FACULTAD DE TURISMO Y FINANZAS

GRADO EN TURISMO

ARE E-MICROMOBILITIES REVOLUTIONIZING URBAN TRANSPORT? A VALORIZATION OF HOW CULTURE INFLUENCES MODE OF TRANSPORT CHOICE

Trabajo Fin de Grado presentado por Julia Hümpfner, siendo la tutora del mismo la profesora Dra. Dª. Reyes González Relaño.

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TÍTULO:

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ABSTRACT:

E-scooters, e-mopeds, e-bikes, are rising as an alternative more sustainable mode of urban transport, they are expected to have great potential to reduce pollution and to substitute motorized vehicles for short commutes. E-micromobilities are expected to play an important role in tourist destinations fighting massive overcrowding and congestion of existing transport infrastructure. The objective of this paper is to explore a new perspective in the discussion of mode of transport choice by introducing the method of cultural analysis to understand the influence of culture. A survey was conducted in 3 cities (Munich, Seville, Kaohsiung) to analyse university students´ use and perception of urban transport means and explore their acceptance of e-micromobilities as future tourists based on their culture. Despite the cities´ geographic and socio-geographic characteristics there are other factors such as culture that might influence mode of transport choice more. The main results confirm, based on the sample, that sustainable mode of transport choice is positively related to Inglehart´s classification of cultures as modern/postmodern. As such the analysis indicates that respondents in Munich and Seville will be more accepting of e-micromobilities. Future research is recommended.

KEY WORDS:

Sustainable Non-motorized Urban Mobility; Tourist Movement in Cities; Cultural Dimensions and Values: Theories of Hofstede and Inglehart; Statistical Analysis; Case Study: Munich, Seville, Kaohsiung

TÍTULO:

¿ESTÁN REVOLUCIONANDO LAS E-MICROMOVILIDADES EL TRANSPORTE URBANO? UNA VALORIZACIÓN DE LA INFLUENCIA DE LA CULTURA EN LA ELECCIÓN DEL MEDIO DE TRANSPORTE

RESUMEN:

Los patinetes, motos y bicicletas eléctricas están emergiendo como el medio de transporte urbano alternativo más sostenible. Estudios recientes analizan su gran potencial de uso por su contribución a la reducción de contaminación y como sustitutos de los medios de transporte motorizados para los desplazamientos cortos. Además, las e-micromovilidades tendrán un papel importante en los destinos turísticos que están luchando contra la aglomeración y la congestión de la infraestructura de transporte. Este trabajo tiene como objetivo explorar una nueva perspectiva en el debate de la elección del medio de transporte introduciendo el análisis cultural como variable relevante. Se ha realizado una encuesta en tres ciudades de características diversas (Múnich, Sevilla, Kaohsiung) para analizar el uso y la percepción de la movilidad urbana entre los estudiantes universitarios y explorar su comportamiento, como futuros turistas, hacia las e-micromovilidades en base a su cultura. Los resultados indican que, a pesar de las características geográficas y socio-geográficas de las ciudades, hay otros factores como la cultura que posiblemente influyan la elección del medio de transporte. Se confirma que la elección del medio de transporte sostenible está positivamente relacionada con la clasificación rasgos modernista/postmodernista de la cultura, atendiendo a las teorías de Inglehart. Así, el análisis indica que los encuestados en Múnich y Sevilla aceptarán mejor las e-micromovilidades como medio de transporte para desplazamientos cortos. Se recomienda continuar avanzando en esta línea de investigación.

PALABRAS CLAVE:

Movilidad Urbana Sostenible y no-motorizada; Desplazamiento de turistas en ciudades; Dimensiones y valores culturales: Teorías de Hofstede e Inglehart; Análisis estadístico; Múnich, Sevilla, Kaohsiung

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1 INTRODUCTION: TOURISM AND URBAN MOBILITY

Tourism is defined as “the movement of people to countries or places outside their usual environment for personal or business/professional purposes” (World Tourism Organisation, 2022). The tourism activity includes the displacement to the destination, the accommodation at the destination, the activities undertaken at the destination, the return trip to the place of origin and the sharing of memories and experiences after returning to the usual environment.

As such, the transport industry is an essential element of the tourism system, it doesn’t just influence how tourists travel to and from destinations but also the way tourists move within a destination. Unfortunately, the latter aspect is getting little attention in the field of research. In the process of building a sustainable tourism industry in cities it is important to achieve sustainable urban mobility, based on alternative and integrated, meaning connected and combinable, transport means (Signorile et al., 2018).

One critical issue of tourism mobility in urban destinations is the agglomeration of tourists in the city centres due to the concentration of tourism resources, such as monuments, shops, restaurants, and other infrastructure, in centrical spaces where historically the city was founded. The success and sustainable development of urban tourism in a destination will strongly depend on the accessibility and centrality of its resources (Aranburu et al., 2016).

Many tourism destinations are witnessing major impacts caused by the excessive use of private vehicles in the current urban mobility systems and have therefore directed their focus towards micromobilities, referring to means such as walking, cycling and using small electrically powered vehicles, as an alternative mode of transport to solve these issues (Davies et al., 2020).

In order to successfully implement sustainable mobility, it is crucial to understand tourists´ propensity to use alternative and integrated modes of transport. A visitor´s attitude towards mobility depends on the cultural context and the strategic policies on mobility observed in their usual environment. The tourists most likely to change are the younger generations and thus the industry should cater to and research should focus on this demographic profile (Signorile et al., 2018).

The idea for this bachelor thesis originated from a prior project aiming to explain mode of transport choice in the city of Kaohsiung (Taiwan) using cultural analysis. Brainstorming along this line of thought the main challenge was to identify a concrete context, in which it is possible to relate urban transport, culture and tourism. Finally, the use of micromobilities for tourist mobility in cities connects all these concepts and provides a significant need for investigation. Due to my personal experience living in various cities for long periods of time, I selected 3 cities I am familiar with and that seem interesting for many reasons. Munich, Seville and Kaohsiung are 3 cities that are very different in terms of culture, level of economic development, climate, size and yet similar considering that each one is significant in their country. This paper intends to improve and enhance the approach of the pilot project and its questionnaire and establish a new survey and dataset that permits the comparison between respondents of different nationalities.

The work is divided into two parts, theoretical framework and practical approach, where the first is structured as following. Chapter 2 portrays the objectives and methodology of this paper. Then, chapter 3 summarizes the general situation and trends in the transport sector in Asia and Europe. Continuing, chapter 4 discusses cultural theories and concepts and possible applications of these in the case of micromobilities. Next, chapter 5 introduces the three cities of the case study/survey and their most relevant

characteristics for the implementation of micromobilities. Having concluded the theoretical part, finally, the practical part is developed in chapter 6. It presents the findings of the survey and evaluates them according to the information detailed in the theoretical framework. Lastly, chapter 7 concludes the work with some final results gained from combining theory and practice.

2 OBJECTIVES & METHODOLOGY

2.1 OBJECTIVES

The main aim of this research is to explore a new perspective in the discussion of mode of transport choice in urban surroundings, specifically the use of micromobilities, by introducing the concept of culture and cross-cultural analysis as an influential factor enhancing and complementing those theories based primarily on demographic, socioeconomic and geographic indicators.

The research question dealt with in this paper is: “How will university students of different cultural backgrounds (German, Spanish, Taiwanese) accept the implementation of e-micromobilities as a new mode of transport in tourist destinations?”. As such the following objectives are formulated.

Firstly, this thesis aims to test the existence and importance of the link between cultural aspects on a national level and mode of transport choice on an individual level in the case of university students in three different cities in three different countries.

Secondly, considering the relationship between culture and transport use, this paper intends to understand the behaviour towards and use of micromobilities, as tourist mobility in urban destinations, Generation Z will exhibit based on their cultural values.

Thirdly, this research will propose a critical assessment of micromobilities as an alternative mode of transport for urban mobility, discussing its implementation and use both from a logistic efficiency perspective as well as from a sustainability perspective.

2.2 METHODOLOGY

The methodology used to answer the research question, “How will university students of different cultural backgrounds (German, Spanish, Taiwanese) accept the implementation of e-micromobilities as a new mode of transport in tourist destinations?”, is described both visually in figure 2.2 and in written form in the subchapter below.

In the first step, a brief literature review was conducted to complement the knowledge gained from previous projects and to direct the general research idea that was already present at that time.

