

Nguyen Dat LBI20S

Nguyen Quan LBI20S

## Introducing E-scooters to the Da Nang Market and User's Attitudes



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## Abstract

Authors: Nguyen Quan & Nguyen Dat

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There are many dissertations about the introduction of E-scooters as a means of transportation in most European countries. However, in Vietnam, specifically Da Nang, there are only some reports related to the introduction of E-scooter as a sustainable and environmentally friendly means of transportation. The choice of topic was based on the authors' preferences about the European type of E-scooter which has the potential to replace motorbikes widely used and polluting the atmosphere in Da Nang. The introduction of E-scooters will bring many economic benefits because of their convenience, low operating costs, and friendliness to the environment.

During the implementation process, the authors used previous studies as sources for research to introduce e-scooter to the Da Nang market and customer's attitudes. The content of the theoretical part was related to e-scooter, sustainable mobility, transportation planning, market research, customer attitudes and adaptations, infrastructure, and local legislation. This study combined quantitative and qualitative data collection with 106 survey respondents and 10 interviewees including locals and tourists to discover their attitudes.

As a result, many residents and visitors had positive attitudes to using the e-scooter as a means of transportation. The thesis answered the research questions, but still had many limitations. The authors expected there would be people interested in this topic to delve into the research to bring the project to reality.

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## 1 Introduction

Motorbike is the main vehicle widely used in Vietnam. Therefore, its emissions lead to polluted air in big cities such as Hanoi, Ho Chi Minh, and Da Nang, and the air quality is not good for people's respiration. As a result, the Vietnamese government has been encouraging the use of electric vehicles instead of motorbikes. The introduction of E-scooter models such as Tier, and VOI, to the Vietnamese market, specifically Da Nang, would improve the air quality in the areas. Besides, the rental price and the selling price of an E-scooter are more reasonable than a motorbike. Finally, the maximum speed of the vehicle below 50 cc is safe and does not require a driving license when used suitable for all ages.

In terms of limitations, Da Nang's infrastructure is still limited, such as no separate routes for electric vehicles, rough roads which are likely to cause accidents to the users, and few charging stations for electric vehicles. E-scooter has its limitations such as battery capacity, safety equipment or not being suitable for long journeys with bumpy roads.

The language barrier is a challenge for tourists when coming to Da Nang. English is not a common language in the locality, leading to difficulties in communication between tourists and locals, affecting tourists' experience when visiting Da Nang according to a survey conducted by TripAdvisor in 2018.

The authors indicated the necessary theoretical background related to the introduction of E-scooter to the Da Nang market. E-scooter was defined along with its benefits and drawbacks. Besides, technological advancements were mentioned to suit tourists and locals. In addition, the necessary regulations and appropriate infrastructure when introduced in Da Nang were studied. As a result, in the future, electric vehicles would become sustainable mobility instead of motorbikes with the encouragement of the government, and the benefits that E-scooters bring.

The possibility of E-scooter becoming a sustainable means of transportation when traveling to Da Nang. They are eco-friendly, affordable, and easy to use. Introducing E-scooters as a means of transport may solve problems such as air and noise pollution and congested traffic. In addition, E-scooter is flexible in terms of hours of use to explore different tourist attractions in the city. To determine the feasibility of introducing E-scooter to local people and visitors, the authors

indicated three research questions and used data collection methods to answer the questions and identify the importance of introducing E-scooters to locals and tourists.

1. What are the benefits and limitations of electric motorbikes as a means of transport in Da Nang?
2. What are the main factors and attitudes that will affect residents and visitors when traveling by tram in Da Nang?
3. How to make the electric motorcycle model suitable for the Vietnamese market - apply to Da Nang, a tourist area in Vietnam

## 2 Theoretical backgrounds

In this section, the theoretical contents related to the introduction of E-scooter include its benefits and limitations. In addition, there are technological improvements that make E-scooters more suitable for use in the Da Nang market. Regulations and infrastructure improvements to make E-scooter more widely used are also mentioned. Attitude and behavior assessment of users will be analyzed by the writers based on data collected from interviews and survey questionnaires, reputable books and reports available on libraries and websites.

### 2.1 What are E-scooters?

An E-scooter, often referred to as an electric scooter, is a two-wheeled vehicle driven by an electric motor, according to a writer in Web Development (2019). It has an electric engine and a rechargeable battery and functions similarly to a standard kick scooter for personal mobility. Typically, E-scooters are small, light, and simple to fold for storage or transit.

The battery, motor, throttle, and controller are all crucial parts of an electric scooter. An electric scooter's battery and engine are important to its operation. The controller reacts when a rider twists the handlebar throttle by telling the battery to power the motor, which is normally mounted on the wheel hub. The motor uses energy to turn the gears, which then moves the electric scooter's wheels. It has some factor similar with conventional kick scooters, certain E-scooters may need users to physically lift one foot off the ground while also turning the throttle to turn on the engine. While stopping is usually accomplished by using the brakes, maneuvering is often accomplished by using the t-stem handlebars. It's vital to remember that the throttle setting will determine the E-scooter's top speed. (Nely, 2019).

Nely (2019) claimed that an electric scooter is made up of several crucial parts, including the battery, motor, throttle, and controller. The scooter's range on a single charge is determined by the battery, making it essential. The three most often used battery kinds are lithium-ion, nickel metal hydride (NiMH), and lead-acid. The newest and strongest batteries are lithium-ion batteries, which provide longer performance life.

The scooter's speed, capacity for ascent, and load carrying are all governed by its engine. Brushed DC motors and brushless DC motors were named by Rachel (2022) as the typical motor types used in electric scooters. Brushless DC motors feature better power-to-weight ratios, are more robust, and are more efficient. Depending on the model of E-scooter, the user may adjust the speed using the throttle. Kevin (2023) said that it travels at a rate of roughly 25 km/h. Thumb throttles, finger (trigger) throttles, and twist throttles are the three primary categories of throttles. The scooter moves ahead when the controller receives a signal from the throttle and tells the battery to release power to the engine. The primary component is the controller, which communicates with other scooter elements and takes input from the rider. It enables communication between the throttle, battery, motor, and other controls of an electric scooter.

Erik's e-article from 2023 said: There are three different kinds of electric scooter brakes: foot brakes, mechanical (disc or hydraulic) brakes, and electric brakes. These brakes halt the scooter's motion to protect the rider. For optimal safety, disc brakes and electronic brakes work best. An electric scooter may have pneumatic (air-filled) wheels or solid wheels. Pneumatic tires give a smoother ride and greater grip whereas solid tires are puncture-proof but might have a bumpier ride. (Matt, 2023) Nely (2019) asserted that electric scooter suspension solutions enhance riding quality by absorbing shocks. Hydraulic/air-piston suspension, spring, elastomer, or both may be present. Suspension is vital when traveling an E-scooter on rough terrain or with robust tires. Additionally, Nely-pointed handlebars enable the rider to steer and regulate the scooter. They may be adjusted to accommodate the rider's height and often include rubber or silicone covering for a firm grip. Controllers like the throttle button, brake lever, and display settings may be found on the handlebars. The scooter frame, which is constructed of materials like aluminum, steel, or carbon fiber, binds all the components together and is the final portion of the E-scooter that Nely (2019) captures. For increased comfort, certain scooters could come with an optional seat. The scooter's entire weight includes the weight of the frame. In conclusion, it's critical to comprehend these elements and how they interact to choose the best electric scooter.

## 2.2 Benefits and drawbacks of E-scooters

The benefits and drawbacks of the E-scooter have played an important role in bringing it to use in a new market. Users often have certain doubts in experiencing something new without knowing the operation, use and limitations of the E-scooter. Therefore, the introduction of the benefits and limitations of this E-scooter has been mentioned in detail by the writers through the SWOT analysis model.

### 2.2.1 SWOT analysis

A SWOT analysis, according to (Böhm, 2009), is a systematic framework used to assess the advantages and disadvantages of a company, project, product, or person. It offers a methodical way to comprehend the internal and external variables that may have an influence on the performance of the business and aids in strategic decision-making. A description of each part of a SWOT analysis is given below:

#### - Strengths

The internal qualities, resources, or skills that offer an organization a competitive edge or a unique competency are referred to as strengths. These may include things like a recognizable brand, high-caliber goods or services, a talented team, effective procedures, intellectual property, sound finances, or a committed clientele.

#### - Weaknesses

When compared to competitors, internal traits known as vulnerabilities may hurt an organization's performance. They represent regions that need improvement or locations where the entity is short on specific abilities or resources. Weaknesses include elements like inadequate infrastructure, a lack of expertise, a minimal market presence, ineffective marketing strategies, and operational inefficiencies.

#### - Opportunities

Opportunities are outside forces influencing the market or industrial environment that may provide the firm with favorable prospects or rewards. Emerging trends, technical advancements, alterations in consumer behavior, the emergence of new market sectors, joint ventures, and advantageous economic circumstances may all lead to these. Opportunities are places where the organization may develop, flourish, or obtain a competitive advantage.

#### - Threats

Threats are outside forces that raise questions about the viability or success of an organization. They could be brought on by rivals, shifting market dynamics, fluctuating economies, technological disruptions, changes in the law, or other outside forces. To maintain the sustainability of the entity, threats must be recognized and assessed to design measures for risk reduction or adaptation.

For managers and staff in every organization, the idea of making plans or choices is essential. SWOT Analysis, a tried-and-true instrument for strategic analysis, is one of the most popular methods for strategic management and marketing (Chermack & Kasshanna, 2007). SWOT Analysis is advantageous and practical for a few reasons:

SWOT analysis delivers an all-encompassing viewpoint and all-encompassing answers. It serves as a road map that leads from the general to the specific, placing an emphasis on another research that come after (Chermack & Kasshanna, 2007). The pros and cons of the organization's internal and external environments are evaluated, it facilitates macro assessments. Strengths and weaknesses are typically shown in a Two-by-Two Matrix style, which aids in identifying the components that add value (strengths) or subtract value (weaknesses) (Chermack & Kasshanna, 2007).

Analysis reveals possibilities that can be taken advantage of and manages or eliminates dangers. It makes it easier to develop strategies that set a firm apart from its rivals (Chermack & Kasshanna, 2007). It provides a structured method for collecting, analyzing, and making decisions, acting as a thinking model for organizational management. It establishes the basis for making strategic choices and complements other theories and strategic decision-making instruments as Norton Balanced Score Card, Delphi Panel, and Porter's Five Forces Model (Chermack & Kasshanna, 2007).

This style encourages participation in group discussions and creative activities like brainstorming and group gatherings. Initiating conversations on the future and organizational objectives helps to shift the emphasis from day-to-day issues and the present situation (Chermack & Kasshanna, 2007). It also fosters knowledge exchange and collaboration. It may be used at several analytical levels, such as the individual, organizational, national, and international levels. Governments, non-profit organizations, educational institutions, and multiculturalism-related initiatives may all utilize it (Chermack & Kasshanna, 2007).

Even though it is often used, SWOT analysis has drawbacks. Among these disadvantages are:

The act of writing down strengths might be arbitrary and dissimilar to testing and really using such talents. The overall viewpoint of the SWOT model may not be sufficient to handle the dynamic and competitive character of the corporate world of today. Experience and education are needed for methodical construction and efficient use.

The number of SWOT Analysis-identified elements does not imply quality. Setting priorities, narrowing down on specifics, and resolving disagreements and changes in several aspects may be difficult. SWOT analysis may be expensive and time-consuming without yielding many advantages. It might be difficult to group variables into the four SWOT quadrants since a single factor can be included in numerous categories at once. Over time, factors may also change from strengths to weaknesses or from opportunities to dangers.

SWOT Analysis lacks a comparison benchmarking index, making it difficult to conduct competitive analysis in situations with strong interdependence. Information in Analysis may be tainted by organizational culture and skewed by people's desires and objectives, rendering it untrustworthy. It is crucial to be aware of these limitations and to use SWOT study as a beginning point for more in-depth strategic study and practical solutions rather than as the only available option. (Dess and others, 1997)

### 2.2.2 Technological advancements

Technology, according to Jaffe et al. (2002), includes all methods used to make labor easier and boost output, including tools, equipment, materials, processes, and power sources. In contrast to

science, which seeks to comprehend the causes of events, technology is concerned with actual applications. Technology has advanced more quickly throughout time because of society's yearning for longer and easier lives. Millions of people use the internet every day as a vital source of knowledge.

Technology and society's growth are closely related. Without technical developments, which have profoundly changed the economy, progress would not have been possible. The industrial industry has seen improved quality and efficiency with fewer hazards. The average lifetime has increased, and death rates have reduced because of health-related innovations (London et al., 2004).

Every element of human existence is impacted by technology, including agriculture, industry, professions, health, education, the arts, politics, leisure, and everyday activities. It's vital to remember that although technological improvements have made life more convenient and comfortable, abuse of these breakthroughs has the potential to endanger human life and society (Dosi, 1982).

Additionally, Rosenberg (2004) underlines the value of researching technological development to broaden our understanding of the modern world. Despite being new, the idea of intranet technology has been shown to provide administrative and pedagogical advantages in institutions like schools. Researching the benefits of technical development may increase public understanding (Rosenberg, 2004).

The 20th and 21st centuries have seen an incredibly quick pace of technological development. It is anticipated that both good and bad elements would emerge as new electronic technologies and machines continue to be created and enhanced, giving rise to complaints (SSRG International Journal of Humanities and Social Science, 2018).

From the development of early instruments like spears and knives to more recent inventions like the printing press and computers, technological development has been a constant throughout human history. Nowadays, businesses compete with one another by releasing ever-more-advanced items on the cutthroat consumer market. As an example, Apple's development of the iPhone provided a versatile gadget with capabilities that outperformed rivals. By making it simple to access games, books, news, and social networking sites, the development of application marketplaces changed the mobile phone business (Daniel, 2019). Electric scooters, sometimes known as E-scooters, have advanced significantly technologically in recent years. Here are a few significant E-scooter technological advancements:

**Batteries:** The creation of more effective and potent batteries has been one of the most significant technical developments in E-scooters. In E-scooters, lithium-ion batteries have taken over because they provide better energy density, a longer operating range, and quicker charging periods. Additionally, improvements in battery management systems have improved overall performance and safety (Daniel, 2019).

