usage of Micromobility Among Residents in Cyberjaya, as part of requirement for final year project.

I intend to gather information from you on the topic, and I will be very grateful if you can spare several minutes to participate in the study by completing the questionnaire. Hence, the questionnaire developed aims to assess Knowledge, Attitude and Practice of Micromobility Usage among Cyberjaya residents.

The results from this survey will be used as the basis for understanding the current knowledge, attitudes and practices regarding micromobility usage in Cyberjaya and give insight to the authorities and micromobility related company in order to promote the use of the new trend of sustainable transportation named 'micromobility'.

Figure 3.4: Front page of the online questionnaire

The first section was on socio-demographic and socio-economic information. The respondents need to fill up all the information required which are their age, gender, ethnicity, marital status, citizenship, highest education level, and their economic status (B40, M40 or T20). The second section will provide questions on the knowledge of respondents related to micromobility usage where multiple choices questions had been applied. The third section will consist of Likert scale questions on the respondents' attitudes toward micromobility usage followed by the fourth question that will consist of both multiple-choice questions and closed-ended questions which require information regarding respondents' practices or behaviours on micromobility usage.

3.6.1 Quality Control

3.6.1.1 Content validity

The questionnaire was a validated questionnaire which was adapted from previous research. This questionnaire had been adapted from the instrument of a study (Knowledge, Attitude and Practice of Physical Activities among Undergraduate Students of University of Nigeria) by Aniodo, Eskay and Ezeudu (2014). (Active Commuting to School as a Source of Health Promotion among Urban Day Secondary School Students in Ibadan, Nigeria: Barriers and Facilitators) by (Adeniyi, Ogwumike, Ayanleke, Maruf, 2014). (Knowledge, Perception, Attitude and Practice of Active Commuting within Campus among Undergraduate Students Of The University of Ibadan) by (ADEKEYE, 2017). The adapted questionnaire is also being modified to

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make it suitable for people that live in Malaysia and to use for specific objectives of this study.

3.6.1.2 Face validity

The questionnaires were initially tested among four respondents who were not from Cyberjaya, to get their input on the questions; whether the questions were understandable or not, and whether they were able to measure the desired outcome. Comments were noted and appropriate improvement was made. Then, pretesting was done among another 40 respondents to assess the understanding of the questionnaire and to obtain the questionnaire reliability measures.

3.6.1.3 Internal consistency (Reliability)

After the questionnaire was pretested, Cronbach alpha test was carried out of which a score of 0.7 and above was accepted as reliable as it is closer to 1. The Cronbach alpha correlation coefficient for the knowledge statement of the pretested instrument is 0.7 while that of the attitude and practice statement is 0.9. Therefore, the instrument is reliable.

3.7 Variables

3.7.1 Dependent variable:

The level of knowledge, attitudes and practices.

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3.7.2 Independent variable:

The demographics variables

3.8 Operational Definitions

The operational definition for each variable is explained in Table 3.1.

Table 3.1: Operational definitions

No.	Variable Terms	Definition	Measurement (coding used in data analysis)
1	Gender	Biologically determined gender as reported by the respondents (male/female)	1 = Male 2 = Female
2	Age	Respondent's age counted in years during the data collection.	1 = 18 - 25 2 = 26 - 35 3 = 36 - 45 4 = 46 - 54
3	Nationality	Respondent's nationality is either Malaysian or Non-Malaysian.	1 = Malaysian 2 = Non-Malaysian
4	Ethnicity	The races of the respondents, either Malay, Chinese, Indian, or others.	1 = Malay 2 = Chinese 3 = Indian 4 = Others
5	Marital status	Respondent's status of being married, divorced, or single.	1 = Single 2 = Married 3 = Divorced
6	Education level	The highest education level completed by the respondents to date.	1 = SPM/Certificate 2 = Diploma/Degree 3 = Master/PhD 4 = Others
7	Family income	The total income per month in Ringgit Malaysia (RM) from working family members who live together in the house.	1 = B40 2 = M40 3 = T20
8	Micromobility	Vehicles that are driven by electricity, internal combustion, or human power, or any combination of these, and have a	N/A

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		top speed of 50 km/h. For example, walking, cycling, riding a scooter, e-scooter, hoverboards, and many more.	
9	Residents of Cyberjaya	People who spend at least 6 months in a year in Cyberjaya, Selangor.	N/A
10	Knowledge on micromobility usage	The level of knowledge on micromobility usage of the respondents that will be assessed through the questionnaire (either good knowledge, or poor knowledge).	1 = Good knowledge 2 = Poor knowledge
11	Attitudes toward micromobility usage	The attitudes of the respondents toward micromobility usage which will be assessed through the questionnaire given (either positive or negative).	1 = Positive Attitude 2 = Negative Attitude
12	Practice of micromobility usage	Practices on micromobility usage of the respondents which will be assessed through the questionnaire (either good practice, or poor practice).	1 = Good practice 2 = Poor practice

3.9 Data Collection Process

The data were collected through an online submission. The online questionnaires were written in Malay and English. All the respondents were approximately answered the survey within 10 to 15 minutes. After the respondents completed the questionnaire, the researcher immediately reviewed the missing or inaccurate data and excluded it from the analysis.

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3.10 Data Analysis

The data collected from the respondents were sorted, coded, and entered into a datasheet in Statistical Package for the Social Sciences (SPSS), version 26.0. Descriptive analyses were performed using frequencies, percentage, mean, median and standard deviation for demographic factors, knowledge, attitude level, and practice of micromobility usage.

3.11 Ethical Consideration

Ethical approval was obtained from the Ethical Committee for Research involving Human Subjects of Universiti Putra Malaysia (JKEUPM) with the reference number UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM) JKEUPM-2021-469. Written consent forms were obtained from the respondents before their participation in this study.

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CHAPTER 4

RESULTS

This chapter explains the response rate, normality testing, descriptive, and analytical analysis. Descriptive analysis includes the general overview of respondents characteristics in terms of socio-demography, socio-economy, knowledge, attitude, and practice of micromobility usage. The analytical part describes the association between knowledge, attitude and practice with the independent variables, and determines the predictors.

4.1 Response Rate

A total of 412 questionnaires were answered by the residents in Cyberjaya. However, there were 12 questionnaires being returned blank or incomplete. A total of 400 questionnaires being fully eligible, giving a response rate of 100%.

4.2 Normality Test

Normality test was done for the continuous data such as age, and the scores of knowledge, attitude, and practice of the micromobility usage. The Kolmogorov-Smirnov and Shapiro-Wilk normality test of all the continuous variables revealed the P-value less than 0.05 which was significant showing that there was a significant difference between the normally distributed data and these continuous data

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distributions in this study. All the continuous data were not normally distributed. Therefore, median was used to explain the central tendency with inter quartile range (1QR).

4.2 Descriptive Analysis

This section gives an overview of respondents socio-demographic and socio-economic backgrounds. It also contains the data analysis for the knowledge, attitude, and practice of micromobility usage among the respondents.

4.2.1 Demographic factors background

The socio-demographic and socio-economic backgrounds are described in Table 4.1. Most of the respondents were between 26-35 years old and 18-25 years old, which accounted for 33.8% and 31.5% respectively of the sample. The median age was 31.00 (IQR=15.0). The youngest respondent aged 18 while the oldest 54. Majority of the respondents gender are female (61.3%) while in terms of nationality, only 6 non-Malaysian that participated in this survey out of 400 respondents. In terms of ethnicity, the Malay respondents contribute the largest group (79.5%) as compared to other ethnicities. Most of the respondents were single (63.0%), one third of the respondents (36.0%) were married and only four respondents had divorced.

As for the level of education, most of the respondents were Diploma or Degree holders (57.5%) and 38.5% of them were SPM or Certificate holders. There are only 8.0%

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respondents that come from T20 family income (above RM10,971 per month) while 49.8% from B40 and 42.3% from M40 family income.