Once the final research question was determined the next phase of in-depth literature research followed, gathering detailed information about the key concepts of cultural analysis from various scientific articles using google scholar as the search engine. Since some concepts of cultural analysis date back to the late 20th century the search was then filtered for articles published since 2018 quoting the original authors who introduced said concepts, selecting those articles that in some way establish a relationship between transport and culture.

At the same time, further research was conducted to collect information about the current situation of urban transport in Europe and Asia as well as the trends of urban transport highlighted in scientific articles. Special attention was given to the role attributed to micromobilities as a future mode of transport in this context, its potential and desirability. Since this concept is very recent, the research focused on definition of the concept, service types, growth rates, performance evaluation and the connection to tourism, leisure or culture.

This literature research built the foundation of the theoretical framework nevertheless it was not sufficient. In order to better understand the theoretical concepts, interpret and contrast the survey results, in a third step, a descriptive analysis of the three cities of

interest was done. The cities were analysed, using statistical, cartographic and electronic resources, considering location, topography, climate, size, etc. since these are other important factors that may influence mode of transport choice.

Based on the theoretical framework, in a fourth phase, a preliminary questionnaire was designed to be distributed amongst university students in the following three cities: Munich (Germany), Seville (Spain), Kaohsiung (Taiwan). At the same time, the chi-square test as a method of statistical analysis was studied to be able to apply it once the survey would be completed. The chi-square test of independence is a hypothesis test applied to discover whether two categorical or nominal variables are inclined to be related or not (JMP Statistical Discovery LLC., 2022).

Step 5 was comprised by the revision and distribution of the questionnaire[1]. The questionnaire was distributed as an internet-based survey during March and April of 2022, using google forms, via various social media channels, mainly WhatsApp and Instagram, to university students in the corresponding cities. The sampling method for this research is non probabilistic, the majority of respondents were selected on a basis of personal contact and convenience. Respondents of foreign nationality were deleted from the survey since the same cultural background cannot be guaranteed. Therefore, only German, Spanish and Taiwanese students were analysed in the final stage. A total of 120 admissible responses were retrieved.

The questionnaire consists of 36 questions organised in 4 parts: general questions; questions regarding mode of transport choice; questions regarding urban mobility and mode of transport perception; questions regarding cultural aspects. The questions were written in English for the respondents in Germany and Taiwan and were translated to Spanish for the survey conducted in Seville.

The survey “Mode of transport choice – Munich” reached 53 responses of which finally 45 were considered valid for analysis. The sample consists of 18- to 25-year-old German university students of which 80% study in their hometown, Munich, and generally consider their socio-economic level either equal (48.9%) or above (42.2%) the average of their environment. The respondents are 46.7% male and 53.3% female.

The survey “Mode of transport choice – Seville” reached 40 responses of which finally 37 were considered valid for analysis. The sample consists of 19- to 25-year-old Spanish university students of which 56.8% study in their hometown, Seville, and generally consider their socio-economic level equal (86.5%) to the average of their environment. The respondents are 27% male and 73% female.

The survey “Mode of transport choice – Kaohsiung” reached 42 responses of which finally 38 were considered valid for analysis. The sample consists of 18- to 26-year-old Taiwanese university students of which only 23.7% study in their hometown, Kaohsiung, and generally consider their socio-economic level equal (76.3%) to the average of their environment. The respondents are 36.8% male and 63.2% female.

The reduced number of responses is explained by various factors. Firstly, the strict segmentation of the target population. The profile required in the survey was delimited by age (Gen Z), by occupation (university students), by nationality (German, Spanish, Taiwanese) and by location (Munich, Seville, Kaohsiung) in order to collect a sample for which a comparison based on culture would be more meaningful. The complexity and duration of the survey was another factor that made the completion of the survey more difficult.

Grouping questions into different topics according to the information provided by the answers provided a clear overview of the data. The results were analysed topic for topic

[1] Please see Annex I

using excel applying various mathematical and statistical concepts, such as percentage, average and weighted mean as well as the chi square test of independence to test correlation of two variables.

The survey analysis will highlight the dominant mode of transport (chapter 3), the convenience of different urban modes of transport and the perception of the public transport network (chapter 4). Furthermore, it will explore the relationship between sustainability values and mode of transport choice (chapter 5). Particularly, with regard to question 23 the importance of sustainability for mode of transport choice and with regard to questions 12 and 15 the practical implication for mode of transport use in daily situations. Lastly, the analysis evaluats the current use of micromobilities and intends to predict university students´ attitude towards micromobilities, based on their perception of and preferences for the different modes of transport.

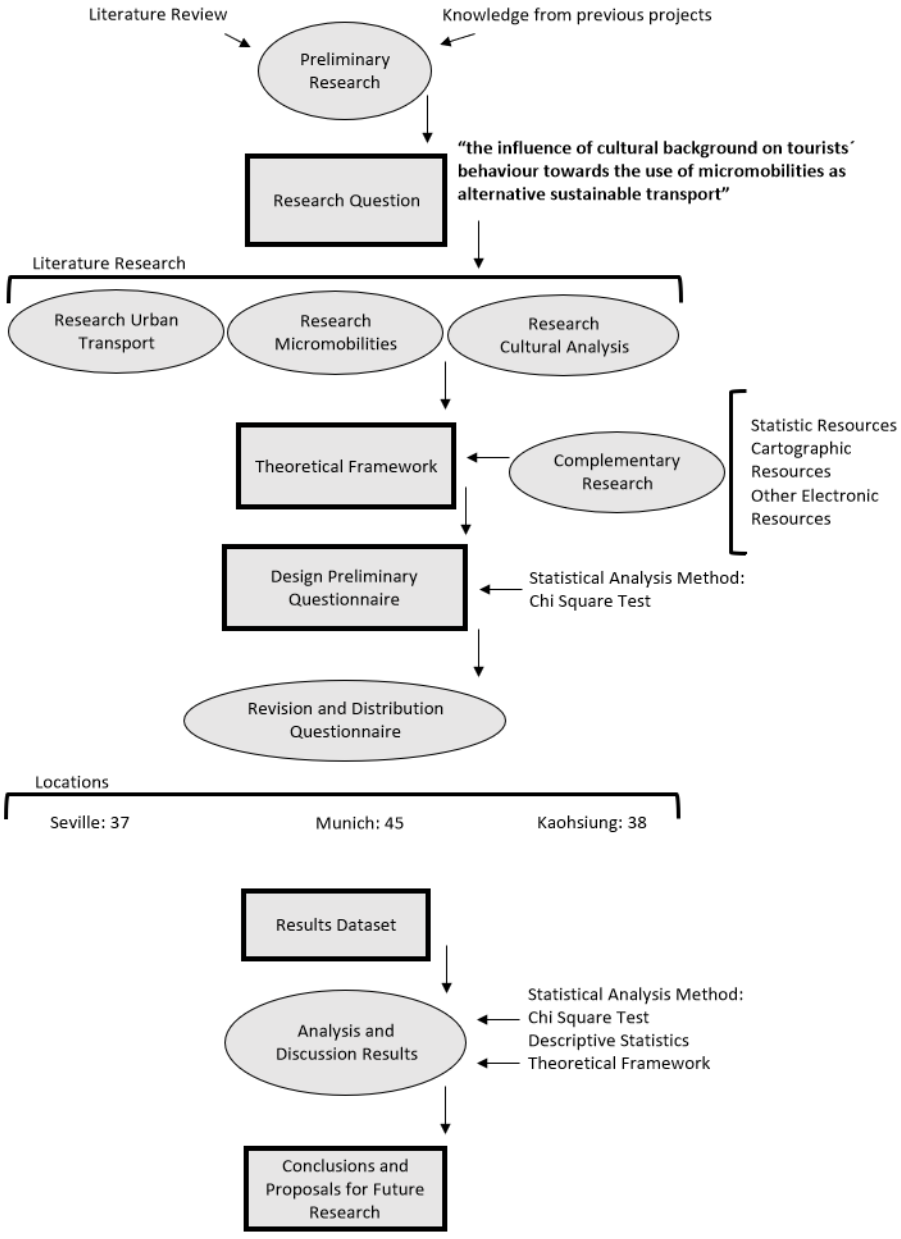

Figure 2.2 Methodology

Source: Own elaboration

3 TRANSPORT IN ASIA AND EUROPE

Transport can be considered an essential activity in the every-day life of people all around the world. Modes of transport are the tools that enable individuals to fulfil the need of displacement between various locations for reasons such as work, leisure, personal management and household (Dorocki & Wantuch-Matla, 2021). The movement of large groups of people using various types of transport calls for the development and extension of infrastructure and suitable regulation by public authorities to overcome challenges and improve transport systems.