**Motor Efficiency:** Modern E-scooters have more energy-efficient electric motors that provide greater power while using less energy. This results in increased range, greater climbing abilities, and improved acceleration (Nely, 2019).

**Foldable and lightweight designs:** Manufacturers have made significant advancements in developing foldable and lightweight E-scooter designs. E-scooters have gotten lighter and easier for consumers to carry and store thanks to the usage of materials like aluminum and carbon fiber. Additionally, foldable designs make it simpler to transfer items in automobiles, public transit, and other conveyances (Nely, 2019).

**Safety Improvements:** The emphasis of technological developments in E-scooters has been on safety improvements. Larger wheels are now standard on certain versions for increased stability and shocking absorption. Furthermore, modern brake technologies, like regenerative braking, have reduced stopping distances and increased safety in general. When riding at night, visibility is improved by integrated lighting systems, which include LED headlights and taillights (Greg, 2022).

**Improved Suspension Systems:** E-scooters now have better suspension systems that provide a smoother ride over uneven terrain. During longer rides, adjustable handlebars and soft grips assist prevent hand strain and vibrations (Daniel, 2019).

**Sharing and Rental Systems:** The popularity of E-scooter rental and sharing services has fueled technological advancements in fleet management. Innovative methods have been created by businesses to remotely track, manage, and monitor a significant number of E-scooter deployments in urban areas. Geofencing, remote diagnostics, and automatic maintenance warnings are some of the features that fall under this category (Tomasz and Agnieszka, 2022)

### 2.3 Sustainable mobility and transportation planning

In this section, sustainable transport and mobility planning will be defined based on books and journals that have been read and summarized by the authors. The definitions of sustainable mobility and traffic planning will help readers better understand the ideas of the authors who want the E-scooter to become an alternative to motorbikes and reduce air pollution caused by motorbikes. its emissions in the Da Nang area.

#### 2.3.1 Sustainable mobility

The notion of sustainable transportation is drawn from the fundamental principle of sustainability, which is widely acknowledged as "development that meets current needs without compromising future generations' ability to meet their own needs" (Hall, R.P, 2002). It entails prioritizing individual needs while considering environmental constraints to meet current and future social needs (Brundtland, G.H, 1987). From an economic approach, sustainability is viewed as a coherent framework that incorporates environmental, geographical, economic, social, and institutional components (Burchard Dziubińska, M, et al., 2014).

Sustainable transportation is based on the concepts of sustainable development and is sometimes known as green transportation due to its emphasis on environmental considerations. According to the Transportation Research Board (1997), sustainability is more than just analyzing dangers; it also entails a thorough examination of systems. It specifically investigates how environmental, economic, and social systems interact with one another across multiple spatial scales of operation, either to their mutual benefit or detriment. A sustainable transportation system aims to minimize major or irreparable harm to future generations by reducing fuel consumption, reducing vehicle emissions, controlling congestion, maintaining safety, and increasing social and economic accessibility (Richardson, B, 1999). The Organization for Economic Co-operation and Development (OECD) (2001) defines sustainable mobility as transportation that does not jeopardize public health or ecosystems while also emphasizing the appropriate use of renewable and non-renewable resources.

The concept of sustainable transportation can be treated in two ways: narrowly and generally. It is narrowly focused on topics such as resource depletion and air pollution. However, it is erroneous to limit sustainable transportation to only environmental concerns. As Litman and Burwell (2006) note, a larger viewpoint is preferred in research, which encourages the discovery of integrated solutions spanning environmental, social, and economic well-being within the arena of sustainable transportation (Zhou, J, 2012).

According to Rajper and Albrecht (2020); Doucette and McCulloch (2011), research indicates that the adaptation of electric mobility in Vietnam, as well as other developing countries, exhibits distinct characteristics compared to developed nations. In contrast to the prevalence of electric cars in developed countries, Vietnam has experienced a significant surge in alternative sustainable micro-mobility options, such as electric scooters and shared bikes, which have gained substantial popularity.

In Da Nang, the immaturity of public transportation, poor traffic infrastructure, and poor economic conditions are the main reasons for the prevalence of motorcycles, which have appealing characteristics such as flexibility in long distance travel, travel time and household travel arrangements, high space efficiency, and low purchase costs. However, inadequate safety, air and noise pollution, and humid and damp weather, which is especially unpleasant on extended excursions, make motorcycle use unattractive. The disadvantages of the overwhelming gasoline-powered motorcycles in Hanoi, Ho Chi Minh city, and Da Nang have directly increased citizens' and authorities' awareness of air pollution as a community well-being issue. In accordance with the government's GHG (greenhouse gas) reduction pledge and the sustainable development trend in the energy and transportation sectors, the issue has pushed to the forefront a more sustainable and less polluted alternative mode of transportation—E-scooters (Bakker, S, 2019).

Because of the high rate of motorcycle adaptation in Vietnam, the transition from gasoline-powered bikes to E-scooters would be more hopeful. It retains the incredible benefits that have made motorbikes popular while adding other benefits such as zero tailpipe emissions, improved efficiency, reduced noise, and the ability to provide supplementary services. In comparison to motorcycles, it is obvious that E-scooters would produce less noise, less air pollution, and, in certain cases, such as with electric bicycles, more physical activity. E-scooter may travel the same distance and cost the same to purchase while using no more road space or parking space than

motorcycles powered by fossil fuels. Motorized two-wheelers are frequently linked to safety issues on the road. E-scooter, which travels at a slower speed than regular motorcycles, might be safer for users (Bakker, S, 2019).

Other electric micro-mobility devices like the Segway, electric kick scooter, hoverboard, and monowheel have not gained much traction in Da Nang besides E-scooters. E-bikes and E-scooters, which are primarily Chinese-made, are the two forms of E-scooters available in Vietnam at the beginning of the electric vehicle era. Due to their inexpensive price and ability to function like bicycles when their batteries run out of juice, electric bicycles initially enjoyed greater popularity in the two major cities of Ha Noi and Ho Chi Minh. However, when Chinese manufacturers marketed this product to launch for the other cities, including Da Nang, E-scooters soon spread their presence. Most models at the time were more affordable than 50cc competitors and featured stylish designs that primarily imitated popular scooter designs. As a result, E-scooters were frequently thought of as a 50cc vehicle alternative that was appropriate for students under the age of 18. According to PwC (2020), elderly preferred E-scooter due to their low speed, safety, and affordability. Electric bicycles are more comfortable and do not need a driver's license or car registration compared to their Internal Combustion Engine counterpart.

As a result, sales of conventional gasoline-powered motorcycles have started to slow down since the start of 2019. The Covid-19 epidemic significantly impacted the market in 2020. According to the Vietnam Association of Motorcycle Manufacturers (VAMM, whose members include Honda, Piaggio Vietnam, Suzuki, SYM, and Yamaha), the number of motorcycles consumed in 2020 only totaled 2,712,615 units, which was a decrease of approximately 17% from the 3,254,964 units in 2019 and the lowest figure in many years after steadily declining throughout the year's four quarters.

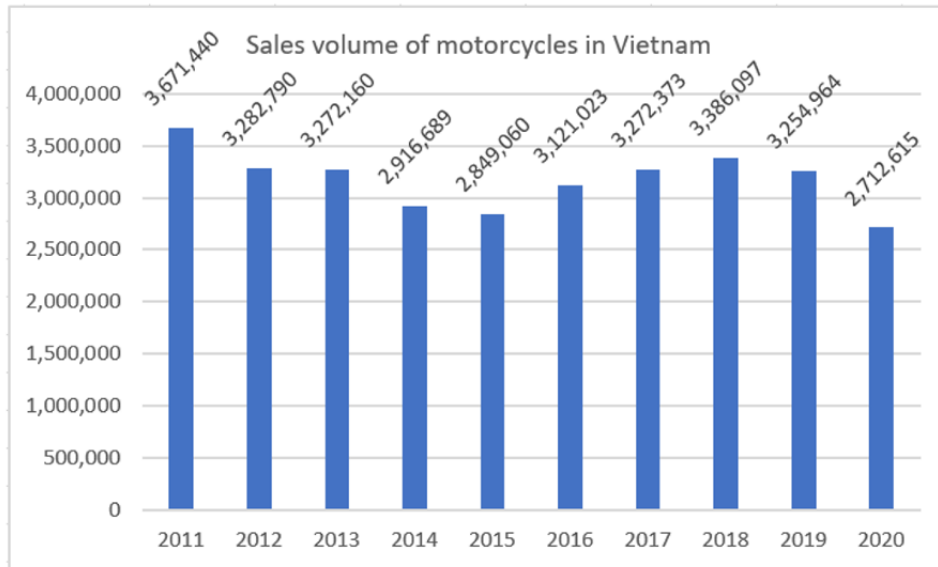


Figure 2.1 Sales volume of motorcycles in Vietnam from 2011–2020. (Motorcycle market in Vietnam - statistics & facts, 2022)

When it comes to the public transportation system, electric scooters will offer connectivity to address the first or last mile issue. Most employees and students take public transportation to the station closest to where they need to go before walking there. If the walking distance is far, they will find the appearance of an E-scooter to be more practical. The E-scooter may also be an option throughout the entire distance, with a rental cost that is comparable to or slightly greater than that of public transportation (Kodukula, S.; Shrestha, S., 2019).

### 2.3.2 Transportation planning impact of E-scooters on transportation

According to Ostojic, et al. (2013), In comparison to private cars, public transportation and electric vehicles have lower operating energy intensity and per-capita emissions, and they have the potential to create a more effective transportation system. Having fewer personal vehicles on the road can lower emissions and enhance air quality. Because it can transport large numbers of passengers at a significantly lower cost than light and heavy rail systems, bus rapid transit (BRT) has gained a lot of attention in cities all over the world in recent years. By 2016, Da Nang hopes to have the BRT system installed in at least one location. One of the most striking findings made by the Sustainable Urban Energy and Emissions Planning (SUEEP) team in the city was the

requirement for an integrated land use and transport planning approach to ensure that plans for BRT as well as electric vehicles, land use, street signals, parking policies, vehicle registration, pricing policies, and sidewalks are coordinated and have an effective vehicle to turn the plan into reality.

For instance, the central business center of Da Nang is not conducive to pedestrians; most of the sidewalks are used as spaces for street vendors or as parking lots for motorcycles. Due to the growing demand for bicycles, limiting activities that intrude on sidewalks, promoting the use of traditional and electric bicycles, and creating a strong public transportation system would all help Da Nang experience less traffic. rising demand for personal vehicles. The Da Nang Department of Transport and the City's Department of Vehicle Registration and Control must collaborate through city planning to promote the use of public and non-motorized modes of transportation for those benefits to materialize.

In terms of an E-scooter, it could be challenging to convert a sizable user base "backward" to nonmotorized bicycles in Da Nang (or Vietnam as a whole) given the high market penetration of motorbikes in these cities. This is especially true for motorcyclists who commute over large distances to their places of employment, residence, educational institution, and place of business. As a result, the city may want to think about developing rules and initiatives for alternatively powered motorbikes, including electric scooters. This technology, which is very well-liked in China, might lead to a switch from using gasoline to other ways of producing electricity. To enable cheap or free battery charging, huge solar charging stations might be erected across the city (Ostojic, et al, 2013).

Typically, individuals will only walk a short distance to the bus stop before considering it too cumbersome and using other modes of transportation like cars or motorcycles. Increasing the density of land development in this walkable neighborhood or incorporating neighboring E-scooter rental locations will raise the chance of numerous bus passengers, ensuring high bus ridership. To facilitate denser growth, routes should be identified and land usage in suitable locations along "zoned" routes as early as possible. The landowner will be able to decide whether to scale up the building or sell it to other developers interested in some type of speculative development if this step is taken far before the implementation of a BRT system. By the time the BRT system is operational, planning and zoning in advance can help guarantee that the business and population

concentrations along the route will have expanded to levels that can support high passenger loads (Ostojic, et al, 2013).

Parking lines also play an important role in the government's plannings. Passengers walking between one system and another destination when using BRT are considered. Da Nang should begin reclaiming sidewalks around the city to create designated E-scooter parking zones, and stringent enforcement of their use will aid in achieving this goal. Doing so will boost the BRT system. Da Nang can also learn from other cities where food sellers need authorization to use public walkways to guarantee they are not situated in places where project completion may be hampered. a BRT and an electric scooter together. This project simultaneously advances the development of two different eco-friendly modes of transportation. When traveling to a BRT station, users can either purchase a scooter or, if the distance is short, prioritize using the E-scooter entirely (Ostojic, et al, 2013).

The city should keep up its campaign to reduce the number of cars on the road. The use of public transportation and BRT may increase in Da Nang because of restrictions on street parking, high vehicle registration fees, the promotion of car-sharing programs, congestion pricing, and other policies that discourage the use of private vehicles in specific locations or at times of the day or week (Ostojic, et al, 2013).