Table 4.1: Socio-demographic factors of the respondents (N=400)

Variable	Median (IQR)	Frequency (n)	Percentage (%)
AGE (in years)	31.00 (15)		
18 - 25		126	31.5
26 - 35		135	33.8
36 - 45		87	21.8
46 - 54		52	13.0
GENDER			
Male		155	38.8
Female		245	61.3
NATIONALITY			
Malaysian		394	98.5
Outlander		6	1.5
ETHNICITY			
Malay		318	79.5
Chinese		48	12.0
Indian		18	4.5
Others		16	4.0
MARITAL STATUS			
Single		252	63.0
Married		144	36.0
Divorced		4	1.0
EDUCATION LEVEL			
SPM/Certificate		154	38.5
Diploma/Degree		230	57.5
Master/PhD		5	1.3
Others		11	2.8
FAMILY INCOME			
B40		199	49.8
M40		169	42.3
T20		32	8.0

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4.2.2 Knowledge on the usage of micromobility

Majority of the respondents (70.1%) stated that they are not familiar with the word micromobility while 29.9% stated that they were familiar with the word micromobility. Half of the respondents stated wrongly that micromobility is not a form of physical activity programmes while another half of them answered correctly. Only 8.8% of the respondents stated wrongly that micromobility involves the use of drugs to make one healthy. Most of the respondents (83.0%) were able to state rightly that micromobility involves working and cycling as a means of transport. 2.3% stated poorly that micromobility makes one add weight while 0.8% of them stated poorly that micromobility involves watching television programmes at one's leisure. Almost half of the respondents (46.6%) did not know that micromobility also involves scooters, hoverboards, e-bikes as means of short trip.

Out of the 400 respondents, 64.3% stated correctly that swimming is not an example of micromobility, 35.8% stated wrongly that walking is not an example of micromobility. 90.0% stated correctly that dancing is not an example of active commuting, 57.8% stated correctly that travelling by car is not an example of active commuting. 41.3% stated wrongly that cycling is not an example of active commuting while 58.8% stated correctly that travelling by motorcycle is not an example of micromobility. Almost all of the respondents (95.0%) acknowledged that micromobility has any benefit.

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Majority of the respondents (85.0%) chose 'Time consuming' as an option that is not part of the benefit of micromobility. Most of the respondents (71.1%) also chose 'Electrocution' as the option that is not part of the risk associated with active commuting. Only one third of the respondents (30.9%) chose correctly that 'none of the above' is the answer under protection that should not be used during micromobility activity.

The median knowledge score was 7.00 (IQR=2.0). Result shows that the majority (79.5%) of the respondents had good knowledge on micromobility while one over five (20.5%) of the respondents had poor knowledge. See figure 4.3.

Table 4.2: Frequency distribution of Knowledge of the respondents (N=400)

Variable	Yes (%)	No (%)	Total
Familiar with the word micromobility?	29.9 (120)	70.1 (281)	400
Micromobility*			
a. It is a form of physical activity programmes	50.0 (200) **	50.0 (200)	400
b. It involve the use of drugs to make one healthy	8.8 (35)	91.3 (365)	400
c. It involve walking and cycling as a means of transport	83.0 (332) **	17.0 (68)	400
d. It makes one add weight	2.3 (9)	97.8 (391)	400
e. It involve watching television programme at one's leisure	0.8 (3)	99.3 (397)	400
f. It involve scooters, hoverboards, e-bikes as means of short trip	43.5 (174) **	46.8 (187)	400
Example of micromobility usage*			
a. Swimming	26.5 (106)	73.0 (292)	400
b. Walking	64.3 (257) **	35.8 (143)	400
c. Dancing	10.0 (40)	90.0 (360)	400
d. Travelling by car	42.3 (169)	57.8 (231)	400

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e. Travelling by motorcycle	41.3 (165)	58.8 (235)	400
f. Cycling	58.8 (235) **	41.3 (165)	400
g. Riding scooter	80.8 (323) **	19.3 (77)	400
Micromobility have any benefit	95.0 (380)	5.0 (20)	400
The benefits of micromobility usage are except			
a. Healthy Living	28.2 (113)	71.8 (287)	400
b. Reduce cost of Transportation	25.3 (101)	74.8 (299)	400
c. Time consuming	85.0 (340)**	15.0 (60)	400
d. Environmental friendly	7.0 (28)	93.0 (372)	400
e. A form of physical exercise	46.0 (184)	54.0 (216)	400
f. Mental alertness	29.8 (119)	70.3 (281)	400
The risks associated with micromobility usage except			
a. Road accident	18.0 (72)	82.0 (328)	400
b. Risk of inhaling particles	18.5 (74)	81.5 (326)	400
c. Risk of theft	4.8 (19)	95.3 (381)	400
d. Electrocution	41.3 (165)**	58.7 (235)	400
e. Insecurity	2.8 (11)	97.3 (389)	400
Not protective equipment that should be used during the usage of micromobility			
a. Face Mask	5.8 (23)	94.3 (377)	400
b. Head helmet	6.3 (25)	93.8 (375)	400
c. Knee guard	2.5 (10)	97.5 (390)	400
d. Chest guard	0.8 (3)	99.3 (397)	400
e. Sunglass	2.3 (9)	97.8 (391)	400
f. Face cap	13.5 (54)	86.5 (346)	400
g. None of the above	69.0 (276) **	31.0 (124)	400

*** Multiple response**
**** Correct answer**

Table 4.3: Level of knowledge on micromobility among respondents (N=400)

Knowledge level	Frequency (n)	Percentage (%)
Good (6-10)	318	79.5
Poor (0-5)	82	20.5

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4.2.3 Attitude of the Cyberjaya residents towards micromobility usage

Majority of the respondents (92.0%) agree that they can participate in micromobility usage even if they have the money to board a taxi for any short trip while 3.8% and 4.3% chose 'disagree' and 'undecided' respectively. Most of the respondents (76.0%) also disagree that micromobility is not an activity they will encourage whereas, only 13.0% and 11.0% of the respondents chose 'agree' and 'undecided' respectively, which showed that they have a good attitude toward micromobility usage. About half of the respondents (53.3%) disagree that micromobility is too dangerous for them to participate whereas, one third of the respondents (35.5%) chose 'agree', and the rest of them (11.3%) choose 'undecided'. Majority of the respondents (78.8%) agree that they enjoy cycling and walking from their place of residence to another place while 18.8% and 2.5% chose 'disagree' and 'undecided' respectively. In addition, most of the respondents (74.3%) also agree that they are fascinated by the sight of micromobility users while 20.8% and 5.0% chose 'disagree' and 'undecided' respectively.

More than half of the respondents (65.5%) agreed that people who cycle or ride scooter frighten them while only 21.3% disagree that people who cycle or ride scooter frighten them and 13.3% chose 'undecided'. Almost half of the respondents (48.8%) agreed that they hate engaging in using micromobility while 38% disagree that they hate engaging in using micromobility. 13.3% of them chose 'undecided'. Half of the respondents (51.5%) agreed that they like read materials on micromobility usage while 42.8% and 5.8% chose 'disagree' and 'undecided' respectively. Only about

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quarter of the respondents (30.0%) agreed that they were comfortable discussing about micromobility transportation with their friends and families while 49.5% and 20.5% chose 'disagree' and 'undecided' respectively. More than half of the respondents (58.3%) agreed that they like associating with people that do participate in physical activity programmes while 25.5% and 16.3% chose 'disagree' and 'undecided' respectively. Majority of the respondents (68.8%) agreed that they don't like engaging in micromobility because they get tired easily while only 20.5% disagree that they hate engaging in micromobility, and 10.8% chose 'undecided'.

Based on table 4.5, the result shows that the median attitude score was 6.00 (IQR=2.0) . More than half of the respondents (54.8%) have a positive attitude toward micromobility usage and another 45.3% of them had a negative attitude about micromobility usage.