3.1 CHARACTERISTICS OF URBAN TRANSPORT IN ASIA

Although motorization has been growing rapidly in Asia, in 2015 only in the most developed countries like Japan and South Korea it was possible to see similar rates of automobile ownership as in Europe, as detailed in figure 3.1. Excluding Japan and South Korea, the average rate of motorization in 2015 in Asia was 85 vehicles/1,000 inhabitants whereas the European average was 581 vehicles/1,000 inhabitants. Nevertheless, the increase in motorization in Asia is globally the highest with an increase in 141% over the past 10 years.

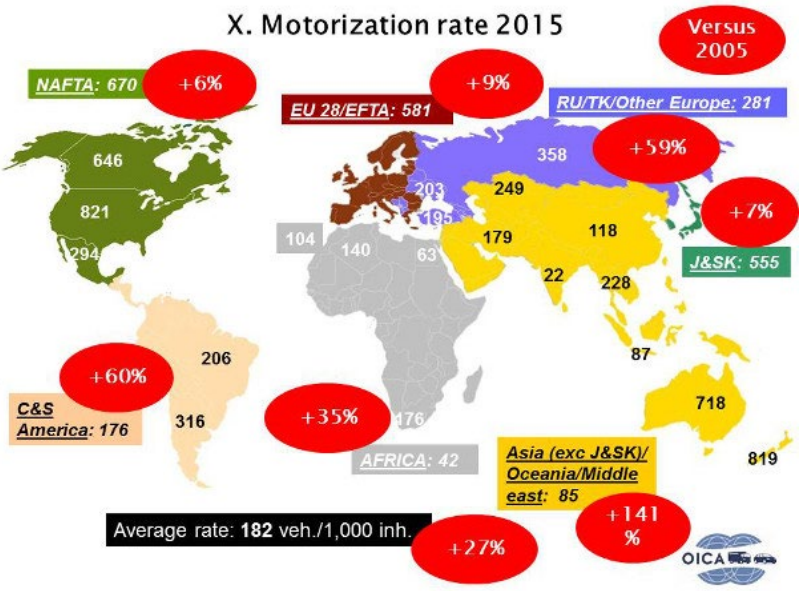

Figure 3.1 Motorization Rate World Map

Source: International Organization of Motor Vehicle Manufacturers, 2022

An important element of urban mobility that characterises most Asian cities, especially in South Asia and South-East Asia, are motorcycles because they provide the opportunity for many people to acquire private mobility at a lower cost (Regmi, 2020). The reasons for the popularity of motorcycles in Asia are on the one hand of economic nature as mentioned before and on the other hand linked to factors such as climate and accessibility. For example, in Vietnam´s two biggest cities the public transport system is perceived as mediocre and insufficient by many citizens. Hsu et al.´s survey suggests the main reason for preferring to ride a motorcycle is the lack of accessibility supplied by the urban public transport system. Even in countries like Taiwan, where economic development is close to reaching the level of a high-income economy, the rate of motorcycle ownership is still witnessing high growth rates (Hsu et al., 2003).

Many Asian cities are trying to solve the issues of traffic caused by urbanization and motorization by implementing and expanding mass public transport systems. The possibilities for improvement of urban public transport infrastructure in Asia are often limited by the lack of financial resources and consequently the most implemented option is bus transport due to its large capacity, low costs and simplicity of installation (Regmi, 2020).

3.2 CHARACTERISTICS OF URBAN TRANSPORT IN EUROPE

As mentioned before and pictured in figure 3.1, the level of motorization in Europe is much higher than that in Asia. Therefore, it could be expected that the characteristics and issues of the transport sector in Europe vary from those in Asia. This abstract will shed some light on the current situation of urban transport in Europe.

The world of urban transport in Europe and many countries of the Global North is dominated by private car ownership causing traffic congestion and pollution, leading to health and social problems (Groth et al., 2021; Davies et al., 2020). For this reason, since the beginning of the 21st century an increasing interest in developing alternative modes of transport has arisen in many of these countries (Dorocki & Wantuch-Matla, 2021; Groth et al., 2021).

The improvement of existing and construction of new urban public transport systems require high costs and is complicated by spatial saturation. In some cases, the creation of new urban public transport systems is simply impossible due to city regulations on the conservation of historic city centres, buildings and remains (Dorocki & Wantuch-Matla, 2021).

Mobility research in recent years observed a shift in mode of transport choice in western countries towards multimodality, a term describing the concept of flexibly switching between various modes of transport for everyday mobility that are considered equally convenient. Millennials are the generation that have induced this change and openness towards alternative modes of transport as a result of increased environmental awareness and increased competence to adapt to new kinds of interconnected mobility, that require using information and communication technologies, amongst other reasons (Groth et al., 2021).

The most promising solutions in urban mobility currently discussed by researchers are centred around shared mobility, electric mobility and mobility-as-a-service (Miskolczi et al., 2021). The latter referring to the implementation of “mobility packages that allow the use of any kind of transport means to reach a certain destination without any difference between either providers or data” (Signorile et al., 2018).

3.3 FUTURE TRENDS OF URBAN MOBILITY: E- MICROMOBILITIES

3.3.1 Challenges and Solutions

Making urban mobility sustainable has been one of the main goals in the transport industry for quite some time now (Lyons, 2018). Lam and Head believe that sustainable urban mobility is about achieving “the ease, convenience, affordability and accessibility of travelling to one´s destination with minimal impact on the environment and others” (Lam & Head, 2011).

The challenges transport systems currently face can roughly be condensed into the following problems: technical issues of current mobility services and vehicles and social issues affecting mode of transport choice.

On the one hand, poor management and outdated equipment in the case of urban mobility result in increased waiting times, low user satisfaction and increased environmental impacts (Miskolczi et al., 2021). On the other hand, deep-seated social attitudes and mobility culture as well as economic constraints possibly complicate the efforts made to influence user´s decision making. Reducing the need to travel and trip lengths as well as convincing people to switch to other modes of transport could potentially relieve congestion and reduce the overload in the urban transport system (Miskolczi et al., 2021; Signorile et al., 2018).

Furthermore, research suggests that it is not sufficient anymore for urban mobility to just be sustainable, goals need to go beyond that. Solutions for urban mobility should be affordable, effective, attractive, sustainable and connect towns and cities. Those solutions that use emerging technologies to ensure this are referred to as 'smart' and represent the future of urban mobility. In order to be smart about urban mobility both research and implementation are required to balance technological knowledge with social and behavioural science, understanding people´s lifestyles, practices, constraints and needs (Lyons, 2018).

Shared mobility and mobility-as-a-service as a solution to the aforementioned challenges is expected to encourage people to get rid of their private cars. Moreover, electric mobility is predicted to achieve sustainability in the urban transport sector however the sustainability of electric vehicles is still questioned. For electric cars, concerns are primarily the production of batteries, powering these vehicles, that causes major environmental impacts. Nevertheless, the ideal scenario of future urban mobility researchers concluded at present consists of both shared and electric mobility (Miskolczi et al., 2021).

3.3.2 The Role of Micromobilities

The concept of micromobilities to date is still loosely defined but generally summarizes the modes of walking, cycling and various new types of electric mobility, the latter displayed in figure 3.3 (Davies et al., 2020).

Figure 3.3 Overview of E-Micromobility

Source: Society of Automotive Engineers, 2022

Micromobilities, especially bicycles, e-scooters and e-bikes, are considered to be able to reduce and possibly even replace car travel for short trips within cities (Noland, 2021). Offering consumers flexibility and door-to-door accessibility, micromobilities can in a way provide similar comfort to cars and start a change in behavioural patterns. The greatest potential of micromobilities however, consists of solving the first- and last-mile problem

by properly integrating micromobilities and public transport, this combination as a mode of transport can reach a level of access, speed and comfort that may challenge that of cars. It will be a big step towards shifting away from private motorized vehicles (Oeschger et al., 2020).

Most types of micromobility are supplied both as private and shared modes of transport. In the case of bicycles, it has always been used as a private mode of transport. Especially for the newer powered section of micromobilities, also referred to as e-micromobilities, this is not the case. In recent years shared micro-vehicle systems for newer modes of transport such as e-scooters and e-bikes as well as prevalent modes of transport such as bicycles have increasingly gained popularity. Amongst the shared micromobility systems research distinguishes between station-based and dockless systems both of which are based on information and communication technologies (Oeschger et al., 2020).