### 2.3.3 Challenges and opportunities for incorporating E-scooters.

In terms of being environmentally friendly, electric motorcycles help to lower greenhouse gas (GHG) emissions in the transportation industry. By creating a clear path for the introduction of E-scooters in Vietnam from 2020 to 2030, the nation can reduce its transportation sector's greenhouse gas emissions by 27% from current levels by that year. In other words, Vietnam's development of e-transportation represents a potential means of assisting Vietnam in realizing the objectives set forth in the 2015 Paris Agreement. The relevance of the vehicle is acknowledged by the Vietnamese government employing renewable energy as a strategy of reducing climate change and conserving the environment. As a result, a strong basis for the growth of E-scooters in Vietnam also in Da Nang has been established. In terms of challenges, there are four primary stakeholder categories that have advanced E-scooter infrastructure. Firstly, the government

(national and local) advanced the deployment of E-scooters such as the government offers policy assistance, fiscal and non-fiscal incentives, and risk mitigation. In addition, private businesses are leading the charge in producing the charging equipment needed by the Vietnamese market. Furthermore, service providers supplement charging service stations including private organizations, public corporations, and utilities. Finally, distribution firms for electric utilities - Both public and private utilities offer a link to the grid and provide electricity for E-scooter charging.

On the one hand, In Vietnam, there are hardly any electric vehicle charging facilities. There will not be any development in this area until the Vietnamese government creates a strategy for constructing a charging network. Sales of electric vehicles will suffer because of a lack of infrastructure for charging. Additionally, Tesla does not currently have any plans to expand its Supercharger network to Southeast Asia. Vietnamese consumers who intend to buy electric vehicles soon will have to provide their own charging infrastructure. Therefore, synchronous coordination between these four key stakeholder groups is essential. This indicates that substantial public investment is required for the growth of E-scooter infrastructure. The reality in Vietnam has shown that several businesses were unable to carry out their development plans for charging infrastructure because they lacked the necessary financial means and cohesion (Le, T. A. et al, 2021).

#### 2.3.4 Impact of E-scooters on transportation

For the past few years, cities have grappled with traffic congestion. the transition away from personal vehicles and toward new modes of transportation, like mobility and sharing based on information and communication technologies in cities, particularly in central business districts. The improvement of urban transportation systems through commerce will be sustainable and successful (Mostofi, H. et al, 2020). Their use is expanding daily because of the introduction of electronic micro mobility in urban transportation. However, it is claimed that the modal shift from walking and public transportation to this new mode of transportation is growing every day, based on the expansion of the European and Asian scooter markets since 2014 (Hardt, C. et al, 2016). If electronic micro-vehicles were to replace individual cars and be utilized as a last-mile or first-mile solution as a supplement to public transportation, it would be advantageous for urban sustainability.

Additionally, millennials travel less than previous generations and have a go-nowhere attitude. Micro-vehicles may be a more enticing mode of transportation for these people because they do not tend to spend as much money on cars as earlier generations did. According to some, driving is the least enjoyable mode of transportation, which may result in a change in how people utilize their private vehicles (Chang, A. et al, 2019). Therefore, if micro-vehicles, E-scooters, are widely used on the road, the level of circulation of personal vehicles, particularly cars, will decrease, leading to a major reduction in traffic congestion.

#### 2.4 Market research

A key tool for companies functioning in hostile markets is market research. Understanding your target market's purchasing patterns can improve your chances of success. By doing research, business may come up with creative concepts for new product development and figure out the best positioning approach in a certain market (Hanh, 2023). For instance, a company may discover via market research that a certain product's flavor is quite popular in one location yet regarded as unique by another client group. This knowledge is essential for efficient marketing. For firms wanting to identify their specialty and develop their marketing strategy, market research is essential. They can prevent squandering money on pointless endeavors, especially during expensive and extensive marketing campaigns. It is crucial to remember that market research does not ensure company success. Nevertheless, it aids in their decision-making when introducing a product.

Finding the biggest and fastest-growing market for their product, comprehending market trends and prospects, studying market circumstances, business methods, and spotting possibilities are all part of the work of market research. It makes it possible for businesses to concentrate their efforts and constrict their breadth of vision. This enables them to organize target markets according to importance and make expansion plans. Additionally, market research supports the development of strong product recommendation strategies. Conducting market surveys after a certain amount of time, such a year, enables evaluation of efforts and trade partners. This assessment makes it possible for each market to make the required modifications. Insights on your rivals' successes, failures, blunders, and strengths are also provided through market research. Even the development of new products may be stimulated by it. Finally, it encourages the development of

crucial commercial connections with partners who are knowledgeable about and invested in their corresponding markets (Hanh, 2023).

#### 2.4.1 Market research process

John (2016) provided detailed procedures in his market research. Finding the issues is the first step. This is done to assist companies in clearly identifying marketing problems or businesses to which they should pay close attention when approaching the market. To correctly identify the contributing elements, it is crucial to state the study purpose and research question in clear terms. Second, creating a research strategy that identifies the data required to respond to research questions aims to provide light on pertinent topics like consumers, price, or rivals. Define procedures for data gathering, methods for analysis, and formats for reporting that make data collecting easier, prevent mistakes, and guarantee the accuracy of the data. The next step is to do the research. Reliability and accuracy are ensured by using proper scientific methodologies for data collecting. Methods for gathering data include surveys, interviews, and questionnaires. Data is examined when the research is completed, and the findings are then reported. For analysis and analytical procedures to turn data into valuable insights, businesses must format, clean, and modify the data. making suggestions based on study results and data interpretation to understand ramifications. To deliver the results to internal stakeholders, prepare a report or presentation. Taking proper action by utilizing study results as a guide for making decisions. The action plan for doing additional market research or conducting adequate planning must be prepared if the findings indicate a change in course. Make research available to help the company achieve its objectives and intended results.

#### 2.5 User behavior and adaptation

According to the authors' opinions, nowadays, travel needs are extremely popular all over the world. Young people's interest in discovering new things is increasing day by day, so the demand for vehicles is also proportional to major tourist destinations. To meet that, the government in

these tourist destinations has deployed transport rental agencies. At first, motorbikes were widely rented in Asian countries. However, it requires the user to have a driver's license, moreover, the high speed makes the safety significantly reduced. Besides, emissions make the air quality as well as the whole environment in these localities worse. In the face of these hazards and complaints from locals, electric vehicles are being used increasingly widely. Nevertheless, it also depends on the preferences and needs of the user. Some of the factors such as fast travel, cost, comfortable travel time, environmentally friendly modes of transportation, safety, and the others, influencing user's behaviors are indicated in this section.

There are factors influencing user adaptation of E-scooters. According to Ali, T.; Ali, M. (2021) study, most respondents thought that easy access and parking were the most significant advantages of using E-scooters over other transportation options. Additionally, it was discovered that accessibility was not the most crucial factor, but rather time and expense. Reliability was also regarded by the respondents as an important criterion. 70% of respondents favored availability as well as convenient parking and access.

On the other hand, cost-effectiveness, speed, comfort, and environmental friendliness were valued more highly than safety. Because it avoids busy locations, residents and visitors have chosen this mode based on dependability preferences. Some respondents felt that E-scooters were more effective for longer distances and saved more time in addition to comfort, which was also chosen by commuters to avoid perspiring in business attire. Others believed electric scooters to be safer due to the ability to maneuver and travel in bike lanes safely (Tuncer and Brown 2020). Similarly, the most important preferences chosen by all consumers referred to shorter journey times and E-scooter dependability. According to more than 60% of frequent users, E-scooters are favored over other forms of transportation because they are fast, easy to park, easily accessible, and reliable, and they can get users to place that are difficult for private vehicles to reach (Sanders, Branion-Calles, and Nelson 2020).

## 2.6 Infrastructure and regulations

In this segment, our attention will be directed towards the formulation of initiatives pertaining to the facilitation of E-scooter utilization within the city of Da Nang, encompassing the enhancement

of associated infrastructures. Additionally, we will delve into governmental regulations aimed at endorsing the adoption of E-scooters and promoting the utilization of new energy vehicles, while also exploring the legal framework governing the use of two-wheeled electronic vehicles

### 2.6.1 Infrastructure

A public bicycle rental scheme is now being implemented in Da Nang with the goal of stimulating tourist development and developing pathways for alternative vehicles like electric automobiles and electric motorcycles, offering practical transportation choices. To reduce traffic congestion, apart from motorcycles and automobiles, special routes are being created for these types of vehicles. The rental stations are intentionally placed to be accessible by public transportation, close to popular tourist destinations, protect the urban environment, and guarantee pedestrian safety (Trang, 2023).

The report by Trang claims that an integrated smart system is being implemented, and each bike will have an ID tag, a smart lock, and a location. The usage of E-scooters is made easier by this technological progress since users can more quickly find, change settings, and strengthen security measures. Additionally, special software for renting out public vehicles has been created to simplify payment procedures depending on how often (hourly or daily) the car is used. There are e-wallet choices for online payments in Vietnam, including Zalopay, MoMo, and Payoo. The handlebars, saddles, wheels, and chains of the E-scooters include anti-theft locks. It works well with owners' electric scooters and keeps them from getting lost. The director of the Da Nang Department of Transport, Mr. Bui Hong Trung, stated his support for such efforts that would increase residents' and visitors' convenience in terms of transportation inside the city. This initiative demonstrates the government's dedication to improving transportation infrastructure and accessibility to well-known places, which will facilitate the growth of E-scooters given Da Nang's prominence as a well-liked tourist destination (Trang, 2023).

Recently, the Da Nang government unveiled a comprehensive scheme to encourage the people to utilize electric cars (EVs) on a large scale. The idea calls for building parking spaces and EV (electric vehicle) charging stations across the city. This project demonstrates Da Nang's unwavering commitment to leading the development of transportation infrastructure and the transition

to environmentally friendly transportation alternatives in line with the city's environmental protection objectives (Da Nang Today, 2021).

By 2025, the city hopes to have 150 Levels 1-2 and 15 Level 3 EV charging stations in place as part of this initiative. These numbers are anticipated to rise to 250 Levels 1-2 and 50 Level 3 stations by the year 2030. This project will be carried out with the goals of lowering emissions, promoting internal traffic growth, and making Da Nang an ecologically friendly city (Da Nang Today, 2021).

The Da Nang administration has recently shown a rising interest in enhancing the city's environmental friendliness. Numerous environmental programs, such as "Da Nang - The Environmentally Friendly City," have been launched, with a focus on encouraging youngsters to conserve the environment (Da Nang Today, 2018). This shows that environmental issues are receiving more local attention. Adopting E-scooters is consistent with the recommended regional plan for creating sustainable infrastructure, financial systems, and related initiatives (Da Nang Today, 2018).

#### 2.6.2 Regulations

Based on their environmental protection campaigns addressing issues like climate change, pollution, and sustainable development, the Vietnamese government has identified key areas in need of improvement and development, according to the study done by Tuan et al. (2018) on electronic media in Vietnam.

Type of Policies		Selected Cities							
Items	Strategy	Hanoi <sup>1)</sup>	Hai Phong <sup>2)</sup>	Da Nang <sup>3)</sup>	HCM <sup>4)</sup>	Can Tho <sup>5)</sup>	Hue <sup>6)</sup>	Nha Trang <sup>7)</sup>	Ha Long <sup>8)</sup>
	<b>Climate Change</b>	X	✓ (clean-energy transport/bus)	✓ (encouraging the use of e-MCs)	✓ (pilot install of charge stations)	X	X	✓ (low-carbon transport technology)	✓ (clean-energy transport)
Target of electric vehicle development	<b>Green Growth</b>	✓ (by 2030, 5% of MCs are e-MCs)	X	X	X	X	X	✓ (200 e-buses in operation in 2025)	X
	<b>Climate Change</b>	X	X	X	X	X	X	X	X

(Source: Consultant team)

1) Hanoi: Plan No. 228/KH-UBND (2017); Plan No. 149/KH-UBND (2020); Plan No. 242/KH-UBND (2017).

2) Hai Phong: Decision No. 1463/QĐ-UBND (2014); Decision No. 65/QĐ-UBND (2014); Decision No. 3337/QĐ-UBND (2017); Decision No. 565/QĐ-UBND (2020); Decision No. 2894/QĐ-UBND (2017).

3) Da Nang: Decision No. 1349/QĐ-UBND; Decision No. 3583/QĐ-UBND (2017); Decision No. 3442/QĐ-UBND (2020).

4) Ho Chi Minh: Decision No. 1159 /QĐ-UBND (2017); Decision No. 3924/QĐ-UBND (2020); Decision No. 815/QĐ-UBND (2015).

5) Can Tho: Decision No. 45/KH-UBND; Plan No. 170/KH-UBND (2017); Plan No. 27/KH-UBND (2018).

6) Hue (Thua Thien Hue province): Plan No. 91/KH-UBND (2015); Decision No. 962/QĐ-UBND (2014); Plan No. 230/KH-UBND (2017).

7) Nha Trang (Khanh Hoa province): Decision No. 2584/QĐ-UBND (2017); Decision No. 201/QĐ-UBND (2016); Plan No. 6676/KH-UBND (2017).

8) Ha Long (Quang Ninh province): Plan No. 6970/KH-UBND (2015); Plan No. 73/KH-UBND (2020); Plan No. 86/KH-UBND (2018).

✓: Yes; X: Not yet

Note: (\*) According to Decision 1393/QĐ-TTg on Viet Nam Green Growth Strategy (2012), the reduction rate of GHG emissions is 8-10% by 2020, and 20% by 2030 (without international support) and 30% by 2030 (with international support).

According to the Second Biennial Updated Report of Viet Nam (2017), with domestic resources, by 2030, Viet Nam will reduce GHG emissions by 8% compared to the Business-as-Usual (BAU) scenario (estimated at 62.65 MtCO<sub>2</sub>-e) and this above-mentioned 8% contribution could be increased to 25% (approximately 197.94 MtCO<sub>2</sub>-e) if international support is received.

Figure 2.2 Summary of action plans of the province/city on green growth, climate change and sustainable development strategies (Tuan et al, 2018)

The government also recognizes the significance of exploiting energy sources, implementing non-polluting practices, and reducing climate change. To resolve these issues, published policies must be established. Examples include Resolution No. 136/NQ-CP, which demonstrates the government's commitment to promoting sustainable development using non-polluting fuel vehicles, and Resolution No. 55-NQ/TW from the Communist Party of South Vietnam, which emphasizes the importance of utilizing new energy sources in industry and advocacy (Tuan et al., 2018). The government has issued several resolutions to minimize the usage of conventional vehicles, such as automobiles and motorbikes, with the goal of attaining a 15% reduction by 2030 and a 20% reduction by 2045. Several proposals are now being put into action, with a focus on promoting ecologically beneficial behaviors that are in line with the nation's environmental protection legislation.