Table 4.4: Attitude of the Cyberjaya residents towards micromobility (N=400)

Statements	Agree(%)	Disagree(%)	Undecided (%)	Total
1. I can participate in micromobility usage even if I have the money to board taxi to any near place	92.0 (368) **	3.8 (15)	4.3 (17)	400
2. Micromobility usage is not an activity I will encourage	13.0 (52)	76.0 (304) **	11.0 (44)	400
3. Micromobility usage is too dangerous for me to participate	35.5 (142)	53.3 (213) **	11.3 (45)	400
4. I enjoy cycling and walking from my place	78.8 (315) **	18.8 (75)	2.5 (10)	400

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of residence to another place				
5. I am fascinated by the sight of micromobility	74.3 (297) **	20.8 (83)	5.0 (20)	400
6. People who cycle or ride scooter frighten me	65.5 (262)	21.3 (85) **	13.3 (53)	400
7. I hate engaging in micromobility usage	48.8 (195)	38.0 (152) **	13.3 (53)	400
8. I like reading materials on micromobility	51.5 (206) **	42.8 (171)	5.8 (23)	400
9. I am comfortable discussing micromobility transportation with my friends and families	30.0 (120) **	49.5 (198)	20.5 (82)	400
10. I like associating with people that do participate in physical activity programmed	58.3 (233) **	25.5 (102)	16.3 (65)	400
11. I don't like engaging in micromobility usage because I get tired easily	68.8 (275)	20.5 (82) **	10.8 (43)	400

(positive attitude)**

Table 4.5: Level of attitude towards micromobility usage among respondents (N=400)

Attitude level	Frequency (n)	Percentage (%)
Positive (6-10)	219	54.8
Negative (0-5)	181	45.3

4.2.4 Practice on the micromobility usage among respondents

The level of practice was classified based on the respondents' most frequent means of transport for a short trip (<8km) for the past one month. The good practice included walking, cycling, riding scooter/hoverboard or combination (of walking, motor vehicle/etc) as the frequent means of transport, while public vehicle, private vehicle, or riding motorcycle will be categorized as poor practice of micromobility.

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In table 4.5, the level of micromobility practice among the respondents is illustrated. Based on the table, the respondents' most frequent mode of transportation in the last one month were used of private vehicles (40.5%), followed by riding the motorcycle (18.0%) and 16% of the respondents used combination (of walking, motor vehicle/ motorcycle etc). Only 15.8% of the respondents used public vehicle, 6.0% of them cycled, and 3.8% walking. This shows that only a quarter of the respondents (25.8%) in this study have a good practice on micromobility usage, while majority of the respondents (74.3%) were having a poor practice of the micromobility usage.

Furthermore, table 4.8 shows the practice and behaviour of the respondents for the practice of micromobility usage. Majority of the respondents (91.5%) reported that they have participated in micromobility usage before, while only 6.3% out of 400 participants said that they haven't participate in any of micromobility activity. Less than half of the respondents (34.5%) reported that they do participated in physical activity programmes daily while more than half of the respondents (62.0%) choose 'no' for the statement. Majority of the participants (81.5%) reported that they commute actively only at their leisure while most of them (76.8%) also reported that they commute actively individually. More than half of the respondents (60.5%) reported that they walk or cycle with partners about 65.5% make new friends whenever they are walking or cycling. About three quarter of the respondents (71.0%) reported that they always feel happy each time they participate in using micromobility and about 69.5% reported that their cultural belief encourage micromobility usage. Majority of

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the respondents (73.8%) reported that their parent encourage micromobility usage and almost half of the participants (47.0%) agreed that the friends they do make during using micromobility, do add values to their life while 15.0% said they don't. Only half of the respondents (56.3%) have participated in cycling in the past i.e. during childhood or while growing up.

Table 4.6: Respondent's most frequently used means of transport for short trip in the last one month. (N=400)

Variables	Frequency (%)
Means of most used transport for short trip (below 8 km) in the last one month	
Public Vehicle	15.8 (63)
Private vehicle	40.5 (162)
Walking	3.8 (15)
Cycling	6.0 (24)
By Motorcycle	18.0 (72)
Scooter or Hoverboard	0.0 (0)
Combination (of walking, motor vehicle/etc)	16.0 (64)

Table 4.7: Level of practice on micromobility usage among respondents (N=400)

Practice level	Frequency (n)	Percentage (%)
Good practice	103	25.8
Poor practice	297	74.3

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Table 4.8: Micromobility usage practices among respondents (N=400)

Statements	Yes (%)	No (%)	Don't know (%)	Total
1. Have you ever used micromobility before?	91.5	6.3	2.2	400
2. Do you participate in physical activity programmed such as walking/ cycling/ jogging every day?	34.5	62.0	3.5	400
3. Do you commute actively only during your leisure time?	81.5	17.5	1.0	400
4. Do you commute actively with individually?	76.8	19.8	3.5	400
5. Do you walk or cycle with partners?	60.5	28.7	10.8	400

4.3.1 Association between demographic factors with the level of knowledge on micromobility

Based on table 4.9, there is no association between the level of knowledge on micromobility with all the variables of demographics among respondents.

The association between age and the level of knowledge was not significant as the p-value (0.362) is greater than 0.05. The association between gender and the level of knowledge was also not significant as the p-value (0.114) is greater than 0.05. There was also no significant difference between nationality and the level of knowledge as the p-value (1.000) which is greater than 0.05. There is no significant difference between the level of knowledge with the ethnicity as the p-value (0.804) is greater than

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0.05. Next, there was also no association between marital status and the level of knowledge as p-value (0.548) is greater than 0.05. Education level also does not have any association with the level of knowledge as p-value (0.625) is greater than 0.05). There was also no significant difference between the level of knowledge and the family income as p-value (0.197) is more than 0.05.

Table 4.9: Association between knowledge and demographic variables among respondents (N=400)

Variable	Knowledge on micromobility		Total	Df	X^2	p-value
	Poor N (%)	Good N (%)		1	0.831	0.362
AGE (in years)						
18 - 35	50 (12.5%)	211 (52.8%)	261 (65.3%)			
36 - 54	32 (8.0%)	107 (26.8%)	139 (34.8%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			
GENDER				1	2.504	0.114
Male	38 (9.5%)	117 (29.3%)	155 (38.8%)			
Female	44 (11.0%)	201 (50.2%)	245 (61.3%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			
NATIONALITY				1	0.055**	1.000
Malaysian	81 (20.3%)	313 (78.3%)	394 (98.5%)			
Non-Malaysian	1 (0.3%)	5 (1.3%)	6 (1.5%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			
ETHNICITY				1	0.062	0.804
Malay	66 (16.5%)	252 (63.0%)	318 (79.5%)			

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Others	16 (4.0%)	66 (16.5%)	82 (20.5%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			
MARITAL STATUS				1	0.360	0.548
Single	54 (13.5%)	198 (49.5%)	252 (63.0%)			
Ever Married	28 (7.0%)	120 (30.0%)	148 (37.0%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			
EDUCATION LEVEL				1	0.239	0.625
Below Diploma/Degree	22 (5.5%)	77 (19.3%)	99 (24.8%)			
Diploma/Degree and above	60 (15.0%)	241 (60.3%)	301 (75.3%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			
FAMILY INCOME				1	1.662	0.197
B40	46 (11.5%)	153 (38.3%)	199 (49.8%)			
Others (M40 and T20)	36 (9.0%)	165 (41.3%)	201 (50.2%)			
TOTAL	82 (20.5%)	318 (79.5%)	400			

** = *Fisher Exact Test* *p-value* is significant if $p<0.05$

4.3.2 Association between demographic factors with the level of attitude towards the micromobility usage.

Table 4.10 displays the association between the level of attitude towards micromobility usage with the demographic variables. In this study, there was a significant association between age and the level of attitude towards micromobility usage (X^2=4.067, *df*=1, p=0.001). As shown in the table below, 39.8% of the younger people aged 18 to 35

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years old and 15.0% of the older people aged 36 to 54 years old have a positive attitude towards micromobility usage. Besides, this study also revealed that there was a significant association between the level of attitude with ethnicity (X^2=11.540, *df*=1, p=0.044). 41.5% of the Malay respondents had a positive attitude towards micromobility, while only 13.3% of other ethnic including Chinese, and Indian had a positive attitude towards micromobility.