The integration of public transport and micromobilities are compatible with both the concepts of shared mobility and mobility-as-a-service. Hence, the implementation of micromobilities can play an important role in achieving sustainable urban mobility. Nevertheless, the use of micromobilities, similar to other modes of transport, isn't just a question of willingness but also of other external factors such as accessibility, culture, climate and economic development (Noland, 2021) .

3.3.3 The Desirability of E-Micromobilities

When considering whether it is desirable to pursue the massive implementation of e-micromobilities it is important to consider various factors. Amongst the most pressing issues are firstly, the potential of e-micromobilities within the construct of urban mobility. It is important to understand what this new mode of transport can add to the urban transport system and what shift it could motivate.

Micromobilities have the potential to substitute cars, scooters and even public transport in all trips, regardless of the travel purpose, with a distance of less than 8 km. In China, the European Union and the United States of America trips which are less than 8 km account for approximately 50 to 60 percent of all trips (Şengül & Mostofi, 2021).

Research has already been able to witness the positive impact of e-micromobilities on citizens´ mobility behaviours. Few studies indicate that car ownership and car dependency have declined comparing younger generations to older generations and that shared micromobility services have become popular among the younger generations. Nevertheless, it is still unclear whether e-micromobility will actually contribute to the sustainability of urban transport (Şengül & Mostofi, 2021).

Secondly it is important to consider what role e-micromobilities play with regard to making the urban transport system more sustainable and smarter. Aspects to ponder about range from manufacturing of batteries and vehicles to charging shared-vehicles during the use phase. Research found that personal e-micromobilities outperform shared e-micromobilities, of which shared e-mopeds perform better than shared e-scooters (de Bortoli, 2021).

4 INDIVIDUALS AND THEIR PREDISPOSITION FOR MICROMOBILITIES

THE INFLUENCE OF CULTURE

All individuals are potential tourists. As such, tourists are often grouped by nationality because different nationalities imply different culture which implies different behaviour and attitudes. As stated at the beginning of this paper, it is crucial to understand tourists´ attitudes towards mobility to be able to successfully implement micromobilities as a mode of transport (Signorile et al., 2018). To do this we use cultural analysis.

Cultural analysis is composed of various theories discussing on the one hand, the development of culture in an individual and in society from a theoretical point of view. This approach identifies the different layers of culture that exist, how they are shared among a group´s members and how they evolve over time. On the other hand, dimensions, indicators and models are established to measure cultural aspects and compare societies amongst each other. This practical approach creates a basis of tangible data that can be used to compare societies in various areas of interest, such as consumer behaviour, political affiliations, employee management, etc.

4.1 CULTURAL DIMENSIONS: BASED ON HOFSTEDE

Hofstede (2011) defines culture as “the collective programming of the mind that distinguishes the members of one group or category of people from others” (Hofstede, 2011, pg.3).

Geert Hofstede has developed a theory that analyses culture using 6 dimensions: power distance, uncertainty avoidance, individualism vs collectivism, masculinity vs. femininity, long term vs. short term orientation, indulgence vs. restraint. Hofstede is by far the most recognized author in this field of study even if his model has encountered a lot of criticism over the years.

The dimensions considered most relevant for this research are individualism vs. collectivism and uncertainty avoidance therefore these will be explained in more detail now. Most authors select these two dimensions when studying consumer acceptance of products and services, because these dimensions generally can be helpful to explain how society influences people´s consumption patterns and how open people are to trying new products and services.

According to Hofstede (2011) the dimension called individualism vs. collectivism describes “the degree to which people in a society are integrated into groups” (Hofstede, 2011, pg. 11). As the author states, individualist societies are those that promote an ‘I-consciousness’ in its members, meaning everyone is considered an individual themselves with their own opinions which are respected by others. The relationship between members in individualist cultures is less close, people are supposed to be independent and take care of themselves and their immediate family only. On the contrary, collectivist societies are those that encourage ‘We-consciousness’ in its members, meaning everyone is considered part of an in-group, often extended families, in which the most important thing is maintaining harmony. The relationship between members in collectivist cultures is very strong, people are expected to protect each other and oppose other in-groups (Hofstede, 2011).

According to Hofstede (2011) the dimension called uncertainty avoidance summarizes “to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations” (Hofstede, 2011, pg. 10). As the theory states, societies with a strong uncertainty avoidance tend to be associated with higher levels of

stress and emotionality. People in uncertainty avoiding cultures present a clear need for rules and structure making them more intolerant towards what is new and different. On the opposite side, societies with a weak uncertainty avoidance seem to be related to lower levels of stress and more self-control. People in uncertainty accepting cultures are observed to be comfortable with ambiguity and chaos, making them more openminded and curious about what is new and different.

4.1.1 Innovation and Hofstede

In the last decade a number of authors have investigated the influence of culture on innovation, specifically on the entrepreneurial activity and on the acceptance of innovative products.

At present research has come to the conclusion that the individualism vs. collectivism dimension has a profound relationship with innovation. The assumptions are that individualistic cultures positively encourage the generation of creative ideas and novel products that will be received open-mindedly by individualistic consumers as those products enable consumers to feel distinguished and special. The same way, collectivism is believed to limit the possibility of innovation because in collectivist cultures individual aspirations are subordinate to the group harmony (Tian et al., 2018).

The link between collectivism and innovation is still controversial since there have been some empirical studies showing contradicting findings regarding this negative correlation (Tian et al., 2018).

Furthermore, research has found that as uncertainty avoidance increases innovation decreases. In uncertainty avoiding cultures people intend to minimize risk scenarios and unknown situations through formal rules, social norms, bureaucratic procedures, etc. impeding innovation. Whereas uncertainty accepting cultures foster competition and dissent that create a beneficial environment for innovation (Tian et al., 2018).

4.1.2 Brand Personality and Hofstede

Brand personality is defined as “the set of human characteristics associated with a brand” (Aaker, 1997, pg. 347). Understanding the way consumers perceive brands and are attracted by certain characteristics rather than others is essential for predicting consumer´s brand choices. Hofstede´s model has been commonly applied in the field of global branding and advertising (Matzler et al., 2016).

According to Hofstede´s model individualist cultures value personal beliefs, attitudes and self-concept highly and inconsistency is regarded as a threat to the authentic personality. A consistent person is expected to be mature, dependable and behave with integrity in all facets of his or her life and as such the coherence of an individual´s personality and a brand´s personality is considered very important. On the contrary, collectivist cultures subordinate the individual´s opinions to the in-group´s harmony (Matzler et al., 2016).

The same way, uncertainty avoiding cultures highly value brand-self congruity since the selection of brands coherent with their own personality are assumed to decrease the possibility of discrepancies between the provider´s service and the customer´s expectation. Furthermore, in uncertainty avoiding cultures consumers prefer known brands they can easily retrieve information about opposed to uncertainty accepting cultures that are more tolerant to the new and unknown (Matzler et al., 2016).

4.1.3 Hypothesis: Micromobilities and Hofstede

Micromobilities, especially all kinds of alternative electric transport, are one of the most promising innovations in passenger transport in the 21st century. Many companies have appeared in cities all around the world in the last decade without precedent offering a range of new services.

Applying the findings for innovation and brand personality to the case of micromobilities, the conclusion is that individualist cultures are more likely to accept this service if and when the company transmits trust and reliability to its consumers and is associated with socially favourable values as could be digitalization and sustainability. Even though, uncertainty avoidance generally seems to be a factor impeding the successful implementation of micromobilities, the weight of its impact would be expected to depend on the integration of this new mode of transport into the existing urban transport infrastructure and the information available to consumers. Therefore, I will consider it a secondary factor in this analysis.

Figure 4.1 shows the values of the two Hofstede dimensions for the three countries of interest for this paper.