In Tuan's report, Resolution 356/QĐ-TTg is noted. It aims to increase the number of energy-efficient and environmentally friendly automobiles by 20% by 2030 while limiting the usage of obsolete vehicles. Since the beginning of 2010, use of electric two-wheelers (E2Ws), notably electric bicycles, has grown significantly in Vietnam. Students are increasingly using e-bikes because of

their adaptability, practicality, and cost. Notably, a driving exam, license, or age limitations are not necessary to ride an electric bicycle on public roads, according to the Road Traffic Law 2008 (No. 23/2008/QH12). As a result, there are now more novice riders, including those who are younger than 16 (Tuan et al., 2018).

Charging infrastructure is essential for keeping electric cars on the road. Vietnam, however, lacks explicit technical guidelines and financial incentives to support the construction of charging stations. In line with the Electricity Law and related regulations, the Ministry of Industry and Trade (MOIT) and EVN Group oversee managing the other parts of the charging infrastructure, such as grid connections, transformers, meters, and electrical panels. Based on the 2015 research by DR Truong and Hung, managing the e-bike and e-motorbike markets while also protecting customers. The Vietnamese government has issued a series of decrees and circulars on technical quality control, helmet wear regulations, inspection fees for safety and environment protection, and keeping fees for e-bikes and e-motorbikes.

### 3 Research methodology

In this section, there was a combination between two popular research methods, quantitative and qualitative, which were employed to solve the research problems. Similarly, the authors used the theoretical backgrounds mentioned above to complete the demands of this thesis. Firstly, the definitions of these two research methods should be shown to better understand the functions of quantitative and qualitative methods. According to Creswell (1994), quantitative research is a method used to collect and analyze numerical data to produce a full report to prove, test or predict an issue to certain groups of people. Quantitative research comes in a variety of forms which are survey research, correlational research, experimental research, causal-comparative research. Each variety has its own traits. In this thesis, the method is used in a survey questionnaire sent to population to collect essential information. Qualitative research is a method aimed at understanding complex and topical aspects of human behavior and experience. It focuses on the study of real-life phenomena, using interviews, observations, and social content analysis as the main research methods. It does not analyze deeper to the analysis of numerical and statistical data, methods of analyzing the content of individual and significant phenomena. It is a method that is suitable for education, health care, and psychology. It supports researchers gain a deeper understanding of human experiences, beliefs, and social interactions, thereby providing insights into human complexity (Mckayla, 2023).

Focusing on the authors' questionnaire, participants were able to easily understand its purpose, which is the advantages and disadvantages pointed out to them in the form of questions. Thus, it would be easier to collect Da Nang residence and visitor's opinions when introducing E-scooters to the Vietnamese market, namely Da Nang. In addition, the concerns of users when E-scooter is widely used in the Da Nang area are also mentioned to improve the experience of this vehicle users.

#### 3.1 Data collection and analysis

The main purpose of this thesis is to introduce E-scooters to the Vietnamese market, namely Da Nang, through analysis of its features and structure, according to Nely (2019). In addition, strengths, weaknesses as well as opportunities and threats were also addressed through the SWOT analysis model (Böhm, 2009). As the results, the attitude of users, especially locals and

tourists, would be seen when E-scooters are considered as sustainable vehicles to replace for motorbikes that are commonly used in Da Nang but harm to the environment by emitting CO<sub>2</sub>, and reducing the air quality here. However, there were Da Nang regulations and improvements in the infrastructure system to ensure safety, convenience and promote the demand for electric vehicles in Da Nang.

The authors employed both quantitative and qualitative research methods to answer the research questions in this article. Quantitative methods were implemented by using questionnaires, created as Google forms sent to 106 participants including residents and tourists simultaneously, with many different ages, in the age group of 15-35 years old; After receiving all the answers, the demographic data was also collected, this information was analyzed on the platform of Google forms. Later, the data was transformed into charts including tables, pie charts, bar charts and other types. With the information collected by the writers in this form, primary data, it indicates the reader how reliable this information is. As a result, the E-scooter's characteristics were known through the survey. Users contributed ideas and improvements to the E-scooter so that it is suitable, convenient, and safe when traveling on the streets of Da Nang.

In this thesis, the authors used the direct interview method to collect data from the interviewees. The author interviewed five locals and five tourists. After, the writers used that information to analyze customer interactions in the introduction of E-scooter in Da Nang. Customer recommendations were analyzed to get a better insight into the comparison between E-scooters and traditional means of transport: bicycles, motorbikes, buses. Besides, the user's ideas to improve E-scooter were carefully considered as it plays a vital role in making E-scooter as a transportation mode. The reason customers recommended E-scooters or not to others also contributed to research on customers' behavior in using E-scooters in daily routine (resident) or travelling (tourists). In the last step, each interview summarized to indicate the customer's needs, ideas, or thoughts about E-scooters in this thesis.

The data analysis process was divided into two processes. Quantitative analysis was done to collect the data and through google forms allowed the authors to use the analyzed data and present it through pie charts, bar charts and other types of charts.

Qualitative method was carried out by asking questions related to customer behavior and attitudes. After having face to face meetings with the interviewees, the information provided was

recorded and analyzed clearly by the author. In addition, information was attached in the Appendix to prove the reliability of data collection.

### 3.2 Roadmap of the research

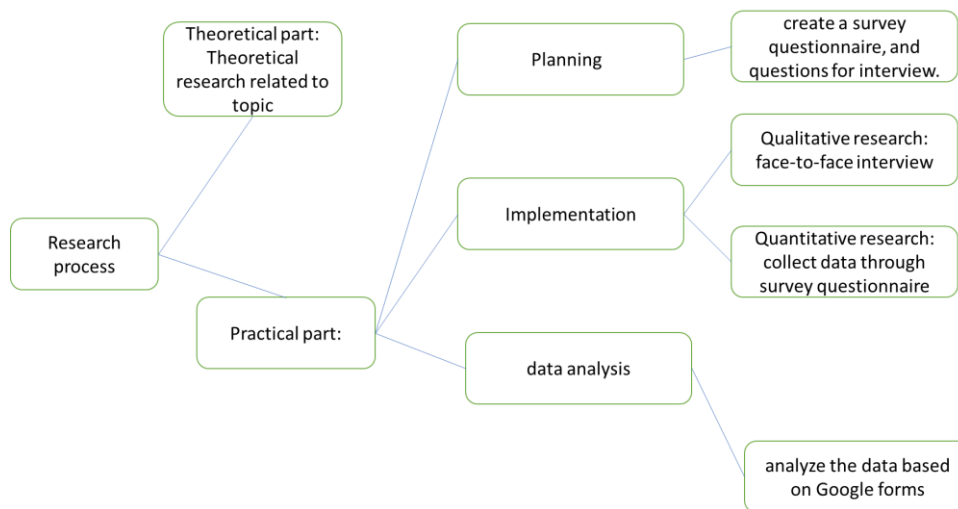


Figure 3.1 The roadmap of the research

The processes of the research could be divided into two parts: theoretical and practical. The theoretical part was completed by using online resources, books, journals, articles, which are reliable. After theoretical completion, the authors employed these theories to analyze the research problems. The practical section was divided into three phrases such as planning, implementation, and data analysis. In planning phrase, the authors carried out the quantitative research by creating a survey questionnaire based on the SWOT analysis model, mentioned in theoretical part. Besides, some questions for interviewing, qualitative research, were also made to collect the demographic data, also the user's attitudes and behaviors.

To implement, all the questions and the survey were sent to the participants including Da Nang residences and visitors. Within one week, all the answers were collected with enough necessary information to solve the research problems. Based on Google forms, the collected data was analyzed automatically. Thus, the authors employed this information to indicate user's behaviors and attitudes simultaneously. Not only the attitudes and behaviors, but the concerns about E-scooter's safety and convenience were also considered.

## 4 Results of the research

In this result, the research aimed to analyze the attitudes of both residents and tourists towards the introduction of electric motorbikes as a transportation option in Da Nang city. We conducted interviews with locals and tourists to gather their views, suggestions, and insights. Through survey analysis, we examined the benefits and drawbacks of electric motorbikes and identified key factors and concerns. Our goal was to understand whether customers are willing to recommend E-scooters or not based on their perceptions and experiences. By gathering this valuable information, the authors were likely to create informed decisions on the viability and potential success of E-scooter as a means of transport in Da Nang city.

### 4.1 Survey analysis

The quantitative research method was used in this thesis as a questionnaire survey organized using the Google platform. All the information was collected and analyzed at the same time the questionnaire was sent to the respondents. The authors used the data transformed into charts such as bar and pie charts, to indicate the user's factors, and concerns when realizing the E-scooter's benefits and drawbacks. After that, the user's ideas about the technical improvements were also considered. This is because of the advancements related to technology, the structure of an E-scooter plays a crucial role in promoting the E-scooter demands (Rosenberg, 2004).

Firstly, according to the collected data, most of the 106 respondents were from the age group of 15 to 35. The number of men and women was the same, there was not much difference because the authors considered gender selection to diversify the data.

### 1.Age

106 responses

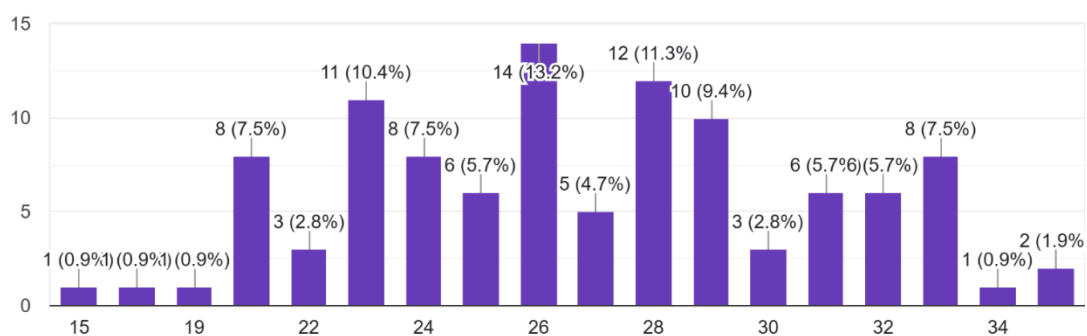


Figure 4.1 The age group of the respondents

### 2. Gender

106 responses

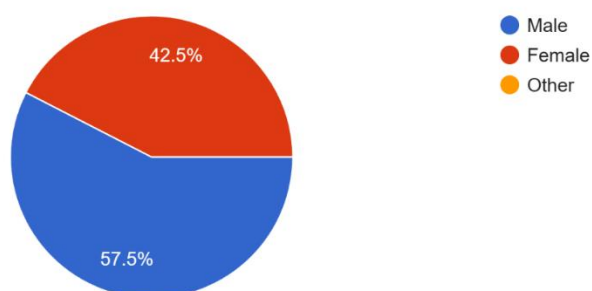


Figure 4.2 The gender of the respondents

Most participants had experienced an E-scooter before, including 68 participants of 106 who used it during their overseas travel. These participants were willing to recommend this form of transportation to their friends and relatives because of its convenience and availability. However, the rest of those who had not used this vehicle, most of them wondered whether to recommend it or not. Because respondents have not experienced it, and do not perceive the benefits that E-scooters bring. Besides, there were also about 4% of the participants who chose not to refer to someone for personal reasons and refused to explain.

5 .If you have not ridden an E-scooter before, how willing would you be to try one in Da Nang?

106 responses

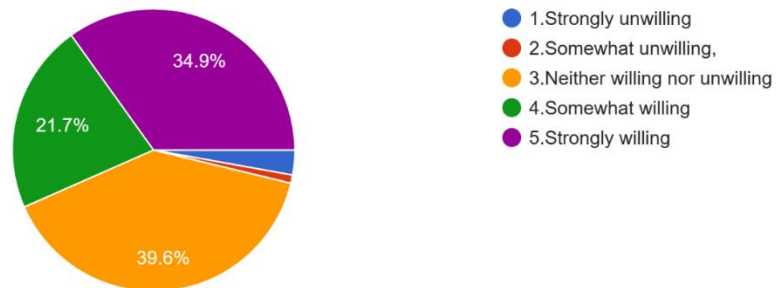


Figure 4.3 The respondent's willingness to recommend an E-scooter.

Secondly, Factors affecting customers when deciding to use E-scooter for their purposes such as going to school, working, and other purposes were mentioned in the survey questionnaire. According to the survey result, most participants chose three main factors: availability, rental, or purchase costs, and especially safety. Indeed, safety and low cost were two of the main reasons to choose a means of transportation in Vietnam (Tuncer and Brown 2020). With a population of about 100 million people based on the General Statistics Office (2021) living in a small country, it is dangerous to use a motorcycle with a maximum speed of 100cc in traffic. Besides, as a developing country, the choice of means of transport at a reasonable cost is always the top concern of Vietnamese people.