Next, there was also an association between marital status and the level of attitude toward micromobility (X^2=4.355, *df*=1, p=0.037), where 37.0% of the respondents that is single had a positive attitude towards the level of attitude while 17.8% of the ever married respondents had a positive attitude towards the level of attitude. Furthermore, the level of education also had a significant association between the level of attitude and the level of education (X^2=8.068, *df*=1, p=0.005), where respondents with higher level of education (54.8%) had positive attitudes towards micromobility usage while respondents with lower level of education (10.5%) had a positive attitude toward micromobility usage. Thus, there was an association between the attitude towards micromobility with the age, ethnicity, marital status, and the level of education.

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Table 4.10: Association between level of attitude and demographic variables among respondents (N=400)

Variable	Attitudes towards micromobility usage		Total	Df	X^2	p-value
	Negative N (%)	Positive N (%)				
AGE (in years)				1	11.540	0.001*
18 - 35	102 (25.5%)	159 (39.8%)	261 (65.3%)			
36-54	79 (19.8%)	60 (15.0%)	139 (34.8%)			
TOTAL	181 (45.3)	219 (54.8%)	400			
GENDER						
Male	73 (18.3%)	82 (20.5%)	155 (38.8%)	1	0.348	0.555
Female	108 (27.0%)	137 (34.3%)	245 (61.3%)			
TOTAL	181 (45.3)	219 (54.8%)	400			
NATIONALITY				1	0.349**	0.694
Malaysian	179 (44.8%)	215 (53.8%)	394 (98.5%)			
Non-Malaysian	2 (0.5%)	4 (1.0%)	6 (1.5%)			
TOTAL	181 (45.3)	219 (54.8%)	400			
ETHNICITY				1	4.067	0.044*
Malay	152 (38.0%)	166 (41.5%)	318 (79.5%)			
Others	29 (7.2%)	53 (13.3%)	82 (20.5%)			
TOTAL	181 (45.3)	219 (54.8%)	400			
MARITAL STATUS				1	4.355	0.037*

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Single	104 (26.0%)	148 (37.0%)	252 (63.0%)			
Ever Married	77 (19.3%)	71 (17.8%)	148 (37.0%)			
TOTAL	181 (45.3)	219 (54.8%)	400			
EDUCATION LEVEL				1	8.068	0.005 *
Below Diploma/Degree	57 (14.2%)	42 (10.5%)	99 (24.8%)			
Diploma/Degree or above	124 (31.0%)	177 (44.3%)	301 (75.3%)			
TOTAL	181 (45.3)	219 (54.8%)	400			
FAMILY INCOME				1	2.614	0.106
B40	82 (20.5%)	117 (29.3%)	199 (49.8%)			
Others (M40 and T20)	99 (24.8%)	102 (25.5%	201 (50.2%)			
TOTAL	181 (45.3)	219 (54.8%)	400			

** = *Fisher Exact Test* **p-value* is significant if *p<0.05*

4.3.2 Association between demographic factors with the level of practice on the micromobility usage.

Based on table 4.11, there was only an association between the level of practice on the micromobility usage with the gender (X^2=14.258, *df*=1, p<0.001), where 14.0% of male had good practice on micromobility compared to the female which only 11.8% of them had a good practice on the micromobility usage. There was no other significant association between the level of practices with other demographics variables (age, nationality, ethnicity, marital status, level of education, and family income) as the p-value were greater than 0.05.

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Table 4.11: Association between level of micromobility practice and demographic variables among respondents (N=400)

Variable	Practice of micromobility		Total	Df	X^2	p-value
	Poor N (%)	Good N (%)				
AGE (in years)				1	0.002	0.960
18 - 35	194 (48.5%)	67 (16.8%)	261 (65.3%)			
36-54	103 (34.7%0	36 (9.0%)	139 (34.8%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			
GENDER				1	14.258	0.000*
Male	99 (24.8%)	56 (14.0%)	155 (38.8%)			
Female	198 (49.5%)	47 (11.8%)	245 (61.3%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			
NATIONALITY						
Malaysian	291 (72.8%)	103 (25.8%)	394 (98.5%)	1	2.112**	0.345
Non-Malaysian	6 (1.5%)	0 (0.0%)	6 (1.5%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			
ETHNICITY				1	0.100	0.752
Malay	235 (58.8%)	83 (20.8%)	318 (79.5%)			
Others	62 (15.5%)	20 (5.0%)	82 (20.5%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			
MARITAL STATUS				1	0.69	0.793

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Single	186 (46.5%)	66 (16.5%)	252 (63.0%)			
Ever Married	111 (27.8%)	37 (9.3%)	148 (37.0%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			
EDUCATION LEVEL						
Below Diploma/Degree	75 (18.8%)	24 (6.0%)	99 (24.8%)	1	0.156	0.693
Diploma/Degree or above	222 (55.5%)	79 (19.8%)	301 (75.3%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			
FAMILY INCOME				1	0.003	0.956
B40	148 (37.0%)	51 (12.8%)	199 (49.8%)			
Others (M40 and T20)	149 (37.3%)	52 (13.0%)	201 (50.2%)			
TOTAL	297 (74.3%)	103 (25.8%)	400			

** = *Fisher Exact Test* **p-value* is significant if *p<0.05*

4.4 Association of Knowledge, Attitude, and Practice of the micromobility usage.

The table 4.12 below represents the association between knowledge, attitude, and practice of micromobility usage. This study has shown that there was a significant association between the knowledge on micromobility and practice (X^2=6.334, *df*=1, p=0.012). Out of 318 respondents with good knowledge, only 18.3% had a good level of micromobility practice compared with 7.5% of those with poor knowledge.

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There was no significant association between attitude and practice of micromobility as the p-value is greater than 0.05. Furthermore, there was also no association between the level of knowledge and attitudes towards the micromobility usage as the p-value is more than 0.05.

Table 4.12: Association between level of knowledge, attitude, and practice on micromobility usage (N=400)

Variable	Practice		Test statistics		
	Poor n (%)	**Good n (%)**	**X^2**	**Df**	**p-value**
Knowledge level			6.334	1	0.012*
Poor (0-5)	52 (13.0%)	30 (7.5%)			
Good (6-10)	245 (61.3%)	73 (18.3%)			
Attitude level			0.008	1	0.928
Negative (0-5)	134 (33.5%)	47 (11.8%)			
Positive (6-10)	163 (40.8%)	56 (14.0%)			

Table 4.13: Association between level of knowledge and attitudes on micromobility usage (N=400)

Variable	Knowledge		Test statistics		
	Poor n (%)	**Good n (%)**	**X^2**	**Df**	**p-value**
Attitude level			0.831	2	0.660
Negative (0-5)	41 (10.3%)	140 (35.0%)			
Positive (6-10)	41 (10.3%)	178 (44.5%)			

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CHAPTER 5

DISCUSSIONS

5.1 Response rate

In this study, the response rate was very high for self-administered questionnaires which was 100%. This outcome is probably because the questionnaire can be distributed online and face-to-face to the respondents.

5.2 Distribution of Sociodemographic factors of the respondents

In this study, the majority of the respondents (65.3%) were aged between 18 and 35 years old. This distribution could be explained by the survey being conducted online, where younger generations are more likely to be exposed to social media, which aligns with the 2017 Internet Users Survey (Malaysian Communications and Multimedia Commision, 2017). Additionally, it aligned with another study from Bangladesh that examined respondents' knowledge, attitudes, and practices surrounding the COVID-19 outbreak in Bangladesh via an online-based cross-sectional study, with the majority of respondents (71.0 %) being between the ages of 21 and 30 (Ferdous, M. Z., et.al, 2020).