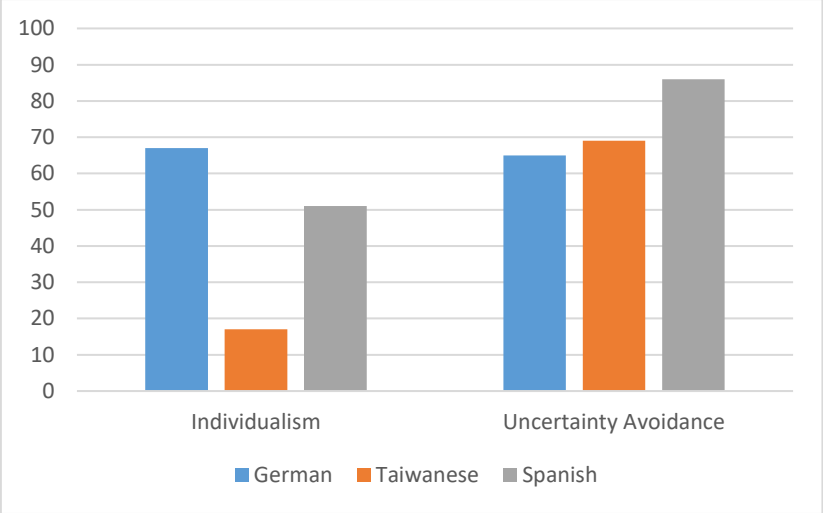

Figure 4.1 Comparison Hofstede Dimensions

Source: own elaboration based on Hofstede Insights, 2022

According to the values represented in figure 4.1, the following hypothesis regarding the acceptance of micromobilities based on Hofstede´s cultural dimensions is established: German university students will show the highest acceptance of micromobilities, followed by Spanish university students that will show higher acceptance of micromobilities than Taiwanese university students.

4.2 MODERNIZATION THEORY: INGLEHART

Ronald Inglehart has developed a theory of modernization and generational change in cultural orientations and values driven by continued economic development. As societies experience economic growth priorities shift from existential security needs towards expressive freedom needs; in industrial societies materialist or modern values are predominant whereas in post-industrialized societies post-materialist or post-modern values are aspired (Beugelsdijk & Welzel, 2018).

This theory was based on the idea of Maslow´s hierarchy of needs model, from which Inglehart and his co-authors deducted a general principle of the working of the human mind. In a situation lacking both security and freedom people will pursue above all security since it is essential to survival. However, once people feel safe, they will seek freedom which permits them to thrive (Beugelsdijk & Welzel, 2018).

Table 4.2 shows a list of attributes associated with modern and post-modern values according to Beugelsdijk & Welzel (2018). In summary, modern values support economic development and concentrate on personal success whereas post-modern values support democracy and strive for quality of life for everyone.

Modern/Materialist Values	Post-Modern/Post-Materialist Values
Authority; Discipline; Hierarchy; Obedience; Self-restraint; Uniformity	Autonomy; Creativity; Diversity; Liberty; Morality; Self-expression

Table 4.2 Summary of Materialist and Post-Materialist Values

Source: own elaboration based on Beugelsdijk & Welzel, 2018

4.2.1 Sharing Economy and Inglehart

There is a big variety of programs offered within the sharing economy. The sharing economy, also known as collaborative consumption is an economic model that combines technology, collaboration and an efficient use of resources. For example, Airbnb offers travellers the possibility to share a citizen´s house for the time of their stay instead of renting a hotel room (Davidson et al., 2018).

Every program has a different level of mediation by third parties. Programs with lower levels of mediation (websites such as couchsurfing) are usually related to lower transaction costs whereas programs with higher levels of mediation (sharing services such as Bixi) are commonly related to higher transaction costs for the provision of the service. Moreover, there is no universal nature of the programs offered within the sharing economy; some services focus on a specific resource whereas some services highlight the experience of sharing itself (Davidson et al., 2018).

Materialist consumers value foremost the ownership and possession of objects and the personal success these objects symbolize; therefore, it would be expected that materialism and sharing were negatively correlated. Nevertheless, research has found that this is not the case. The motives for participating in sharing programs of consumers in economically less developed cultures are linked to perceived utility, a concept comprised by the dimensions: convenience, availability and flexibility. On the contrary, the motives for participating in sharing programs of consumers in economically more developed cultures are related to transformation expectations composed by the dimensions: self, relations, hedonism and efficacy (Davidson et al., 2018).

Materialism as defined by Davidson et al. (2018) itself does not impact the willingness to participate but the reasons for participation. The intentions that cause people to participate in sharing programs seem to be adherent to the general values of a society as considered by Inglehart.

4.2.2 Hypothesis: Micromobilities and Inglehart

In the case of micromobilities as a mode of transport there are two basic business models, on the one hand companies selling micromobilities for private use and ownership and on the other hand companies selling micromobilities as shared services.

The latter would be a service considered within those sharing programs with high level of mediation.

Applying the findings for the sharing economy to the case of micromobilities, the appropriate conclusion is that cultures with modern values would accept micromobilities as a shared service if and when it is overall convenient for them whereas cultures with post-modern values would be expected to make use of these services when they are convinced, it is morally acceptable, it represents a way of self-expression and personal transformation or it provides a higher degree of liberty. At this point, the possibility should be proposed that one of the motives for post-modern cultures to accept micromobilities as an alternative mode of transport could be sustainability.

Figure 4.2 shows the world cultural map elaborated on basis of the world value survey, reflecting on the x-axis the degree of modernization (survival vs self-expression values) that is of interest for the analysis conducted in this paper. Countries located closer to the y-axis, with negative x-values, demonstrate to have modern/survival values and countries situated further from the y-axis, with positive x-values, present to have incorporated post-modern/self-expression values. On the y-axis the society is described with respect to its authority system; negative scores characterize agricultural societies with traditional values whereas positive scores identify industrialized societies with secular institutions. Countries generally start out close to the x-and-y intercept and move up along the y-axis as they go through the process of industrialisation before they find themselves moving right along the x-axis due to other developments. For European countries it has often been a process of democratisation to impulse this movement.

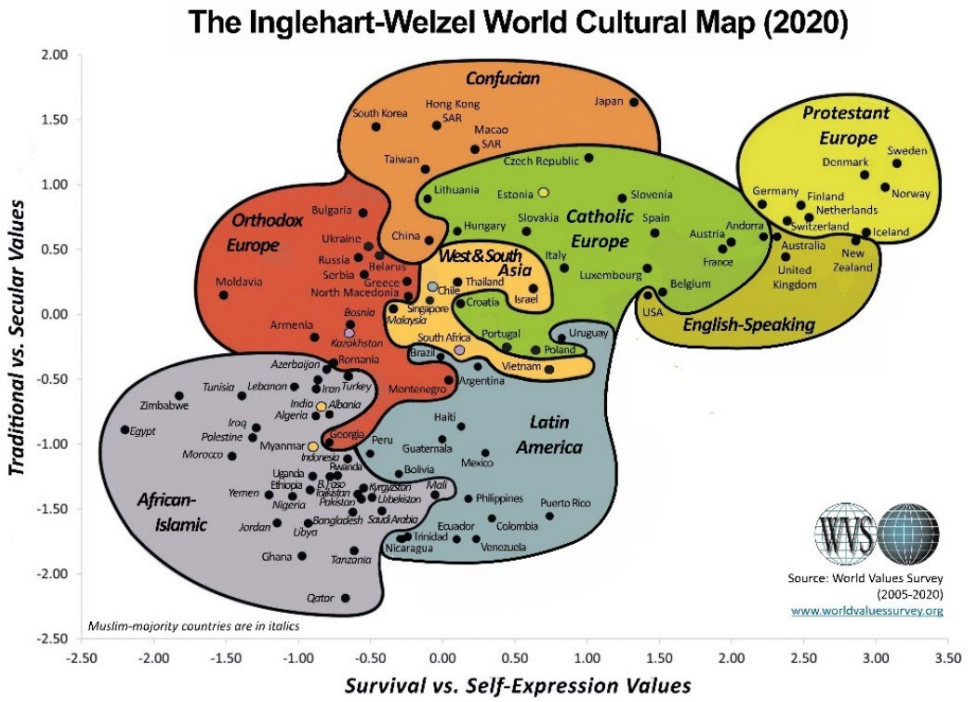

Figure 4.2 World Cultural Map

Source: World Values Survey Association, 2022

According to the locations observed in figure 4.2, at approximate x-values of 2.3 (Germany), 1.6 (Spain) and -0.2 (Taiwan), and considering that in general, it can be expected that the usefulness and convenience of e-micromobilities in the early stages of implementation are limited, the following hypothesis regarding the acceptance of shared-micromobilities based on Inglehart´s modernization theory is proposed: German

university students will show acceptance of micromobilities as a service if it were to be recognized and desired by their peers and society, on the counter position Taiwanese university students will show acceptance of micromobilities as a service if it were convenient and efficient for their daily life. Spanish university students could exhibit both modern and post-modern values which is why they could show acceptance of micromobilities for either utility reasons or peer recognition.