6. What factors would influence your decision to try an E-scooter in Da Nang? (Multiple choices apply)

106 responses

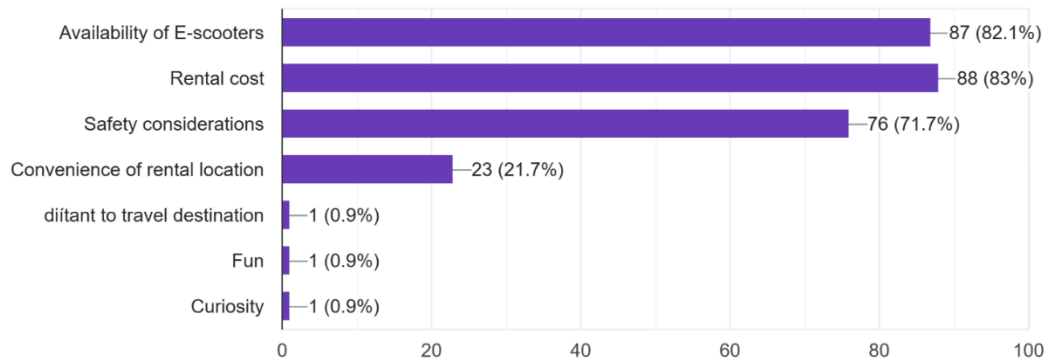


Figure 4.4 Factors affecting the user's decision to use an E-scooter.

Based on Figure 4.4, rental cost or purchase cost and availability were chosen the most with 88 and 87 choices, respectively. Most of the 106 participants thought these factors should be prioritized. Next, an indispensable factor was the safety of the E-scooter with 76 choices. Most visitors to Vietnam are satisfied with everything, especially the food, culture, and human. However, the thing that scared visitors the most was the problem of participating in traffic. Thus, to encourage foreign tourists, the government introduced laws Tuan et al. (2018) and infrastructure improvements based on the Trang (2023) report, which partly reduced the fear of tourists when coming to Vietnam. Figure 4.4 also indicated a few people using E-scooters for their entertainment needs and their curiosity about new means of transport. Fun and curiosity purposes accounted for 0.9% of the total 106 participants, equivalent to 1/106.

9. What are your concerns or hesitations about using an E-scooter in Da Nang? (Multiple choices apply)

106 responses

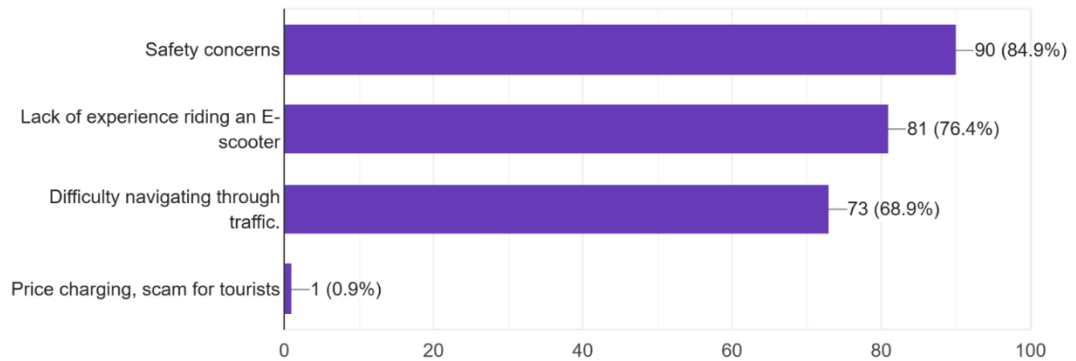


Figure 4.5 The concerns when using E-scooter in Da Nang

However, figure 4.5 shows that for E-scooters to become sustainable, it is important to consider users' concerns. Because when these problems are solved, users would be more confident when using E-scooters and willing to recommend them to others. According to Figure 4.5, Safety, lack of experience riding an E-scooter, and Difficulty navigating through traffic accounted for 84.9%, 76.4%, and 68.9% respectively. Those three choices were high, with 7 to 9 out of every 10 participants choosing them. There was only 1 possibility to worry about tourist fraud. It is common for travelers to a foreign country. Hence, to solve these problems, there were proper solutions selected by the respondents based on Figure 4.6 and Figure 4.7

7. What type of information or resources would be helpful to you when renting an E-scooter in Da Nang? (Multiple choices apply)

106 responses

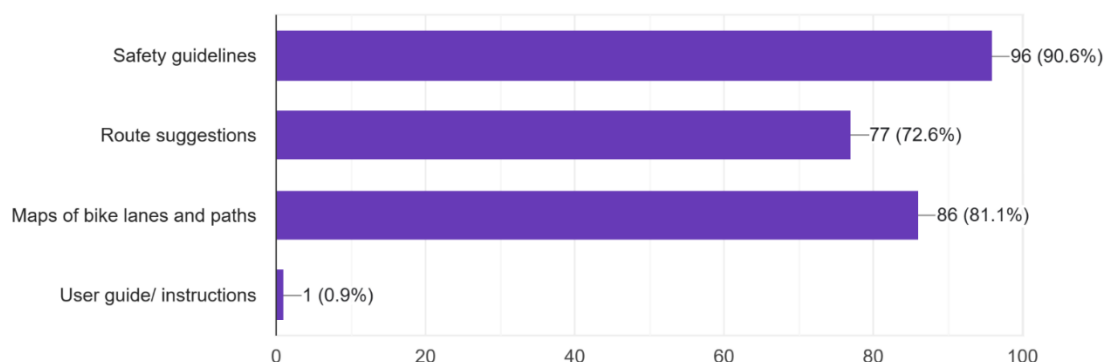


Figure 4.6 Information and resources would be useful while renting an E-scooter in Da Nang

8. In your opinion, how can E-scooter companies better cater to the needs of tourists in Da Nang? (Multiple choices apply)

106 responses

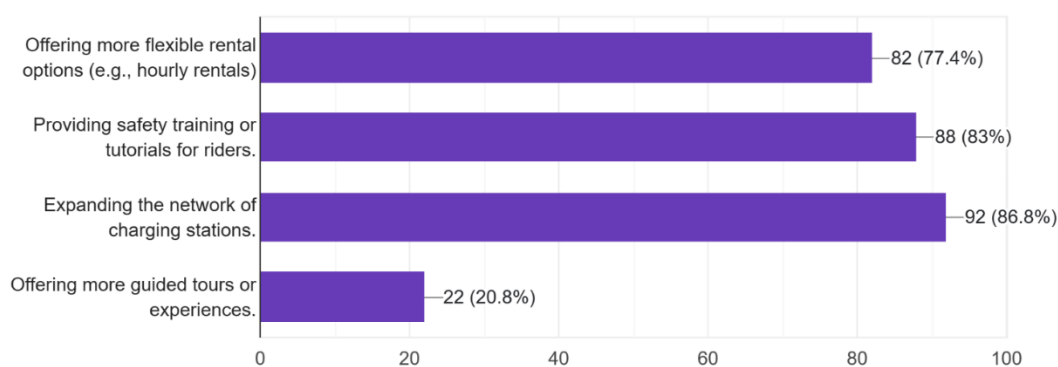


Figure 4.7 Companies take care of the user's needs.

In the opinion of the authors, the Da Nang government, besides regulating laws and improving infrastructure, should also cooperate or support the establishment of service companies that provide protective tools, E-scooter battery chargers, or instructions on how to use the E-scooter safely and effectively to provide for renters and buyers simultaneously. Route suggestions, maps that should be used via Google Maps, and safety guidelines were found to be appropriate

solutions to the concerns raised in Figure 4.5. These options received the most agreement from the respondents' point of view.

Thirdly, apart from the ideas mentioned above, the marketing issue contributed to the introduction of E-scooters to tourists and locals in Da Nang. The study of the Da Nang market was mentioned by the authors in the theoretical part to help deploy advertising and promotion programs for inexperienced users appropriately. In the Da Nang market, most people are using smartphones as an indispensable device in life. Thus, choosing advertising through social networking sites such as Facebook, Instagram, and TikTok is effective. According to Schwarz, R. (2020), Word of Mouth method is considered a popular method in marketing. Therefore, when a person uses and gives positive reviews to E-scooter as well as related companies. These guests then pass the information on to the rest of the people. As a result, E-scooters are likely to become more widely known and used.

11. if you have never used an E-scooter before, what would motivate you to try one in Da Nang? (Multiple choices apply )

106 responses

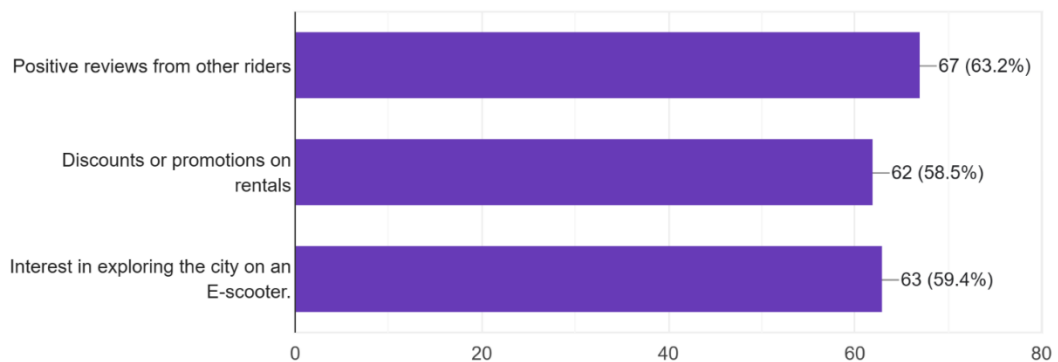


Figure 4.8 The motivations to try E-scooter in Da Nang

The motivations to use E-scooter through positive reviews accounted for 63.2% of the 106 participants compared to discount and promotion and interest in exploring the city options with 58.5%, 59.4% in turn.

E-scooter benefits were discussed in the following step by using the Strength section in the SWOT analysis (Böhm,2009). In the urban areas, Da Nang needs an eco-friendly and sustainable mode

of transportation that is a cost-effective alternative to traditional gasoline-powered vehicles. This mode of transportation is gaining popularity, particularly among the younger generation who have a strong affinity for technology. Additionally, its low repair, maintenance, and operating costs advance E-scooters to an attractive option. Moreover, E-scooters support the current traffic situation in Da Nang to reduce congestion. Because this vehicle only occupies half the area compared to motorbikes. No emissions were found in the E-scooter so the air quality would be further improved. In the modern age, there is an increasing focus on environmental friendliness, and the E-scooter is a prime example of sustainable transportation. As technology continues to evolve, there are improvements in battery capabilities and charging stations, which enhance the usability of the E-scooter. It has gained a lot of attention from young people, making it an attractive transportation option. Moreover, companies in the shipping, travel, or hotel industries could partner with E-scooter companies to reduce transportation costs. E-scooter also has the potential for use in future smart cities, where sustainable and efficient transportation is the key focus.

E-scooters provide an eco-friendly transportation option.

106 responses

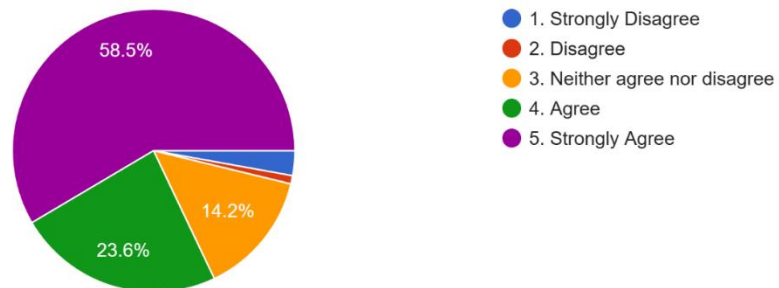


Figure 4.9 E-scooter as an eco-friendly transportation option

E-scooters can reduce traffic congestion in urban areas.

106 responses

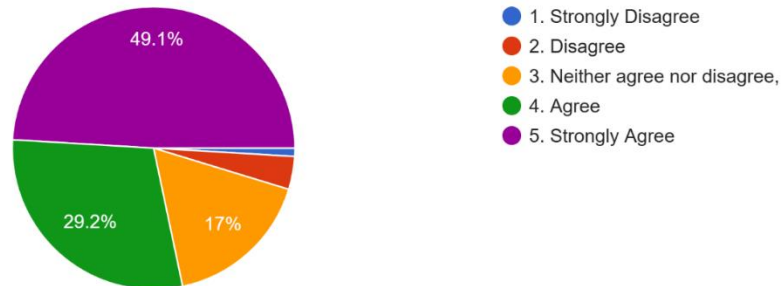


Figure 4.10 E-scooters can reduce traffic congestion.

E-scooters are cost-effective compared to other modes of transportation.

106 responses

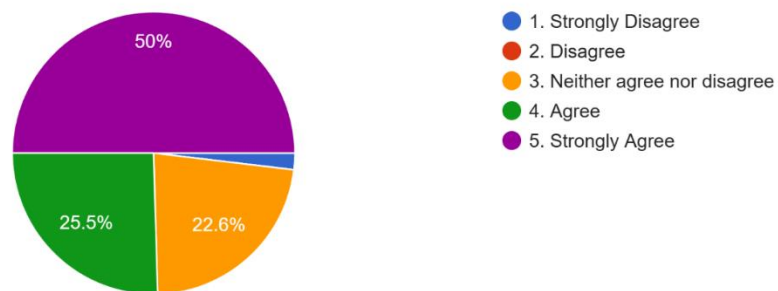


Figure 4.11 E-scooter is a cost-effective mode of transportation.

The benefits that E-scooters bring such as environmentally friendly means of transportation, reduced traffic jams, and reasonable costs received much agreement from the respondents. Specifically, 82.1% of the total participants indicated that the E-scooter will be an environmentally friendly vehicle with almost zero emissions and sustainable energy use. 78.3% and 75.5% agreed that E-scooter will reduce traffic congestion with reasonable rental or ownership costs.

However, besides the benefits, there are some drawbacks that an E-scooter has. In terms of speed, E-scooters have limitations when compared to other types of vehicles and may not be suitable for use on roads that exceed 50 km (about 31.07 mi). Additionally, the extent to which an E-scooter can be used heavily depends on its battery life and the availability of charging

stations in the area. Due to its design, E-scooters are not well-suited for travel on uneven terrain. Furthermore, users may lack proper protective equipment when riding, which could result in potential safety hazards. In Vietnam, E-scooters are required to operate in motorcycle lanes that do not have separate lanes, which could pose risks for riders (Böhm,2009).