Following that, 61.3 % of respondents were female. As several studies have demonstrated, gender has a significant impact on online behaviour and has been found to correspond with online activities (Jackson, Ervin, Gardner, & Schmidt, 2001;

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Kendall, 1999; Lucas & Smith, 2004; Morahan-Martin, 1998; Ogen and Chung, 2003; O'Brien, 1999; Tannen, 1991; Travers, 2003; Turkle, 1995). Notably, some researchers assert that females are more likely to engage in online activities that include conversation and information exchange, whilst males are more likely to engage in online activities that involve information searching (Jackson et al., 2001).

Furthermore, more than half of the respondents were single (63.0%) and the rest were either married or divorced. This may be due to the fact that the questionnaires were mostly distributed among the students through the group Whatsapp, and face-to-face data collection near the schools, and universities in Cyberjaya. According to Setia Haruman (2019), Cyberjaya's student population was 32,607, or 25.6% of the city's overall population of 127,421. There were 5 universities, 3 colleges, and 8 schools which had become the source of education in the city. Besides, more than half of the respondents (57.5%) were degree or diploma holders.

Moreover, the majority of the respondents (79.5%) were from Malay ethnics, followed by Chinese ethnics (12.0%), Indian ethnics (4.5%), and other ethnics (4.0%) respectively. Most of the participants were from Malay ethnics as majority of the population in Cyberjaya were from Malay ethnics which consist of 68.0% of the total population (State Economic Planning Unit (UPEN) Selangor, 2021).

Next, Malaysian citizens were the most contributors in answering the questionnaires as they took part for 98.5% of the respondents. However, Alicia (2020)

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reported that foreigners account for 47.3% of the population, with Chinese, Indians, and foreigners making up the majority of Cyberjaya's residents. Additionally, there are numerous Africans in the neighbourhood, the most of them are students at the local university or employees at a foreign technology business. This may be due to the fact that the online questionnaires were very difficult to reach the foreigner or non-Malaysian as the social media used for the questionnaire distribution may not be compatible with the foreigner.

Almost half of the respondents (49.8%) came from B40 family which means that their family were between middle-income group which represents 40% of Malaysians. The monthly household income are between RM4,851 until RM10,970. In 2019, Malaysia's mean income was RM7,901, while the median income was RM5,873 (Household Income and Basic Survey Amenities Report, 2019).

5.3 Knowledge on the micromobility usage

In the present study, the knowledge, attitude, and practice of Cyberjaya residents were assessed by using online questionnaire. Based on the result, it is found that only half of the respondents (52.8%) had good knowledge of micromobility. This may due to the fact that respondents had already familiar with the existence of micromobility as residents in Cyberjaya had already exposed with micromobility activity since the launched of TRYKE station in Cyberjaya in 2019. Nowadays, TRYKE station can be seen almost everywhere around the Cyberjaya as it had been expanded since three

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years ago. Next, there was no significant difference found in median knowledge with respect to all demographic variables.

Most of the respondents did not familiar with the word micromobility as the term was rarely used in Malaysia and it is still not well-spread among the community. Micromobility Report (2021) wrote that the term 'micromobility' is just four years old, having been coined by Horace Dediu, a business analyst in the United States of America since 2017. Due to the fact that the term is so new, its meaning is continually developing until now, although it is widely acknowledged to encompass bicycles, e-bikes, electric scooters, and shared systems including all of these devices.

Most of the respondents had the basic understanding on the benefits of the micromobility as out of 400 respondents, only 15.0% of them answered wrongly as they agreed with the statement of ‘time consuming’ as one of the micromobility benefits. However, only some of the respondents acknowledged the risk associated with micromobility as they agreed that ‘electrocution’ was not a risk related to the micromobility. According to Safety Concerns Associated with Micromobility Products (2020), the risks connected with micromobility products, such as e-scooters, are classified into three basic categories: mechanical, electrical, and human factors. Mechanical dangers include falls, including rider ejections as a result of frame or structural failures, as well as braking issues and accidents with motor vehicles, objects, and pedestrians. Electrical dangers include fires and explosions caused by battery failures and mechanical battery mounting difficulties, as well as falls and rider

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ejections caused by electronic control (hardware and firmware) malfunctions. Human factors hazards include, but are not limited to, the risks mentioned previously that are associated with user expectations and reasonably foreseeable use cases, such as user positioning (e.g., probable forward body positioning due to handle placement and foot area width) and the location and operation of emergency controls (e.g., brakes), all of which affect the user's ability to respond safely in a dangerous situation.

Most of the respondents still lack the knowledge and importance about the self-protective equipment that should be used when using the micromobility as it is a prevention method to protect them from injury and hazardous pollutants in the air. ITF (2020) had emphasized that the policymakers should require and enforce the usage of helmets on micromobility travelling at speeds greater than a specific threshold. Most governments opted not to require helmet usage on low-speed micromobility. Shared micromobility firms should continue to promote helmet wear, since helmets have been shown to reduce the severity of brain injuries in certain collision types.

5.4 Attitude towards micromobility usage

Only half of the participants have a positive attitude toward micromobility usage. Respondents that have positive thinking may have awareness on the benefits of using the mobility either to environment, reduce road congestion (Abe Martin, 2021) while respondents that have negative thinking may be aware on the risk associated with the micromobility usage such as road accidents, insecurity, theft, and inhaling pollutants. Furthermore, based on the result in this study, there were associations between age,

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level of education, marital status, nationality, and ethnicity with the attitudes towards micromobility usage. However, marital status, nationality, and ethnicity had been excluded from the relationship as the distribution of data were not generalized.

Following that, the relationship between age and level of education with attitudes toward micromobility may because of the exposure receive on information about micromobility by the certain population is varied especially through the social media, learning system, and many more. Hence, only age had a significant association on the attitudes toward the micromobility usage *($p<0.05$)*. Older people were more likely played a significant role in mean attitude scores compared to the younger generation. The result in this study which found that younger people have more positive attitude towards micromobility was aligned with previous studies conducted in United States, which reported that older adults were less likely to have positive attitude towards active commuting (Melissa B. et al., 2012) same goes to another study that reported older people were more likely to have negative attitude towards micromobility due to behavioural beliefs, household cars, and walking distance were the recognized predictors (Bopp M. et al., 2012). Older people most probably concerns with the safety of micromobility usage while younger people more ready to disregard safety concerns in favour of speed or agility (Krizek and Nancy McGuckin, 2019).

As older people tends to have negative attitudes towards micromobility, it is recommended that the policy makers to consider the age factors in promoting micromobility by focusing more to the group that lack in initiating micromobility

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activity to help them fully understand the benefits of micromobility which can led them to have positive attitudes toward micromobility. For an example, there is a report called ‘A physically active life through everyday transport with a special focus on children and older people and examples and approaches from Europe’ which had been published since 2002. This report specifically target children and older people for physical activity as those two groups had low physical activity.

5.5 Practice of micromobility usage

Furthermore, only one out of ten of the respondents in this study were active micromobility users which is very low. It shows that the majority of the respondents were more likely to use cars, e-hailing, public transport, or motorcycles as means of transportation for the short distance trip. The lack of people that use micromobility as their daily transportation for short distance trip may cause by Malaysia regulations itself which do not allows the use of micromobility on the roads due to safety issues.

Besides, there was only an association between micromobility practice with gender. Based on the result in this study, male respondents have higher micromobility practice compared to the female. The finding was aligned with another study that stated, women had lower practice of micromobility compared to man as they feel less comfortable in risky traffic conditions, and a matter of convenience (Krizekand Nancy McGuckin, 2019). Vehicle design may play a role in closing the gap. In the conventional cycling world, proponents frequently argue that public bikeshare systems may make riding more accessible by removing the bother of bicycle locking,

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maintenance, and storage (as well as dealing with male-dominated bike stores). Additionally, proponents of electric micromobility assert that new car forms and designs may aid in the transition (Bliss. L, 2019).