4.3 PACE OF LIFE

The last and least common concept of cultural analysis I will analyse is pace of life. Pace of life is defined as “the rate, speed and relative rapidity or density of experiences, meanings, perceptions and activities” (Levine & Norenzayan, 1999) of a city. Unlike the previously discussed elements of cultural analysis, this indicator is not measured at national level but at city level and therefore could present differences between cities of the same country (Levine & Norenzayan, 1999). Nevertheless, these are some generic findings for this indicator: individualist cultures, cultures of cold climate and economically productive cultures are characterized to have a faster pace of life (Lippke et al., 2021).

A fast pace of life has been associated in research with poor health, increased subjective-wellbeing and life satisfaction as well as higher levels of stress, some of which seem to be quite contradictory and demonstrate the need for further research (Lippke et al., 2021).

4.3.1 Digitalisation and Pace of Life

In their research Santarius & Bergener (2020) define the degree of digitalisation as “the nature and duration of digital information and communication technology [ICT] usage” (Santarius & Bergener, 2020) of an individual. As such two theories are proposed; firstly, a higher degree of digitalisation on an individual level should give people the possibility to finish activities in less time and gain more free time, thus implying a deceleration of the pace of life. However, if this new gained free time were to be used for the completion of other activities, then secondly, this should result in a tighter schedule and would imply an acceleration of the pace of life (Santarius & Bergener, 2020).

Finally, research has found the latter to be the more accurate assumption. Santarius & Bergener (2020) have encountered a strong correlation in their study firstly between ICT usage and covering free time with the realization of other activities and secondly between ICT usage and the performance of multitasking. These findings indicate that a higher degree of digitalisation for an individual leads to a denser daily schedule and a faster pace of life which in turn is perceived as a more stressful life.

4.3.2 Hypothesis: Micromobilities and Pace of Life

In the case of shared-micromobilities the process of subscribing, renting and parking the vehicle usually requires a certain level of digitalisation, especially in the case of non-docked micromobilities.

Applying the findings of digitalisation to the case of micromobilities, the conclusion would be that cultures with a faster pace of life would be more likely to accept shared-micromobilities in their daily life than cultures with a slower pace of life because fast-paced cultures need to work a tighter schedule and cope with a higher level of stress.

Table 4.3 shows the ranking of overall pace of life measured in 31 cities in 31 countries all around the world. The data presented in the table below is used as an approximation in the analysis of pace of life and micromobilities.

Rank	City	Country	Rank	City	Country	Rank	City	Country
1	Zurich	Switzerland	12	Warsaw	Poland	22	Nairobi	Kenya
2	Dublin	Ireland	13	San Jose	Costa Rica	23	Guangzhou	China
3	Frankfurt	Germany	14	Taipei	Taiwan	24	Sofia	Bulgaria
4	Tokyo	Japan	15	Singapore	Singapore	25	Bucharest	Romania
5	Rome	Italy	16	New York	USA	26	Amman	Jordan
6	London	UK	17	Toronto	Canada	27	Damascus	Syria
7	Stockholm	Sweden	18	Seoul	South Korea	28	San Salvador	El Salvador
8	Vienna	Austria	19	Budapest	Hungary	29	Rio de Janeiro	Brazil
9	Amsterdam	Netherlands	20	Prague	Czech Republic	30	Jakarta	Indonesia
10	Hong-Kong	China	21	Athens	Greece	31	Mexico City	Mexico
11	Paris	France						

Table 4.3 Pace of Life in 31 countries

Source: own elaboration based on Levine & Norenzayan, 1999

According to the data portrayed in table 4.3 the following hypothesis regarding the acceptance of shared-micromobilities based on the concept of pace of life is formulated: German university students will show higher acceptance of shared-micromobilities than Taiwanese university students, that show higher acceptance than Spanish university students. Due to the closeness of Spanish culture to that of Latin American countries the assumption is made that the pace of life in Spain is slower than the pace of life in both Germany and Taiwan.

4.4 FUTURE TOURISTS: GENERATION Z REPLACING MILLENNIALS

Research in the last decade has widely discussed the role of Millennials in a global perspective; being the first generation to grow up with the internet and constantly being exposed to ICTs resulted in the development of different general character traits amongst the members of this generation. Millennials are characterized as ambitious, impatient, community-minded, demanding, ethnically diverse, techno-savvy and accepting of diversity (Debevec et al., 2013; Veiga et al., 2017).

Millennials and Generation Z are often joint as they are consecutive generations. Generation Z comprises all those born shortly before or after the year 2000, members of this generation are at present ranging from 9 to 25 years old. As of 2020 the members of Generation Z were estimated to account for 40% of the population in the US, Europe and the BRIC (Brasil, Russia, India, China) countries and 10% of the population in the rest of the world (Entina et al., 2021).

In the context of tourism Millennials are regarded as one of the most important segments. Despite their financial and time restrictions Millennials are recognized as the customer segment with the strongest potential to cause real disruption to the structure and functioning of the tourism industry. Therefore, research identifies the need to gain understanding of the profile and demands of Millennials (Veiga et al., 2017).

Millennials and the members of Generation Z share some characteristics, most importantly technological ingenuity and a sense of comfort in a globalized world.

Nevertheless, Generation Z is expected to manifest consumption patterns vastly different to those of Millennials (Entina et al., 2021).

Cultural change has found to be determined by generational turnover rather than social influence. As such, the ‘cohort effect’ theory suggests that the social environment shapes a person´s culture and identity during that person´s childhood and adolescence and that eventually during adulthood personal values and attitudes become stable (Kiley & Vaisey, 2020).

Generation Z witnessed the global digital revolution characterized by the rapid evolution of the internet, the popularization of social media and the omnipresence of smartphones and tablets. Thus, the members of this generation are strongly guided by morality, ethical behaviour and environmental awareness and are more inclined to take responsibility and contribute towards practical solutions (Entina et al., 2021).

Generation Z represents the market of the future and is still susceptible to attitude change provoked by external influences (Kiley & Vaisey, 2020). As this generation continues to grow, taking over larger shares in the overall population, it reinforces its importance for the global economy. If this generation increases its purchasing power it will become more important for industries, such as tourism, to understand their behaviour, values and mentality (Entina et al., 2021; Robinson & Schänzel, 2019).

5 CITIES AND MICROMOBILITIES

DEMOGRAPHIC, GEOGRAPHIC AND SOCIOGEOGRAPHIC CHARACTERISTICS

The main reason most cities have felt the need to adapt their transport system and add micromobilities as a new mode of transport is urban growth and the consequences of high population density, mainly congestion and pollution (Elmashhara et al., 2022). Nevertheless, not all cities are the same and their characteristics do not facilitate the implementation of micromobilities to the same extent.

This chapter is dedicated to an analysis of the three cities of interest in this study. Various aspects will be studied, starting with location, demographics (population, area, population density), tourism influx, climate (average temperature, precipitation, hours of sunshine), and city landscape composed by topography and the built environment. The built environment refers to a mix of components including road infrastructure (street connectivity, bikeway length) and public transportation network, which are the two aspects that will be taken into consideration in this paper.

Tourism influx, the ratio of tourists to residents, is a relevant aspect in this context. It has been found that the motivation for e-micromobility use is typically related to tourism and recreational activities and it is only slowly reaching the point where citizens use it on a regularly basis for commuting purposes (Esztergár-Kiss & Lopez Lizarraga, 2021). Thus, tourists are a second target segment for providers of e-micromobilities in cities on top of residents. Furthermore, the use of e-micromobilities by tourists could function as promotion and could help raise awareness for the service in citizens minds. Therefore, a higher number of visitors would likely mean a higher level of usage in the short term, mainly by tourists, and could possibly support the long term success of e-micromobilities, through the promotion gained from tourists´ use.

However, tourism influx could not only support the successful implementation of e-micromobilties but more so the implementation of e-micromobilities could immensely improve some of the issues caused by the overcrowding of city centres with visitors. Micromobilities could pose a simple way to access urban districts located outside of the usual tourist cluster and disperse the accumulation of tourists throughout the city. This could impulse the decongestion of city centres.