E-scooters pose safety risks to riders and pedestrians.

106 responses

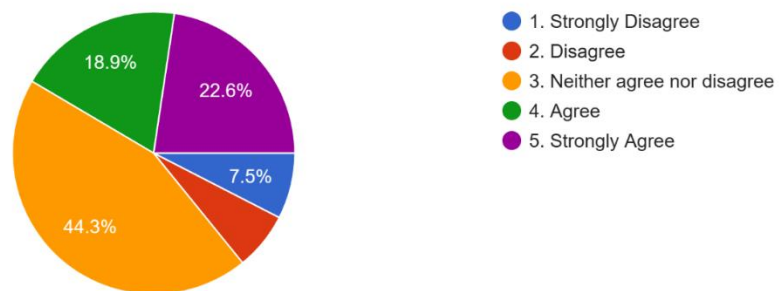


Figure 4.12 Safety risks to the users

There was a diversity of opinion among respondents when saying E-scooter would be dangerous to users. Most of them 44.3% neither agree nor disagree because no E-scooter accidents have happened in Da Nang. The reason is it has not appeared here yet. However, 44 people also agreed it would be extremely dangerous for both users and other road users. The results were the same as the increase in accidents when E-scooters appeared.

E-scooters contribute to an increase in accidents and injuries.

106 responses

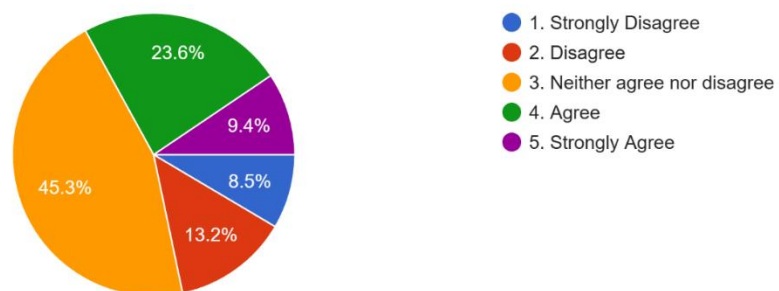


Figure 4.13 The increase in accidents and injuries when using an E-scooter.

In addition, there are currently few public charging stations or places to exchange batteries for E-scooter owners. Most owners of electric vehicles must charge themselves at home or have backup batteries. Over 50% of the participants answered their concerns about the battery charging problem. Because it would be inconvenient to travel long distances with low battery limits. When it happens can cause the flow of vehicles in traffic to be slowed down by problems such as low battery slowing down the vehicle's speed.

E-scooters require a sufficient charging infrastructure.

106 responses

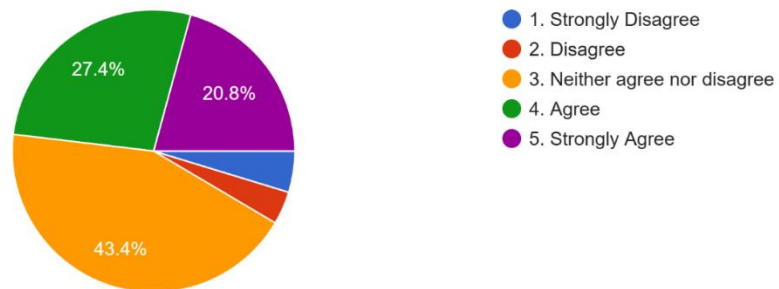


Figure 4.14 The requirements in E-scooter charging infrastructure.

In addition to the limitations, users had suggestions for upgrading the E-scooter to suit the Vietnamese market as well as Da Nang. These improvements are necessary to motivate users and contribute to improving the atmosphere in Vietnam. Not only that, but it also brings economic benefits when many companies are established to cooperate with the government to serve the operation of E-scooters in the country.

17. What improvements do you think could be made to E-Scooters to make them a more appealing transportation option? (Multiple choices apply )

106 responses

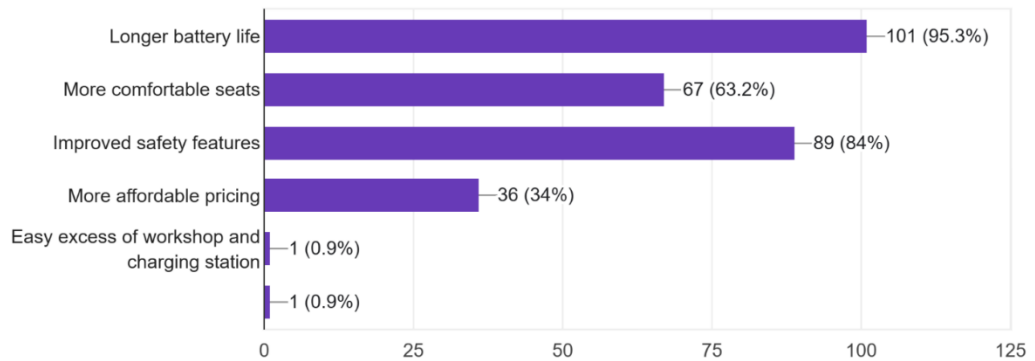


Figure 4.15 The improvements could make E-scooter be more appealing transportation option.

According to Figure 4.15, 95.3% out of 106 respondents asked to improve battery life. This showed the respondents would like to use E-scooters for long-distance travel to easily explore the city and experience the novelty of E-scooters instead of motorbikes. Charging costs certainly are cheaper than gasoline. Next is the safety issue mentioned with 89 choices, accounting for 84%. Protective tools during use such as helmets and protective gear are provided by the companies when renting the E-scooter or are sold at a reasonable price to the users. 67 people asked for more seats for the car and 36 people were worried that the rental price would be more expensive than motorbikes as well as public transport.

16. In your opinion, do you believe introducing e-scooters to the Da Nang market would be beneficial?

106 responses

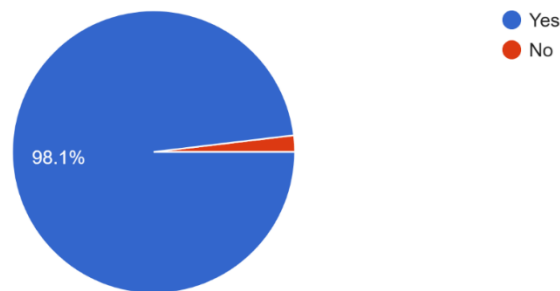


Figure 4.16 The benefits that E-scooter could bring to the Da Nang market.

In general, according to the results obtained from the survey, if the E-scooter has improvements in battery life, seating, and safety when used, together with its benefits, it motivates people's preferences to use the E-scooter. Because almost 98% of respondents agreed that E-scooter will be beneficial to the government, stakeholders, and even users. Not only promotes the tourism industry when tourists have safe, economical means of transportation that do not require a driving license but also increases the economic growth in the Da Nang area and still ensures the health of the people.

## 4.2 Local and tourist 's interview

### Interviewee 1

As a local, she had a positive attitude in approaching E-scooter as a means of transportation in the city. Interviewees thought that E-scooter could bring benefits such as compactness, suitable for the traffic situation in the city due to the increasingly crowded traffic situation, especially at rush hour. In addition, residents are concerned about many related issues such as the environment, so they tend to use environmentally friendly vehicles.

She was a person who used to use an E-scooter and was quite worried about the E-scooter's battery capacity not responding for long distances. Therefore, she thought that E-scooter needs

to overcome this point to be easier for local people to accept it. Due to the strong points of the E-scooter such as saving travel costs and being environmentally friendly, the interviewee was willing to recommend it as a means of transportation for others.

#### Interviewee 2

She was also a local who used to use E-scooter, so her thoughts about E-scooters were quite positive. She said that factors such as convenience in commuting and parking were one of the strong points affecting her desire to choose an E-scooter as her means of transportation. Besides, the issue of the environment was remarkably interesting for the interviewee, she believed it was an environmentally friendly means of transport because its operation depends on electricity, so it hardly emits toxic gas and improves the local environment in the city's pollution reduction campaign by the government. In the end, the cost of using the E-scooter intends to be lower than traditional vehicles and saving on maintenance costs. The flexibility of the E-scooter is a strength as it can be rented or purchased at a cheaper price than other vehicles.

According to the interviewee, factors related to the infrastructure in the city need to be considered. There are few charging stations, so it is necessary to develop more charging stations by building them in parallel with the existing gas stations to help users easily locate them on the map. Safety issues need to be considered because it affects the trust of users, especially potential ones. This includes maintenance or measures to enhance traffic compliance. In addition, it was recommended to increase the identification of E-scooter when participating in traffic such as materials or lights to ensure safety for users.

The interviewee said it should be more incentives for E-scooter tenants such as subscription packages, pay-per-ride, or discounts to attract more people who tend to save on travel costs. She confirmed that she will recommend E-scooter as a means of transportation for others due to its convenience, economy, and impact on the environment.

#### Interviewee 3

Interviewee said E-scooter was a good means of transportation for the locality because it is more cost-effective and environmentally friendly than traditional means of transport. After all, her concern for the environment was extremely high. She tends to use E-scooter as a means of

transportation. E-scooter is easy to access parking spaces due to their small size, suitable for short trips, and unaffected during rush hours.

Her opinion regarding the safety issue of using an E-scooter is that the city's infrastructure has not yet developed to have a dedicated route for an E-scooter. Scooters concerned about using E-scooters on sidewalks can be dangerous for users and pedestrians. In addition, it is necessary to strengthen traffic safety knowledge for those who have never used E-scooter to ensure traffic safety.

She was willing to recommend the E-scooter as a means of transport to others but needs to upgrade factors related to issues such as battery capacity, usability in all weather, and the need to develop infrastructure that is suitable for E-scooter.

#### Interviewee 4

According to the interviewee, the E-scooter is a flexible vehicle, especially when used on short trips. In addition, driving an E-scooter in traffic does not require any driving license, so it is suitable for all ages. In the end, environmental friendliness was what he cared about most when using an E-scooter as a means of transportation.

Safety when using an electric vehicle was an issue he cared about when using it. After two years of using E-scooter as a means of transportation while studying abroad, the interviewee argued government needs to improve safety for users such as helmets, gloves as well as other equipment.

The interviewee recommended E-scooters as a means of public transportation as it is one of the most flexible and eco-friendly vehicles for all ages. Economically, compared with public transportation, the E-scooter is an excellent choice because it has durability and long life of many years without much cost compared to Buses or Bicycles.

#### Interviewee 5

The interviewee said E-scooters' advantages such as not using gasoline, it would save money on gasoline, and reduce environmental pollution. Not requiring a driving license is a good point, it would be suitable for students and tourists when using E-scooter. The above reasons are the factors for him to choose an E-scooter as a means of public transportation.

According to him, Improvements in battery capacity or built-in backup batteries for E-scooter to be able to use on long trips. As a result, E-scooter could be more attractive. Due to its advantages when used, the respondent was eager to share it with others.

The locals thought E-scooter 's advantages such as its dimension help locals deal with the traffic jams. The E-scooter was an eco-friendly vehicle based on the report of Nely (2019) mentioned in the theoretical part that the E-scooter 's advantages help to win the hearts of local people. Besides that, Stakeholders should have marketing campaigns and cooperate with the government 's campaigns which are necessary to increase people's understanding of the importance of the environment. (Da Nang Today, 2018). In addition, underdeveloped infrastructure is the main weakness of E-scooters for bumpy roads which affect the safety of users. There is no safety equipment to ensure users' safety. Designated parks and charging stations are matters for users to consider when using them. Overall, most local interviewees would recommend E-scooters to others because it is more economical, eco-friendly, and easier to use than cars and buses. Those are strong points that make it possible to become a means of transport in Da Nang and attract many tourists.

#### Interview 6

She thought that E-scooters could become a means of transportation due to the convenience they brought to tourists. Besides, it brought many new experiences to tourists who have never used an E-scooter. The interviewee said that the E-scooter will help with body training when using it because the user needs to keep the body balance when they stand on it.

In addition, the available features of the E-scooter such as being foldable and easy to use are strengths of it (Nely, 2019). The interviewee thought focusing on issues such as creating more dynamic designs, and personality attracts young people. Customer groups such as homemakers, or young people needed to design seats and could be resized. If the E-scooter becomes one of the means of transportation, stakeholders should focus on the price for the group of users who are likely to own it because they consider the E-scooter's price.

She would advise people to use an e-scooter. According to her responses, utilizing it on short journeys in place of riding bulky conventional motorcycles provided her convenience, sportiness, and met her needs.

#### Interviewee 7

According to the opinions of the interviewee, E-scooter is more flexible and convenient than other means. Environmental friendliness is a good point compared to existing vehicles in the city.

He found that having significant promotional packages for users could attract more interest from users. In addition, it was recommended to design more obstacle detection devices, auto brakes if the E-scooter moves too fast or suggest safe routes during use to improve safety and attract the attention of customers.

He would recommend using an E-scooter as a means of transportation because it brings many benefits such as being environmentally friendly, convenient, and compact. The price of E-scooter rental will be calculated based on the user's travel time and it will be more expensive than other means of transportation. It is necessary to offer a reasonable cost.

#### Interviewee 8

The interviewee found the advantages of E-scooter such eco-friendliness, safe to travel on crowded roads, low cost, and being more compact than other vehicles. Those were the reasons she considered using E-scooter as a means of transportation.

However, E-scooter still has many limitations such as the speed is low, making the travel time longer than using other. Stakeholders who intend to attract more people should improve the speed of vehicles from 25 kilometers per hour to about 30 or 35 kilometers per hour. This would save a lot of travel time and if integrated with location suggestions or maps, it would be indispensable for travelers.

She would advocate for the use of electric scooters as a mode of transportation for others because they are foldable, portable, and environmentally friendly, all of which strongly influenced her decision to choose them over more conventional vehicles.