5.6 Knowledge, Attitude, and Practice of Micromobility

Findings from the current research found that having good knowledge on micromobility accounts for good practices of micromobility among the respondents. It is aligned with another study that also reported that increase in knowledge leads to increase in commuting practices (Adekey, 2017). Thus, the practice of micromobility can be increase by improving the level of knowledge regarding micromobility. Knowledge can be gained from everywhere. Robert Audi defines four "standard fundamental sources" of knowledge or justified belief in "The Sources of Knowledge" as: perception, memory, awareness, and reason. So, one of the way to increase knowledge related to the micromobility are through advertising on social media, media mass, infographics and many more.

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CHAPTER 6

CONCLUSION AND RECOMMENDATION

This chapter will conclude the study by summarising the key research findings in relation to the research aims and questions and discussing the value and contribution thereof. It will also review the limitations of the study and propose opportunities for future research.

6.1 Conclusion

This study aimed to investigate the knowledge, attitude, and practice on micromobility among residents in Cyberjaya. The results indicate that the level of knowledge and attitudes of the respondents toward micromobility were still at a fair level as only half of the respondents managed to achieve good knowledge on micromobility and positive attitudes toward micromobility usage. Hence, the level of practice among respondents was very low. Further findings show that there were relationship between attitude with age ($p=0.001$) and relationship between attitude with educational level ($p=0.005$). There was also relationship between the micromobility practice with the gender ($p<0.001$). Good knowledge also corresponds with the good practice of micromobility as there was a relationship between knowledge and practice of micromobility ($p=0.012$).

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6.2 Strength and study limitation

This study strength is it provides a baseline for knowledge, attitude, and practice among residents in Cyberjaya and helps to fill the gap on the knowledge of micromobility which are still far away to be fully understand and well-developed to become daily means of transportation for short distance trip. This study also could increase the awareness regarding micromobility as a new means of sustainable transportation.

The major limitation of this study is that the sample sizes are confined to the Cyberjaya region, and so the findings cannot be applied to all populations in Malaysia, however they may undoubtedly assist the state and country in raising awareness about KAP among the general public. Due to the questionnaire being self-administered, there is a significant likelihood of inaccuracies or misinterpretation of data. Additionally, this study omits information on the factors associated with the attitudes and practice of the micromobility. In light of these findings, more research should be done in the near future to elicit additional information about factors associated with micromobility knowledges, attitudes and practises to identify the critical aspects that should be addressed when implementing the micromobility and assist enforcers in developing a more targeted approach for minimising micromobility in Malaysia.

6.3 Recommendation

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This study recommends for further study on the factors associated with the knowledge, attitudes and practice of the micromobility usage to prioritize the significant factors that should be tackled when implementing the micromobility. Besides, another same study can be done in another city that may not have enough exposure regarding micromobility to compare their level of knowledge, attitude, and practice on micromobility. This study also suggested that the micromobility developers and other interested parties such as KASA (Kementerian Alam Sekitar dan Air) should promote the micromobility through media mass and social media such as Tiktok, Twitter, Facebook, Instagram, and many more to increase the public awareness on the micromobility usage and increase their knowledge so that, the practice of micromobility can be increase.

Policy makers, government, local authority, or any interested parties also should take action to ensure that the safety of micromobility users will not be compromised by providing the best environment for the active micromobility users and improve sidewalks conditions by adding street trees, public seats, pedestrian scale lighting, and enhancing public art on sidewalks to promote active commuting (Wier M. et. al, 2011). As micromobility can just be used at the certain place like sidewalks and bicycle lanes, policy makers should consider to improve road connectivity to facilitate the micromobility users and provide regulations for micromobility users that will specifically the things that they can or cannot do during using a micromobility.

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APPENDICES

APPENDIX 1: JKEUPM APPROVAL LETTER

ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS
(JKEUPM)
UNIVERSITI PUTRA MALAYSIA

Research title	:	**Knowledge, Attitudes and Practices Related to the Usage of Micromobility Among Residents in Cyberjaya.**
Study Site	:	**Cyberjaya**
JKEUPM Ref No.	:	**JKEUPM-2021-469**
Researcher	:	**Nur Irdina Izzati Binti Jomain**
Supervisor	:	**Dr. Nor Eliani Binti Ezani**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 15/7/2021
2. Respondent Information Sheet & Consent (English), Version 2 dated 13/9/2021
3. Respondent Information Sheet & Consent (Malay), Version 2 dated 13/9/2021
4. Proposal (English), Version 2 dated 6/9/2021
5. Questionnaire/Interviews (English), Version 1 dated 15/7/2021
6. Questionnaire/Interviews (Malay), Version 1 dated 15/7/2021
7. Curriculum Vitae of:
    a. Dr. Nor Eliani Binti Ezani

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

[X] Approved

[X] **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**

[ ] Disapproved

Please note that the approval is **VALID UNTIL 14 OCTOBER 2022**

Researchers should comply with the following:

I. Complete a Study Final Report upon study completion (Form 3.2).

II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved sites to JKEUPM. SAEs are to be reported within 15 calendar days from awareness of event by

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APPENDIX 2: SAMPLE SIZE CALCULATION

No	Specific Objectives	Formula	Prevalence from previous study	Total sample size
1	To determine the socio-demographic status of residents in Cyberjaya.	None	None	None
2	To determine the level of knowledge, attitudes, and practices regarding micro mobility usage among residents in Cyberjaya.	**One proportion formula:** $n = \frac{Z^{2(1-)}}{d^2}$ Where, n = sample size, Z = Z statistic for a level of confidence, P = expected prevalence or proportion (in proportion of one; if 20%, P = 0.2), and d = precision (in proportion of one; if 5%, d = 0.05) n=1.962 [0.38 (1-0.38)]/0.052 n= 364	For knowledge, P= 0.38 (good knowledge among respondents on active commuting by ADEKEYE, 2017)	364
3	To determine the association between socio-demographic and level of knowledge, attitudes and practices on micro mobility usage among residents in Cyberjaya.	**Two proportion formula:** $n = (Z_{1-\alpha}\sqrt{2\underline{P}(1-\underline{P})} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)})^2 / (p_1-p_2)^2$ Then, $\underline{P} = (P_1 + P_2)/2$ Where, $\underline{P} = (P_1 + P_2)/2$ n = sample size, $Z_{1-\alpha}$ = z-score for (1-α) of 95% = 1.96 $Z_{1-\beta}$ = z-score for (1-β) of 80% = 0.842 P1 = 0.50 P2 = 0.49 P = (0.50 + 0.49)/2 = 0.495 n = [1.962 √2(0.495)(1-0.495) + 0.842 √(0.50)(1-0.50) + (0.49)(1-0.49)]^2 / (0.50-0.49)^2	P1: 0.50 (male that have good knowledge) P2: 0.49 (female that have good knowledge) (ADEKEYE, 2017)	38

APPENDIX 3 (QUESTIONNAIRE)

Dear Respondent,

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Greetings, my name is Nur Irdina Izzati binti Jomain, a degree student in the Department of Environmental and Occupational Health, Faculty of Health and Medical Science, University Putra Malaysia. I am currently conducting a research project titled Knowledge, Attitude and Practice Related to the Usage of Micromobility and Assessment of Carbon Footprint Among Residents in Cyberjaya, as part of requirement for final year project. I intend to gather information from you on the topic, and I will be very grateful if you can spare several minutes to participate in the study by completing the questionnaire. Hence, the questionnaire developed aims to assess Knowledge, Attitude and Practice of Micromobility Usage among Cyberjaya residents. The results from this survey will be used as the basis for understanding the current knowledge, attitudes and practices regarding micromobility usage in Cyberjaya and give insight to the authorities and micromobility related company in order to promote the use of the new trend of sustainable transportation named 'micromobility'. Road Transport (Amendment) Act 2020, which was published in October 2019, defines 'micromobility' as vehicles that are driven by electricity, internal combustion, or human power, or any combination of these, and have a top speed of 50 km/h.