Furthermore, several studies analysed the relationship between weather and micromobility usage and conclude that low temperatures, rain and snow are unfavourable and discourage micromobility use. On the contrary, high temperatures and good weather conditions increase the likelihood of micromobility use (Elmashhara et al., 2022; Hosseinzadeh et al., 2021).

Moreover, factors such as topography, referring to the existence of hills and slopes, have been found to negatively affect the use of micromobilities. On the contrary the existence of public transport hubs, universities and points of interest in the surroundings of MSS (Micromobility Sharing Systems) stations, as well as bikeways and good street connectivity favour the use of micromobilities (Elmashhara et al., 2022).

The tourism sector in cities will be required to adapt its service to the needs of future generations, therefore it is essential to understand these generations behaviour and values (Entina et al., 2021). In the context of urban mobility, it is not enough to simply provide a good transport system to tourists, it is fundamental to be able to promote these systems and attract tourists to make use of them (Signorile et al., 2018). Therefore, it is important for tourist destinations to analyse their strengths and weaknesses with respect to the implementation of micromobilities. Also, it is of great importance to observe the

habits tourists develop with regard to city transport in their own urban context (Signorile et al., 2018).

5.1 MUNICH

Located in the south of Germany at 48°N and 12°E, Munich is the third biggest city in Germany by population (www.LatLong.net, 2022; World Population Review, 2022a). As reflected in table 5.1 the city registered a total population of more than 1.5 million inhabitants and a population density of 5 thousand inhabitants per km². Furthermore, it is characterised by a slightly more domestic tourist demand. In 2018 the number of domestic tourist arrivals amounted to more than 4.5 million, on top of that, the city also received more than 3.5 million international tourist arrivals. A big tourist magnet in Munich for both domestic and international arrivals is certainly the Oktoberfest. It is celebrated during the months of September and October, not overlapping with any common holiday period, and yet was able to attract almost 20% of annual tourist arrivals in 2018, only slightly less than the high season during the summer months (Bayerisches Landesamt für Statistik und Datenverarbeitung, 2022a; Bayerisches Landesamt für Statistik und Datenverarbeitung, 2022b; Bayerisches Landesamt für Statistik und Datenverarbeitung, 2022c; Bayersiches Landesamt für Statistik und Datenverarbeitung, 2022d).

	Population (2021)	**Area**	**Population Density (2021)**	**Number of annual domestic tourist arrivals (2018)**	**Number of annual international tourist arrivals (2018)**
Munich	1,562,128 inhabitants	310.7 km²	5,027 inhabitants/km²	4,507,912 arrivals	3,758,082 arrivals

Table 5.1 Statistics of Munich

Source: own elaboration based on Statistisches Amt München, 2022; Bayerisches Landesamt für Statistik und Datenverarbeitung, 2022e

The city´s climate is described as slightly continental, characterized by cold winters and mild summers (Climatestotravel.com, 2022a). The average temperature of the coldest month, January, is estimated to be -0.6°C and the average temperature of the warmest month, July, is suggested to be 18.2°C. The yearly rainfall amounts to approximately 1000 mm; during the rainiest period, situated between May and August, more than 100 mm rainfall per month are recorded whereas in the driest months still up to 70 mm rainfall per month are measured. The yearly hours of sunshine observed on average reach a total of 2,605 hours. During the period from November to January the monthly average of hours of sunshine stays below 4 hours, whereas in the summer months from May to August it ranges between 9.5 and 11 hours (Climate-Data.org, 2022a).[2]

The topographic map in figure 5.1.1 shows the elevation levels throughout the city. Lower elevations can be observed in the north of the city and along the course of the city´s river, towards the south of the city the level of elevation increases. The minimum and maximum level of elevation observed in the topographic map of Munich are 489 metres and 543 metres respectively, therefore the difference in elevation measures 54 metres. The topographic map suggests the existence of hills and slopes.

[2] Climate data measured in period 1999 – 2019, based on ECMWF data

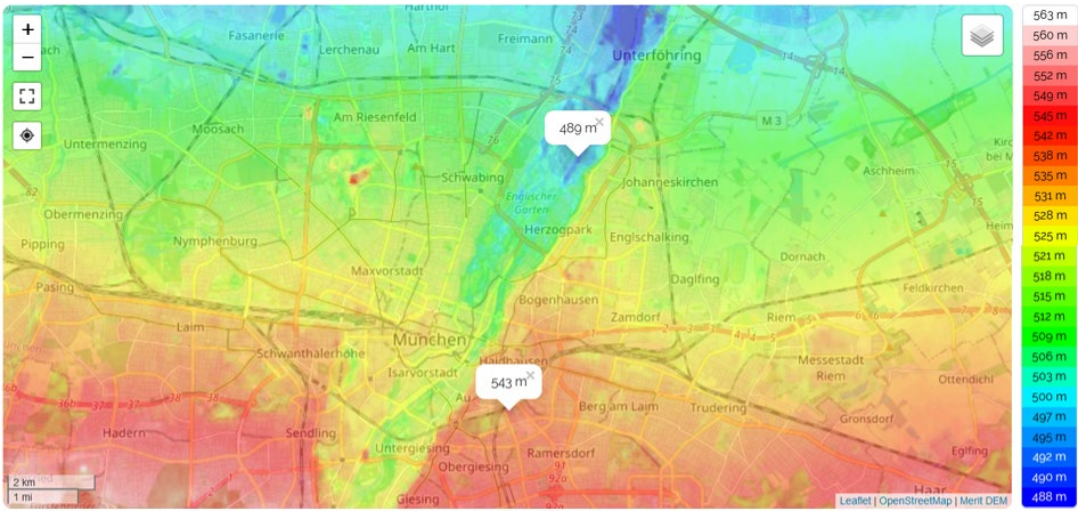

Figure 5.1.1 Topographic Map of Munich

Source: own elaboration based on Topographic-map.com, 2022a

The analysis of street connectivity will be based on the image shown in figure 5.1.2 taken from google maps. Large long streets connect all parts of the city. The city districts also exhibit big streets that generally resemble the chessboard pattern. Alleys and smaller paths are less common in Munich.

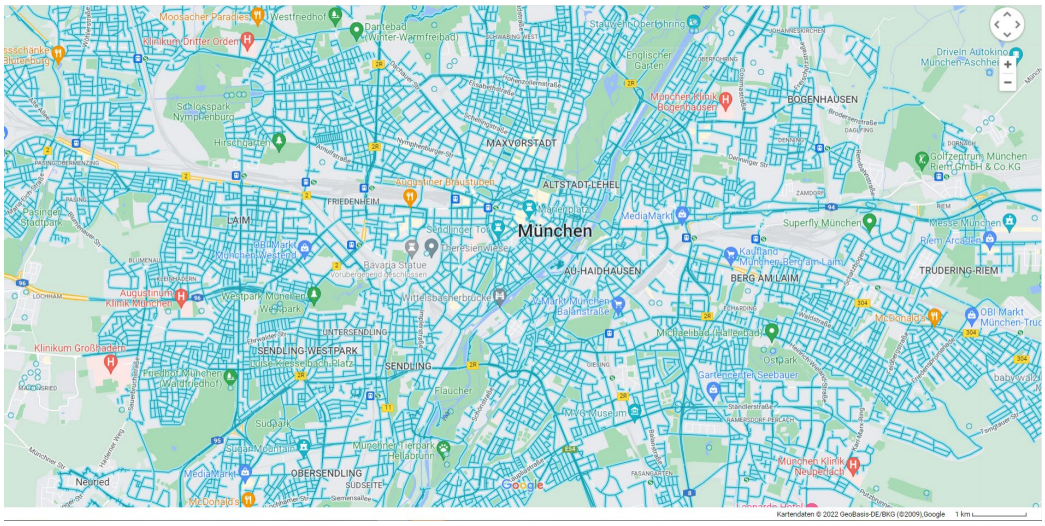

Figure 5.1.2 Street View of Munich
Source: Google Maps, 2022a

The network of bike paths in Munich is comprised primarily by two types of bike paths, traditional bikeways and bike streets. In total the network composes a length of 1,400 km (Landeshauptstadt München, 2022). With respect to the city´s population this figure could be translated into another indicator considering bike path in km per 10,000 inhabitants. Thus, the relative length of bike path in Munich city would be 8.96 km/10,000 inhabitants.

The public transportation network in Munich, based on the official city map displayed in figure 5.1.3, contains 8 lines of suburban trains, 8 lines of underground trains, 14 lines of trams, and various lines of express and city buses, that are not portrayed on this plan due to its complexity.