#### Interviewee 9:

E-scooters in Da Nang have several advantages over traditional means of transport such as cars, buses, or motorbikes. They are cost-effective, fuel-efficient, and environmentally friendly. E-scooters are highly maneuverable in traffic, making them a convenient choice for navigating

through congested areas and easily finding parking places. However, E-scooters have limitations in terms of range and charging infrastructure, safety concerns, and vulnerability to extreme weather. While they are great for urban commuting, they may not be suitable for long journeys and safety is a major consideration.

To make E-scooters a more attractive means of transport for tourists. According to the interviewee, companies need to focus on incorporating multilingual interfaces to serve tourists who may not understand the local language, developing GPS-guided tour functions that provide pre-programmed routes to popular attractions, creating user-friendly mobile apps that provide essential information and recommendations, setting up dedicated parking area services near attractions travel, ensure availability of safety equipment, integrate audio guides into E-scooters for information reports, coordinate with local tourism boards to integrate E-scooter rental services with tourist information, offering discounted or tourist-friendly price plans, visually appealing E-scooters that reflect local culture or landmarks, while encouraging environmentally friendly activities. By implementing these innovations, E-scooters can provide travelers with a convenient, informative, and sustainable mode of transportation, enhancing their overall travel experience.

She would recommend E-scooters to others as a means of travel because E-scooters offer cost-effectiveness, environmental friendliness, maneuverability in traffic, and parking convenience. However, caution should be exercised due to safety concerns, and limited range for longer trips.

Interviewee 10:

When comparing electric motorbikes with traditional means of transport such as cars, buses, or motorbikes, several factors need to be considered. E-scooters offer advantages such as cost savings, environmental friendliness, and convenience for short-distance travel. However, they have limitations in terms of range, speed, infrastructure reliance, passenger capacity, weather sensitivity, storage, accessibility, and mobility efficiency.

Several improvements can be made to E-scooter to enhance their appeal as a means of transport. These include extended range, improved speed, and acceleration, enhanced safety features, increased comfort, added weather protection, smart connectivity integration, power distribution, increased durability, integrated shared system implementation, and sustainable use of materials. By addressing these areas, E-scooters can bring a more convenient, comfortable, and sustainable transportation experience to users.

E-scooters boost your health and fitness since they need you to move while you drive. This may help to increase calorie burn, muscular tone, and heart health. She would advise others to do it.

Tourists provide ideas for comparing E-scooters with traditional modes of transport and suggestions for improvement to make them more appealing. E-scooters have good comments for their convenience, flexibility, and environmental friendliness. They are suitable for short-distance travel and are cost-effective (Nely, 2019). However, safety concerns and limitations such as range, speed, infrastructure reliance, and weather sensitivity have been acknowledged. Interviewees recommended improvements such as extended range, improved speed, and safety features, and smart connectivity integration. Tourists also emphasized the importance of affordable prices and promoting after-sales services. In general, the interviewees tended to recommend E-scooters due to their convenience, sportiness, and suitability for travel needs.

## 5 Conclusion

The thesis focused on introducing an E-scooter as a means of transportation for the Da Nang market, based on theories given in the theoretical section and surveys, and interviews to analyze local's and visitor 's attitudes about E-scooter becoming a sustainable means of transportation.

The results of this study met the expectations of the authors. Based on interviews conducted, overall customer attitudes towards E-scooters in Da Nang were positive. Customers appreciated the convenience, cost-effectiveness, and environmental friendliness of electric scooters for short trips during rush hours. However, E-scooters still need more improvements in the future if it intends to attract more users. The concerns included battery capacity, safety measures, infrastructure development, and weather resistance. Despite these concerns, most of the interviewees were still willing to recommend E-scooters to others because they brought many impacts when operating on Da Nang roads. Tourists consider electric motorbikes as convenient and environmentally friendly means of transportation. Suggestions from interviewees include incorporating a multilingual interface, GPS-guided tour functionality, user-friendly mobile apps, and eye-catching design to attract a wide range of tourists. Safety equipment, coordination with travel agencies, and tourist-friendly pricing are also important considerations. Overall, customers had a positive attitude towards E-scooters, recognizing their benefits and potential, and highlighting the need to address concerns to further enhance satisfaction and acceptance. In terms of the survey, the authors provided useful information about the benefits that E-scooter brings to users, and stakeholders, especially the atmosphere of the people of Da Nang. In addition to the benefits, there were limitations that an E-scooter needs when adapting to the market. Therefore, improvements were also made in the article and were agreed upon by the respondents. According to that result, the introduction of an E-scooter to Da Nang would bring many economic benefits, promoting the tourism industry to create job opportunities for local people.

At the end of the thesis, the authors accumulated a lot of knowledge and ways to do the thesis. The theoretical part included the main items such as the definition of an E-scooter, its benefits, and limitations. These theories were used to disseminate the basics of E-scooter to new users. Because it could be better if users understand the E-scooter's structure, functions, and limitations to suggest the most suitable E-scooter improvements for the users. The author pointed out these ideas through the questionnaire in the survey, and the questions in the interview about the

behavior and attitude of the respondents when E-scooter intends to become a means of transportation that can replace motorcycle appearing mostly in traffic. In addition, market research theories, sustainable vehicle definitions, regulations, and infrastructure improvements support the success of introducing E-scooter to the Danang market legally, and safely for users.

## 6 Recommendations

Based on positive responses in surveys and interviews, the introduction of E-scooters into Da Nang would receive a good reception and attitude from locals and tourists. In addition, disseminating the advantages and disadvantages of electric vehicles to people helped them better understand the convenience as well as the necessary improvements of this vehicle. The benefits considered by the participants were related to environmental protection, low fuel consumption, and low operating costs, suitable for those who do not have a driving license such as tourists and citizens under 18 years old. However, the survey pointed out the factors affecting the choice of electric vehicles such as the safety, availability, and adequacy of the infrastructure were also considered. The Da Nang government needs to focus on improving these issues for electric vehicles to be widely and safely used. Besides, there should be safety instruction videos before customers use integrated into the app and provide protective tools for users such as safety gloves, and helmets. On the other hand, it is advisable to choose places near residential areas, commercial areas, or train stations so that it is easier for locals to use when going to work or for tourists to visit if it is possible to integrate a good map. Location suggestions for tourists make the E-scooter an indispensable part of tourists in Da Nang. There should be a customer survey on price factors to be able to offer the right price for users to avoid the case of too high or low prices. In addition, services, low-cost repairs should be offered to electric vehicle owners and equipment that prevents theft.

There are some proper strategies for encouraging E-scooter adaptation and promoting responsible use. First, infrastructure developments: to ensure the safety of users, the local government should repair sidewalks in the Da Nang area by limiting traffic encroaching on the roadway or building blockhouses to limit the commercial space creating a spacious sidewalk for pedestrians, bicycles as well as 2-wheel electric vehicles. Besides, potholes on the road surface should be filled to avoid unnecessary accidents. Because the shock absorbers of the E-scooter are weak compared to those of a motorcycle. Parking space plays an extremely significant role in boosting user demand. Parking places should be installed in many places to facilitate the return of 2-wheel electric vehicles after use, next to bus stops, and to avoid encroaching on the streets where motorbikes and cars are moving. Finally, it is advisable to build automatic ticketing booths at the 2-wheel tram parking place. Because many people in Vietnam specifically Da Nang are not willing to use a

bank card, they cannot be activated on the app. Therefore, setting up an automatic ticketing station would support people who do not use a bank card to access this vehicle.

In terms of Education and Awareness Campaigns: there should be instructions on how to use the E-scooter properly such as how to operate it, safety measures, attachments, proper parking, and other notes. These articles were widely distributed on the internet, on flyers from partner companies, or billboards at bus stops. Another recommendation is about E-scooter companies that work with governments to promote E-scooter campaigns and encourage responsible use by users through advertisements and promotions such as free activation for inexperienced users, discounts for responsible users, and some other promotions.

Encourage Sustainable Transportation by pointing out the disadvantages of using motorbikes and including the benefits of increased demand for E-scooters. Two-wheel electric vehicles are widely used, reducing gas consumption, and facilitating the reduction of emissions into the environment. The cost of owning or renting would be more affordable than a motorbike. Especially lower maximum speed is safer for users. In addition, using without a driver's license is highly effective when underage tourists have their transportation. Furthermore, the users are provided road protection equipment by two-wheeler operators such as helmets, and knee, hand, and foot protectors. Signal lights and electronic meters are equipped on the vehicle to ensure that users follow traffic laws.

Finally, building a program to operate the 2-wheel electric scooter with integrated multi-language, easiness which are suitable for all ages, buyers, and renters. However, it is necessary to have adequate registration procedures to facilitate responsible user assessment through which there are separate promotions for them. Especially, having a 24/7 chat box support system to facilitate problem-solving is the best option for customer service.

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## Appendices

### Appendix 1: interview transcript

Interviewee 1:

Age: 31

b. Gender: FEMALE

c. Travel/Local: local

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

-Interviewee: Compact, suitable for Vietnamese traffic, suitable for Vietnamese consumers' needs

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation?

Interviewee: The charger needs a large capacity to use it for a long time

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: Yes, save gas, safe environment

Interviewee 2:

a. Age: 23

b. Gender: Female

c. Local

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee

The popularity of E-scooter as an alternative to traditional transportation methods can be defined in many aspects:

**Convenience:** E-scooters offer a high level of convenience. They are compact, lightweight, and easily manoeuvrable, allowing riders to navigate through traffic, narrow streets, and crowded areas more efficiently than traditional vehicles. They can be quickly accessed and parked, making them ideal for short-distance trips.

**Environmental Impact:** E-scooters are often seen as a more environmentally friendly option compared to traditional transportation. They are typically powered by electric motors, producing zero tailpipe emissions, and reducing air pollution. E-scooters contribute to sustainability efforts and help combat climate change by promoting cleaner modes of transportation.

**Cost-Effectiveness:** E-scooters can be a cost-effective transportation option. Compared to the expenses associated with car ownership, such as fuel, insurance, maintenance, and parking fees, E-scooters offer a more economical alternative. They are relatively affordable to rent or purchase, and the operational costs, including electricity for charging, are typically lower than fuel costs for cars.

However, E-scooters still have weaknesses compared to traditional transportation:

E-scooters are just for one person's use, so if a family or a group of friends need to use them, they must use many E-scooters. Therefore, the total cost is much higher than using traditional vehicles. E-scooters without careful maintenance can affect the quality of vehicles, which can affect the safety of people when using them.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation

**Expanded Infrastructure:** Developing and expanding dedicated E-scooter infrastructure, such as charging stations, can enhance the convenience and safety of using E-scooters. This infrastructure

should be well-integrated with existing transportation systems, making it easier for riders to access and navigate.

**Improved Safety Measures:** Implementing robust safety measures is crucial to instill confidence in potential E-scooter riders. This includes scooter maintenance and promoting adherence to traffic regulations. Enhancing the visibility of E-scooters through reflective materials and lights can also contribute to overall safety.

**Affordable Pricing Models:** Offering flexible and affordable pricing models can make E-scooters more accessible to a wider range of users. Options such as pay-per-ride, subscription plans, or discounted rates for frequent users can make E-scooters a cost-effective choice for short-distance trips, attracting more individuals who may prefer a more economical alternative to traditional transportation.

**Sustainable Operations:** E-scooter companies can prioritize sustainability by utilizing electric scooters with replaceable batteries, investing in renewable energy sources for charging stations, and promoting responsible waste management practices. By aligning with environmentally conscious consumers, E-scooter providers can attract those who prioritize sustainable transportation options.

**Public Awareness and Education:** Raising public awareness about the benefits of E-scooters, such as reduced carbon emissions and improved urban mobility, can help change perceptions and generate interest.

**Collaborations and Partnerships:** Collaborating with local businesses, transportation networks, and community organizations can create synergies that promote E-scooter usage. Partnerships can include initiatives like offering discounts or incentives for using E-scooters for specific purposes, such as commuting to work or attending local events, thereby increasing the appeal and value proposition for potential riders.

**Interviewer:** Would you recommend E-scooters as a means of transportation to others? Why or why not?

**Interviewee:** I will recommend E-scooters as a means of transportation to others because they are convenient, cost-effective, less harmful to the environment, ...

Interviewee 3

a. Age: 25

b. Gender: Female

c. Local

Answers:

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee. I think E-scooters have some advantages and disadvantages after comparing them with traditional modes of transport like cars, buses, or motorbikes.

Cost: E-scooters are typically less expensive than cars and motorcycles. Furthermore, E-scooters save money on fuel costs like gasoline or oil.

Environmental impact: Electric scooters are more environmentally friendly than gasoline-powered scooters because they emit fewer greenhouse gases. They help to reduce air pollution and can help to promote environmentally friendly transportation.

Convenience: E-scooters are smaller and neater than cars, making them easier to park and manoeuvre in traffic. They can be a convenient solution for short trips or in congested urban areas where finding parking can be difficult.

\* Disadvantages:

Safety: E-scooters are frequently operated on busy streets or sidewalks, which can be dangerous for both drivers and pedestrians. Inexperienced drivers or those who disregard traffic laws may be at risk of an accident. Cars and buses, with their larger sizes and built-in safety features, often provide more protection in the event of an accident.

Interviewee: Compact, suitable for Vietnamese traffic, suitable for Vietnamese consumers' needs

Interviewer: In my opinion, several improvements can be made to make the E-scooter a more appealing transportation option:

**Improved safety:** Advanced safety features such as better braking, improved stability control, and integrated lights and reflectors can improve a vehicle's overall safety. Scooter that runs on electricity.

**Improved range and battery life:** Improving battery technology to increase the range and battery life of E-scooters will make them more practical for longer trips and reduce the need for frequent charging.

**All-weather suitability:** The development of E-scooters that can withstand extreme weather conditions, such as rain or snow, will increase their practicality and make them a more dependable shipping option all year.