Responden yang dihormati,

Salam, nama saya Nur Irdina Izzati binti Jomain, pelajar ijazah di Jabatan Kesihatan Pekerjaan dan Persekitaran, Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia. Saya kini sedang menjalankan projek penyelidikan yang bertajuk Pengetahuan, Sikap dan Amalan yang Berkaitan dengan Penggunaan Mikromobiliti dan Penilaian Jejak Karbon Di Kalangan Penduduk di Cyberjaya, sebagai syarat keperluan projek tahun akhir. Saya berhasrat untuk mengumpulkan maklumat daripada anda mengenai topik ini dan saya akan sangat menghargai jika anda dapat meluangkan masa selama beberapa minit untuk mengambil bahagian dalam kajian ini dengan melengkapkan soal selidik. Hasil dari tinjauan ini akan digunakan sebagai dasar untuk memahami pengetahuan, sikap dan praktik terkini mengenai penggunaan mikromobiliti di Cyberjaya dan memberikan wawasan kepada pihak berwajib dan perusahaan yang berkaitan dengan mikrombiliti untuk mempromosikan penggunaan tren baru pengangkutan lestari bernama 'mikromobiliti'. Akta Pengangkutan Jalan (Pindaan) 2020, yang diterbitkan pada bulan Oktober 2019, mendefinisikan 'mikromobiliti' sebagai kenderaan yang didorong oleh elektrik, pembakaran dalaman, atau tenaga manusia, atau gabungannya, dan mempunyai kelajuan tertinggi 50 km/j.

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Name is not required and confidentiality of your identity, response and opinion will be ensured. You are requested to provide honest responses as much as possible as you complete the questionnaire.

Nama tidak diperlukan dan kerahsiaan identiti, respons dan pendapat anda akan terjamin. Anda diminta memberikan jawapan yang jujur sebanyak mungkin semasa anda melengkapkan soal selidik ini. Tandakan kotak di bawah ini untuk menunjukkan kesediaan penyertaan anda

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SECTION A: SOCIO DEMOGRAPHIC DATA

BAHAGIAN A: DATA SOSIO-DEMOGRAFIK

Note: please tick{√} the appropriate responses

Catatan: sila tandakan {√} bagi jawapan yang sesuai

1. Gender/ *Jantina* :

   a) Male/ *Lelaki* [ ] b) Female/ *Perempuan* [ ]

2. Age in years (at last birthday)/ *Umur dalam tahun (pada hari lahir yang terkini)*: _____

3. Ethnicity/ *Bangsa* :

   a) Malay/ *Melayu* [ ] b) Chinese/ *Cina* [ ] c) Indian/ *India* [ ]

   d) Others (Please specify)/ *Lain-lain (Sila nyatakan)*

4. Citizenship/ Kewarganegaraan:

   a) Citizen/ Warganegara [ ]

   b) Non-citizen/ Bukan warganegara [ ]

5. Marital status/ *Status perkahwinan*:

   a) Single/ *Bujang* [ ] b) Married/ *Berkahwin* [ ] c) Divorced/ *Bercerai* [ ]

   d) Others (Please specify)/ *Lain-lain (Sila nyatakan)*

6. Residential area/ *Kawasan perumahan*: _____

7. Occupation/ *Pekerjaan*: _____

8. Level of study (highest)/ *Tahap pengajian (tertinggi):* _____

9. Socio-economicstatus/ *Status sosioekonomi*:

   a) B40 [ ] b) M40 [ ] c) T20 [ ]

   d) Others (please specify*)/ Lain-lain (sila nyatakan) :*

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SECTION B: KNOWLEDGE ABOUT MICROMOBILITY

BAHAGIAN B: PENGETAHUAN TENTANG MIKROMOBILITI

10. Are you familiar with the word micromobilty? YES [ ] NO [ ]

Adakah anda biasa dengan perkataan micromobilty? YA [ ] TIDAK [ ]

Instruction: Question 11 and 13 is a multiple choice question, you can therefore tick[√] more option by ticking the boxes as appropriate answers

Arahan: Soalan 11 dan 13 adalah soalan pilihan ganda, oleh itu anda boleh menandakan [√] lebih banyak pilihan dengan menandakan kotak untuk jawapan yang sesuai

11. The following are correct about micromobility;

Berikut adalah betul mengenai pergerakan mikromobility

(1) it is a form of physical activity programmes/
Ia adalah bentuk program aktiviti fizikal

(2) it involve the use of drugs to make one healthy/
Ia melibatkan penggunaan ubat-ubatan untuk menjadikan seseorang sihat

(3) it involve walking and cycling as a means of transport/
Ia melibatkan berjalan kaki dan berbasikal sebagai alat pengangkutan

(4) it makes one add weight/
Ia menjadikan seseorang bertambah berat badan

(5) it involve watching television programme at one's leisure/
Ia melibatkan menonton program televisyen pada waktu lapang

(6) it involve scooters, hoverboards, e-bikes as means of short trip /
Ia melibatkan skuter, papan hover, e-basikal, sebagai alat perjalanan pendek

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12. Which of the following is/are not an example of micromobility usage

Manakah antara berikut yang bukan merupakan contoh penggunaan kemudahan mikromobiliti

(1) Swimming/ *Berenang*

(2) Walking/ *Berjalan*

(3) Dancing/ *Menari*

(4) Travelling by car/ *Perjalanan dengan kereta*

(5) Cycling/ *Berbasikal*

(6) Riding scooter/ *Menaiki skuter*

13. Does usage of micromobility have any benefit? YES [ ] NO [ ]

Adakah penggunaan micromobility mempunyai faedah? YA [ ] TIDAK [ ]

Instruction: Please tick [√] only one answer out of the option for each question l5 to l7

Arahan: Tandakan [√] hanya satu jawapan daripada pilihan untuk setiap soalan l5 hingga l7

14. The benefits of micromobility usage include the following except;

Manfaat penggunaan mobiliti termasuk yang berikut kecuali;

(1) Healthy Living/ *Kehidupan yang sihat*

(2) Reduce cost of Transportation/ *Kurangkan kos Pengangkutan*

(3) Time consuming*/ Mengambil masa*

(4) Environmental Friendliness/ *Mesra alam*

(5) A form of physical exercise*/ Satu bentuk latihan fizikal*

(6) Mental alertness/ *Kewaspadaan mental*

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15. The following are some of the risks associated with micromobility usage except;

Berikut adalah beberapa risiko yang berkaitan dengan penggunaan mikromobiliti kecuali;

(1) Road accident/ *Kemalangan jalan raya*

(2) Risk of inhaling particles/ *Risiko menyedut zarah*

(3) Risk of theft/ *Risiko kecurian*

(4) Electrocution/ *Renjatan elektrik*

(5) Insecurity/ *Ketidakamanan*

16. Which of these is not protective equipment that should be used during the usage of micromobility?

Yang manakah bukan alat pelindung yang harus digunakan semasa penggunaan mikromobiliti?