- **Infrastructure development:** Adding charging stations to the infrastructure for E-scooters. Furthermore, incorporating E-scooter lanes or pathways in urban areas can improve safety and encourage their use.

**Interviewer:** Would you recommend E-scooters as a means of transportation to others? Why or why not?

**Interviewee:** From my point of viewpoint, as a loyal E-scooter user, I believe E-scooters should be popularized widely due to below reasons:

**Sustainable transportation and community:** E-scooters are powered by electric motors, which significantly reduce carbon emissions compared to gasoline-powered vehicles. Encouraging E-scooter usage can contribute to reducing air pollution and combating climate change, promoting a more sustainable transportation ecosystem. It raises awareness about the environmental impact of traditional vehicles and promotes a mindset of choosing cleaner and more energy-efficient modes of transportation.

**Traffic Congestion Reduction:** E-scooters take up less space on the road compared to cars, easing traffic congestion in urban areas. By promoting E-scooter usage, especially for short-distance trips, cities can experience improved traffic flow, shorter Tourist times, and reduced road congestion.

**Cost-Effectiveness:** E-scooters can be a cost-effective transportation option, especially for short-distance trips. They typically have lower operational costs compared to car ownership, including

fuel, insurance, parking, and maintenance expenses. Encouraging E-scooter usage can help individuals save money and promote more efficient use of transportation resources.

**Accessibility and Inclusivity:** E-scooters are accessible to a wide range of individuals, regardless of age or physical ability. They are relatively easy to operate and navigate, making them an inclusive transportation option that can benefit diverse user groups.

**Innovation and Technological Advancements:** The rise of E-scooters reflects advancements in electric mobility and smart transportation solutions. Encouraging their usage fosters innovation, drives technological advancements, and stimulates the development of sustainable transportation infrastructure.

Interviewee 4:

a. Age: 28

b. Gender: Male

c. Local

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee

When comparing electric scooters with other means of transport such as motorbikes, cars, and vehicles like buses, its first strength is that it is very convenient in commuting, especially at short distances. Besides, the use of electric scooters does not require any documents or driver's license, which makes it more possible for people of any age to use without any license without any legal issues to be concerned about. Also, electric scooters also give users an extremely new and unique feeling because when riding on them, we can enjoy the scenery in the city in the most authentic way without worrying about being tired like riding a bicycle. Overall, personally, E-scooter is one of the greatest means of transportation ever created since it has been immensely helping to reduce the carbon dioxide crisis released into the environment for the eco-friendly charging mechanism.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation

With my personal experience with E-scooter with many different service providers in the last 2 years, the thing that interests me when using their services is about safety when using them. for examples,

enclosed helmet, stable shock absorber system, strong motor system for faster movement, etc. and plus consumer incentives such as discounts for students

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: I would highly recommend E-scooter for people around me for the alternatives of other transportations since it is one of the most versatile and eco-friendly vehicles for any age group of people. Economically, comparing to the public transportation, E-scooter is very cheap option since it has the endurance and longevity for years which does not cost a lot comparing to Bus or Bicycles

Interviewee 5:

a. Age: 33

b. Gender: Male

c. Local

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee

Electronic vehicles compared to cars, buses and motorbikes will save fuel, save fuel costs and do not pollute the environment. No driver's license is required, suitable for students and those without a license, tourists.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation

Interviewee: Improvements to be made on electric vehicles are the need to improve the battery for a longer time and to be able to integrate a power bank to Tourist long distances. In addition, there should be safety devices when using such as helmets.

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: I will introduce to friends and relatives about electric cars because I find it useful and convenient for everyone to reduce Tourist costs.

Interviewee 6:

Demographic information:

One. Age: 28

b. Gender: FEMALE

c. Tourist/Tourist: Tourist

Activities: Demographic Information:

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee: E-scooters will bring a new experience to users, convenience when traveling on short distances. Not only that, but they also make today's young people more active, their bodies will work more because when in use, they will have to balance with their feet, the upper part must adjust the direction.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation?

Interviewee: In addition to the basic functions of the E-scooter such as being able to fold, use electricity, Company should invest in design according to each type of customer: dynamic and

sporty designs will target young and active customers, designs aimed at housewives and children will have additional seats and scooters that can be resized or hidden. In addition to investing in design, the company should also pay attention to the price, when E-scooter is noticed by many companies, customers will begin to compare, which companies offer reasonable prices and quality will be interested and prioritized, the company can segment customers to solve this problem.

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: I will recommend E-scooters to my friends and colleagues; I quite like their sportiness and convenience. Not only that, but it also helps me exercise more and it's easier to move over short distances instead of having to take a heavy motorbike from the house.

Interviewee 7

Demographic information:

One. Age: 29

b. Gender: FEMALE

c. Tourist/Tourist: Tourist

Activities: Demographic Information:

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee: Environmentally friendly, slow speed makes it safer to travel, low cost, smaller and more compact than other vehicles

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation?

Interviewee: Although slow is safer, but 25km/h is very slow, so improve speed 30-35km/h

Increase battery capacity for longer use.

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: I will recommend to others to use electric scooter, because it is neat, easy to move and good for the environment

Interview 8

Demographic information:

One. Age: 23

b. Gender: Male

c. Tourist/Tourist: Tourist

Activities: Demographic Information:

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee: From my perspective, E-scooters are more convenient, and flexible more than many other types of transportation. In addition, E-scooters are more eco-friendly, and they save the environment from being polluted.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation?

Interviewee: From my perspective, E-scooters are more convenient, and flexible more than many other types of transportation. In addition, E-scooters are more eco-friendly, and they save the environment from being polluted.

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: From my perspective, E-scooters are more convenient, and flexible more than many other types of transportation. In addition, E-scooters are more eco-friendly, and they save the environment from being polluted.

Interview 9:

Demographic information:

One. Age: 28

b. Gender: FEMALE

c. Tourist/Tourist: Tourist

Activities: Demographic Information:

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee: E-scooters in Vietnam offer several advantages over traditional means of transportation such as cars, buses, or motorbikes. Firstly, they are highly cost-effective, allowing individuals to save on transportation expenses. Additionally, E-scooters are fuel-efficient, which not only helps users save money but also reduces their carbon footprint, making them an environmentally friendly option.

One of the significant advantages of E-scooters is their exceptional manoeuvrability in traffic. This makes them a convenient choice for navigating through congested areas where larger vehicles may struggle. Furthermore, finding parking becomes much easier with E-scooters due to their compact size.

However, it is important to consider the limitations of E-scooters as well. Firstly, they have a limited range, which means they may not be suitable for long journeys or commuting outside of urban areas. Additionally, the availability of charging infrastructure can be a challenge, as it affects the usability and convenience of E-scooters.

Safety is another crucial consideration when it comes to E-scooters. While they offer great manoeuvrability, riders need to be mindful of their surroundings and take precautions to ensure their safety. Finally, E-scooters are vulnerable to extreme weather conditions, which can pose a risk to riders.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation?

Interviewee: To make E-scooters attractive to tourists, companies should focus on incorporating multilingual interfaces, GPS guided tours, user-friendly mobile apps, dedicated parking areas, safety equipment availability, audio guides, collaboration with tourism boards, discounted price plans, visually appealing designs, and promoting environmental sustainability. These innovations enhance convenience, information, and overall travel experience.

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: I would recommend E-scooters to others as a means of travel. They offer several advantages such as cost-effectiveness, environmental friendliness, manoeuvrability in traffic, and parking convenience. However, it is important to exercise caution and be aware of safety concerns. Additionally, E-scooters may have a limited range, so they might not be suitable for longer trips. Lastly, they can be vulnerable to inclement weather conditions.

Demographic information:

One. Age: 28

b. Gender: FEMALE

c. Tourist/Tourist: Tourist

Activities: Demographic Information:

Interviewer: How do you think E-Cars compare to traditional means of transport such as cars, buses, or motorbikes?

Interviewee: When considering electric motorbikes, or E-scooters, as an alternative to traditional means of transport like cars, buses, or motorbikes, there are several factors to consider. E-scooters offer advantages such as cost savings, environmental friendliness, and ease of control, making them suitable for short distance travel. However, it's important to note their limitations as well. E-scooters have constraints in terms of range, speed, reliance on infrastructure, passenger capacity, weather sensitivity, storage, accessibility, and mobility efficiency.

Interviewer: In your opinion, what improvements can be made to E-scooters to make them a more attractive means of transportation?

Interviewee: E-scooters offer some great potential health and fitness benefits. One of the main advantages is that they involve physical activity while driving. This means that riding an E-scooter can contribute to improved heart health, muscle tone, and even calorie burn. It serves as a more active alternative to sedentary modes of transportation, which is particularly beneficial for individuals with a sedentary lifestyle. By choosing an E-scooter, people can incorporate more physical activity into their daily routine and enjoy the benefits of an active lifestyle.

Interviewer: Would you recommend E-scooters as a means of transportation to others? Why or why not?

Interviewee: I would highly recommend E-scooters to others. One of the key advantages of E-scooters is the potential health and fitness benefits they offer. Riding an E-scooter involves physical activity, which can contribute to improved heart health, muscle tone, and calorie burn. It serves as a more active alternative to sedentary modes of transportation, making it particularly beneficial for individuals with a sedentary lifestyle or those looking to incorporate more physical activity into their daily routine. So, from a health and fitness perspective, E-scooters can be a great choice for anyone seeking an active and convenient mode of

## Appendix 2: Survey questionnaire

### Introducing E-scooter in Da Nang

We are writing to you today to request your valuable participation in a study that aims to gather insights on an important subject. As a respected individual who possesses knowledge and experience in this field, your input would be immensely valuable, and we kindly request your cooperation in answering the following questionnaire.

Allow us to introduce ourselves. My name is Dat, and my colleagues is Quan, and we are student of Business at Kajaani University of Applied Sciences. The study we are conducting survey for our thesis which is named introducing E-scooters to Da Nang market and customer attitudes. The primary goal of this study is to gain a deeper understanding of customer behavior in introducing E-scooter for locals and tourists in Da Nang. By collecting data from a diverse range of

individuals, including experts such as yourself, we aim to identify patterns, trends, and insights that will contribute to a more comprehensive understanding of the subject matter.

Please note that the data collected in this study will be used for research purposes only. Your responses will be treated with the utmost confidentiality and anonymity. We do not gather any personal identifying information, and individuals cannot be recognized based on their answers. Your privacy and data security are of utmost importance to us.

Should you have any questions or require further information, please do not hesitate to contact us. We can be reached via email at [datnguyen@kamk.fi](mailto:datnguyen@kamk.fi) and [quannguyen@kamk.fi](mailto:quannguyen@kamk.fi). Your feedback and insights are greatly appreciated, and sincerely hope that you will consider contributing to this study.

Thank you in advance for your time and cooperation. Your input will make a significant difference in the success of this research endeavor.

Yours sincerely,

Demographic Information:

1.Age

2. Gender

Male

Female

Other

3.Are you a local resident of Da Nang or a tourist?

Tourist

Local

4.Have you ever used an E-scooter before?

Yes

No

5. If you have not ridden an E-scooter before, how willing would you be to try one in Da Nang?

1.Strongly unwilling

- 2.Somewhat unwilling,
- 3.Neither willing nor unwilling
- 4.Somewhat willing
- 5.Strongly willing

6.What factors would influence your decision to try an E-scooter in Da Nang? (Multiple choices apply)

- Availability of E-scooters
- Rental cost
- Safety considerations
- Convenience of rental location
- Other...

7.What type of information or resources would be helpful to you when renting an E-scooter in Da Nang? (Multiple choices apply)

- Safety guidelines
- Route suggestions
- Maps of bike lanes and paths
- Other...

8. In your opinion, how can E-scooter companies better cater to the needs of tourists in Da Nang? (Multiple choices apply)

- Offering more flexible rental options (e.g., hourly rentals)
- Providing safety training or tutorials for riders.
- Expanding the network of charging stations.
- Offering more guided tours or experiences.
- Other...

9.What are your concerns or hesitations about using an E-scooter in Da Nang? (Multiple choices apply)

- Safety concerns
- Lack of experience riding an E-scooter
- Difficulty navigating through traffic.

Other...

10. How likely are you to recommend E-scooters to others who are visiting or living in Da Nang?

(Those who used before)

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

11. If you have never used an E-scooter before, what would motivate you to try one in Da Nang?

(Multiple choices apply)

Positive reviews from other riders

Discounts or promotions on rentals

Interest in exploring the city on an E-scooter.

Other...

12. Have you ever witnessed any safety concerns or accidents involving E-scooters in Da Nang?

Yes

No

13. Benefits of E-scooters:

Please rate the following statements based on your opinion about the benefits of introducing E-scooters to the Vietnamese market.

E-scooters provide an eco-friendly transportation option.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters can reduce traffic congestion in urban areas.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree,
4. Agree
5. Strongly Agree

E-scooters are cost-effective compared to other modes of transportation.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters are convenient for short-distance travel.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters promote a healthier lifestyle by encouraging physical activity.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

14. Do you think E-scooters could be a viable transportation option for commuting to work or school?

Yes

No

15. Drawbacks of E-scooters:

Please rate the following statements based on your opinion about the drawbacks of introducing E-scooters to the Vietnamese market.

E-scooters pose safety risks to riders and pedestrians.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters contribute to an increase in accidents and injuries.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters may cause disruptions in traffic flow.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters require a sufficient charging infrastructure.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

E-scooters may contribute to noise pollution in urban areas.

1. Strongly Disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly Agree

16. In your opinion, do you believe introducing E-scooters to the Da Nang market would be beneficial?

Yes

No

17. What improvements do you think could be made to E-scooters to make them a more appealing transportation option? (Multiple choices apply)

Longer battery life

More comfortable seats

Improved safety features

More affordable pricing

Other...