(1) Face Mask/ *Topeng muka*

(2) Head helmet/ *Topi keledar kepala*

(3) Knee guard/ *Penjaga lutut*

(4) Chest guard/ *Penjaga dada*

(5) Sunglass/ *Cermin mata hitam*

(6) Face cap/ *Topi muka*

(7) None of the above/ *Tiada satu pun di atas*

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SECTION C: ATTITUDE TOWARDS MICROMOBILITY USAGE

BAHAGIAN C: SIKAP TERHADAP PENGGUNAAN MIKROMOBILITI

S/N	Statements/ *Penyataan*	Agree/ *Setuju*	Undecide d/ *Tidak pasti*	Disagre e/ *Tidak setuju*
19	I can participate in micromobility usage even if I have the money to board taxi to any near place/ *Saya boleh mengambil bahagian dalam penggunaan mikromobiliti walaupun saya mempunyai wang untuk menaiki teksi ke tempat yang berdekatan*			
20	Micromobility usage is not an activity I will encourage/ *Penggunaan mikromobiliti bukanlah aktiviti yang akan saya galakkan*			
21	Micromobility usage is too dangerous for me to participate/ *Penggunaan mikromobiliti terlalu berbahaya untuk saya sertai*			
22	I enjoy cycling and walking from my place of residence to another place/ *Saya menikmati berbasikal dan berjalan dari tempat kediaman saya ke tempat lain*			
23	I am fascinated by the sight of micromobility / *Saya terpesona melihat pengunaan mikromobiliti*			
24	People who cycle or ride scooter frighten me/ *Orang yang mengayuh atau menaiki skuter menakutkan saya*			

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25	I hate engaging in micromobility usage/ *Saya tidak suka menggunakan mikromobiliti*			
26	I like reading materials on micromobility/ *Saya suka bahan bacaan mengenai mikromobiliti*			
27	I am comfortable discussing micromobility transportation with my friends and families/ *Saya selesa membincangkan tentang pengangkutan mikromobiliti dengan rakan dan keluarga*			
28	I like associating with people that do participate in physical activity programmed/ *Saya suka bergaul dengan orang yang mengambil bahagian dalam aktiviti fizikal yang diprogramkan*			
29	I don't like engaging in micromobility usage because I get tired easily/ *Saya tidak suka melibatkan diri dalam penggunaan mikromobiliti kerana mudah letih*			

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SECTION D: MICROMOBILITY PRACTICES

BAHAGIAN D: PENGAMALAN MIKROMOBILITI

Instruction: Please tick [√] as many as you feel is/are applicable to you in question 29 Arahan: Tandakan [√] seberapa banyak yang anda rasa / bersesuaian untuk anda dalam soalan 29

30. By what Transport means have you ever get for short trip (below 8km) in the last one month?
Apakah pengangkutan yang pernah anda dapatkan untuk perjalanan pendek (di bawah 8km) dalam satu bulan terakhir?

(1) Public Vehicle/ *Kenderaan Awam*

(2) Private vehicle/ *Kenderaan persendirian*

(3) Walking/ *Berjalan*

(4) Cycling/ *Menunggang basikal*

(5) By Motorcycle/ *Dengan Motosikal*

(6) Scooter or Hoverboard/ *Skuter atau Hoverboard*

(7) Combination (of walking, motor vehicle/etc)/ *Gabungan (berjalan kaki, kenderaan bermotor / dll)*

(8) Others? (Please specify)/ *Lain-lain (Sila nyatakan*): _____

31. Which mode of transportation did you use most frequently in the last one month?
Kaedah pengangkutan mana yang paling sering anda gunakan dalam satu bulan terakhir?

(Tick only one option; the most frequently used)
(Tandakan hanya satu pilihan; yang paling kerap digunakan)

(1) Public Vehicle/ *Kenderaan Awam*

(2) Private vehicle/ *Kenderaan persendirian*

(3) Walking/ *Berjalan*

(4) Cycling/ *Menunggang basikal*

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(5) By Motorcycle/ *Dengan Motosikal*

(6) Scooter/ Hoverboard/ *Skuter atau Hoverboard*

(7) Combination (of walking, motor vehicle/etc)/ Gabungan (berjalan kaki, kenderaan bermotor / dll)

(8) Others? (Please specify)/ *Lain-lain (Sila nyatakan*): _____

32. If by Tracking, How many minutes on the average will take you to walk from your residence to your destination? _____
Jika dengan Penjejakan, berapa minit rata-rata yang akan membawa anda berjalan kaki dari kediaman anda ke destinasi anda? _____

33. If by Taxi/Grab/Bus/Motorcycle, how much on the average does it cost to get to your destination from your residence place?

_____

Sekiranya dengan menaiki Teksi / Grab / Bas / Motosikal, rata-rata berapa kos untuk sampai ke destinasi anda dari tempat kediaman anda?

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Instruction: The table below contains a set of statements/questions to assess your micromobility practices. Please tick [√] the most applicable answer
Arahan: Jadual di bawah mengandungi sekumpulan pernyataan / soalan untuk menilai amalan pergerakan mikromobiliti anda. Sila tandakan [√] jawapan yang paling sesuai

S/N	Statements/ Penyataan	YES/ YA	NO/ TIDAK	D K Ti Ta
37	Have you ever used micromobility before? / Adakah anda pernah menggunakan pergerakan mikromobiliti sebelum ini?			
38	Do you participate in physical activity programmed such as walking/cycling/jogging every day? / Adakah anda mengambil bahagian dalam aktiviti fizikal yang diprogramkan seperti berjalan kaki / berbasikal / berjoging setiap hari?			
39	Do you commute actively only during your leisure time? / Adakah anda berulang-alik secara aktif hanya pada masa lapang?			
40	Do you commute actively with team or individually? / Adakah anda bergerak secara aktif dengan pasukan atau secara individu?			
41	Do you walk or cycle with partners? / Adakah anda berjalan atau berbasikal dengan pasangan?			
42	Do you make new friends whenever you are walking or cycling? / Adakah anda membuat rakan baru setiap kali anda berjalan atau berbasikal?			
43	Do you always feel happy each time you use micromobility? / Adakah anda selalu berasa gembira setiap kali menggunakan mikromobiliti?			
44	Did your friends, families, colleagues and school authority encourage micromobility usage? / Adakah rakan, keluarga, rakan sekerja dan pihak berkuasa sekolah anda mendorong penggunaan mikromobiliti?			

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45	Did your cultural belief encourage the usage of micromobility? /Adakah kepercayaan budaya anda mendorong penggunaan mikromobiliti?			

46	Did your Parent encourage micromobility usage? / Adakah Ibu Bapa anda mendorong penggunaan mikromobiliti?			
47	The friends you make during journey with micromobility, do they add values to your life? / Rakan-rakan yang anda buat dalam perjalanan dengan mikromobiliti, adakah mereka menambah nilai dalam hidup anda?			
48	Have you participated in cycling in the past i.e during childhood or while growing up? / Adakah anda pernah berbasikal pada masa lalu iaitu semasa kecil atau semasa dewasa?			
S/N	**Statements/ Penyataan**	**Always/ Selalu**	**Sometimes/ Kadangkala**	**Never/ Tidak pernah**
49	Do you still engage in micromobility as a form of transportation? / Adakah anda masih menggunakan mikromobiliti sebagai pengangkutan?			
50	Do you use any micromobility transport from your residence place to your school or workplace? / Adakah anda menggunakan mana-mana jenis mikromobiliti dari tempat kediaman anda ke sekolah atau tempat kerja anda?			

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SECTION E: INDIVIDUAL CARBON FOOTPRINT CALCULATION

BAHAGIAN E: PENGIRAAN JEJAK KARBON INDIVIDU

51. Input your monthly electricity usage (KWh) which can be found on your monthly TNB electricity bill. _____
Masukkan penggunaan elektrik bulanan anda (KWh) yang terdapat pada bil elektrik TNB bulanan anda. _____

52. Input your monthly water usage (m^3) which can be found on your monthly water bill.

Masukkan penggunaan air bulanan anda (m^3) yang terdapat pada bil air bulanan anda.

53. What is the fuel type that you used for your transportation:
Apakah jenis bahan bakar yang anda gunakan untuk pengangkutan anda:

(1) Petrol RON95

(2) Petrol RON97

(3) Diesel

54. Input how much you spend on fuel for a month (RM).

_____

Masukkan berapa banyak yang anda belanjakan untuk bahan bakar selama sebulan (RM). _

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