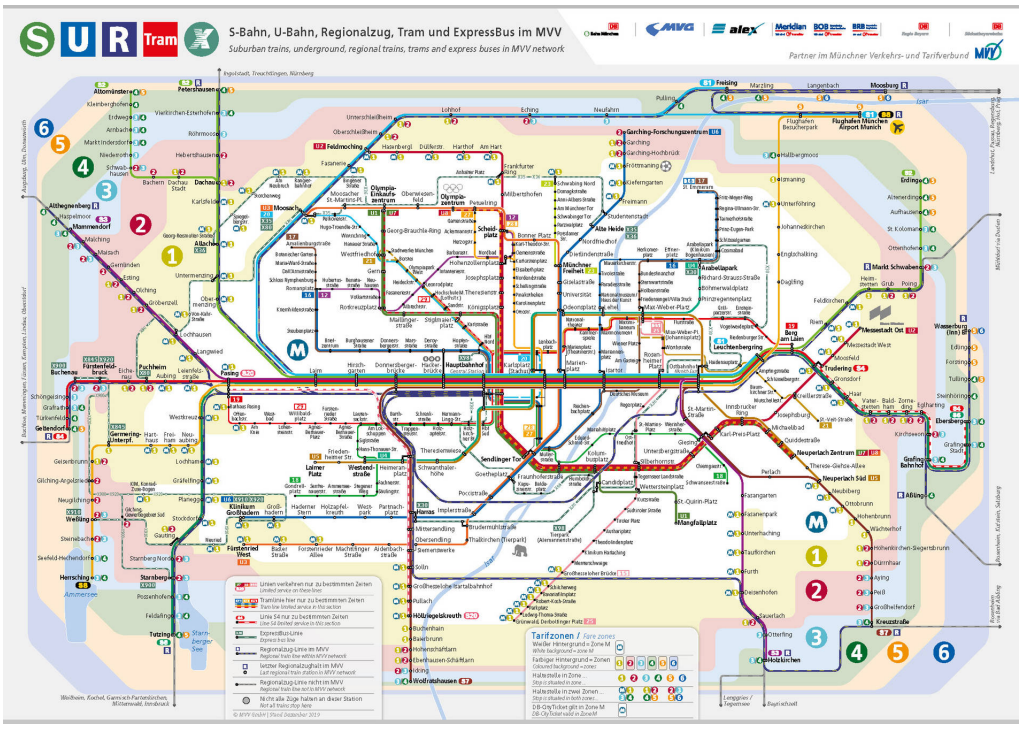

Figure 5.1.3 Public Transport Network of Munich

Source: Münchner Verkehrs- und Tarifverbund, 2022

The white section of the map shows the entire area of Munich provincial capital. The coloured parts depict connections to the outskirts and surrounding areas of Munich provincial county. The network plan represents a high number of connecting stations between different lines and different modes, creating a high number of transport hubs.

Le-Klähn et al. (2014) found in their study that 82% of visitors in Munich use public transport during their stay and only 18% did not use public transport, primarily for one of two reasons. Either because they did not require to use public transport or because they preferred using alternative modes of transport such as the car, walking or cycling (Le-Klähn, Gerike, et al., 2014). Furthermore, Le-Klähn, Michael Hall, et al. (2014) found in their study that 51% of visitors use public transport for all their trips during their stay.

In conclusion the factors that support the implementation of micromobilities in the city of Munich are foremost a good public transportation network, favourable street connectivity and a good network of bike ways. The barriers the city will face are primarily climate and topography. Munich is a big city and the yearly tourism influx is more than 5 times the number of inhabitants.

5.2 SEVILLE

Located in the south of Spain at 37°N and 6°W, Seville is the fourth biggest city in Spain by population (www.LatLong.net, 2022; World Population Review, 2022b). As reflected in table 5.2 the city registered a total population of almost 700,000 inhabitants and a population density of 4.8 thousand inhabitants per km². Moreover, it is characterised by a significant international tourist demand that usually surpasses national demand. For this reason, statistics from pre covid times were taken for reference when travel wasn't limited to covid regulations. In 2018 the number of domestic tourist arrivals observed was slightly higher than 1 million however the number of international tourist arrivals was close to reaching 2 million.

	Population (2021)	Area	Population Density (2021)	Number of annual domestic tourist arrivals (2018)	Number of annual international tourist arrivals (2018)
Seville	684,234 inhabitants	141.42 km²	4,838 inhabitants/km²	1,279,347 arrivals	1,722,883 arrivals

Table 5.2 Statistics of Seville

Source: own elaboration based on Instituto de Estadística y Cartografía de Andalucía, 2022; Sevilla City Office, 2022a

The city´s climate is described as Mediterranean, characterized by hot African-like summers (Climatestotravel.com, 2022b). The average temperature of the coldest month, January, is estimated to be 10.3°C and the average temperature of the warmest month, August, is suggested to be 28.4°C. The yearly rainfall amounts to approximately 483 mm; the rainfall in Seville is concentrated in the period primarily between October and December. Still precipitation records never exceed 80 mm per month. In the summer months rain is extremely sparse. The yearly hours of sunshine observed on average reach a total of 3,433 hours. During the colder seasons the monthly average of hours of sunshine never drops below 6.5 hours per day, whereas during the period from May to August it ranges between 11.2 and almost 12.7 hours per day (Climate-Data.org, 2022b).[3]

The topographic map in figure 5.2.1 shows the elevation levels throughout the city. Lower elevations can be observed in the west of the city and along the course of the city´s river, towards the north-east of the city the level of elevation increases slightly. The minimum and maximum level of elevation observed in the topographic map of Seville are 0 metres and 18 metres respectively, therefore the difference in elevation measures 18 metres. The topographic map does not suggest the existence of hills or slopes.

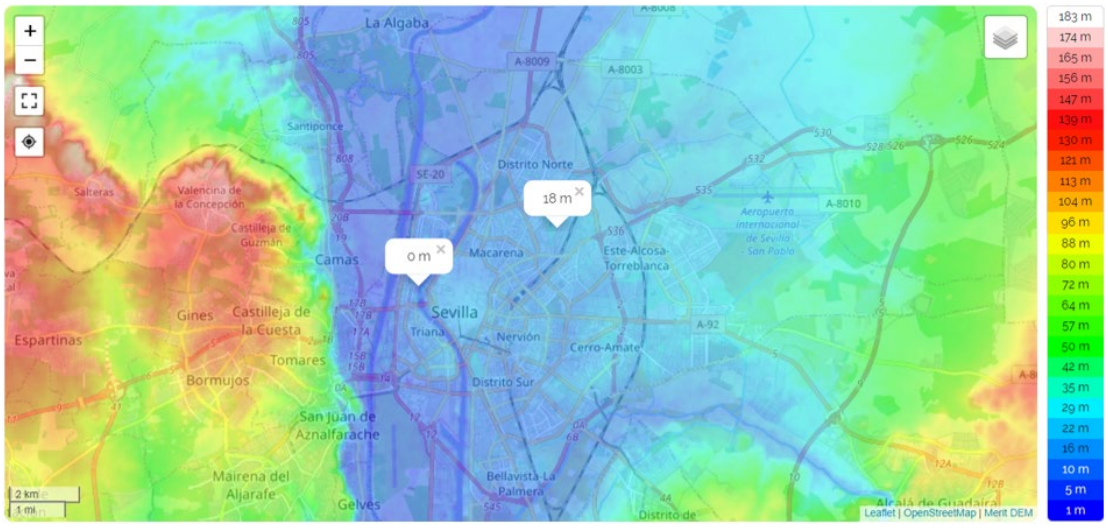

Figure 5.2.1 Topographic Map of Seville
Source: own elaboration based on Topographic-map.com, 2022b

[3] Climate data measured in period 1999 – 2019, based on ECMWF data

Regarding the analysis of street connectivity, the 'Plan de Movilidad Urbana Sostenible Sevilla' will be taken as basis for the analysis. The image in figure 5.2.2 shows the classification of streets in main and secondary streets amongst others. A few large streets connect the outer regions of the city with the city centre. The city centre exhibits many small winding streets, alleys and paths intertwined with one another, thus the city decided to pedestrianize most of this area.[4] Big streets that make up a chessboard pattern are more likely to be found in areas distant from the city centre yet neither in the outskirts it could be considered the norm.

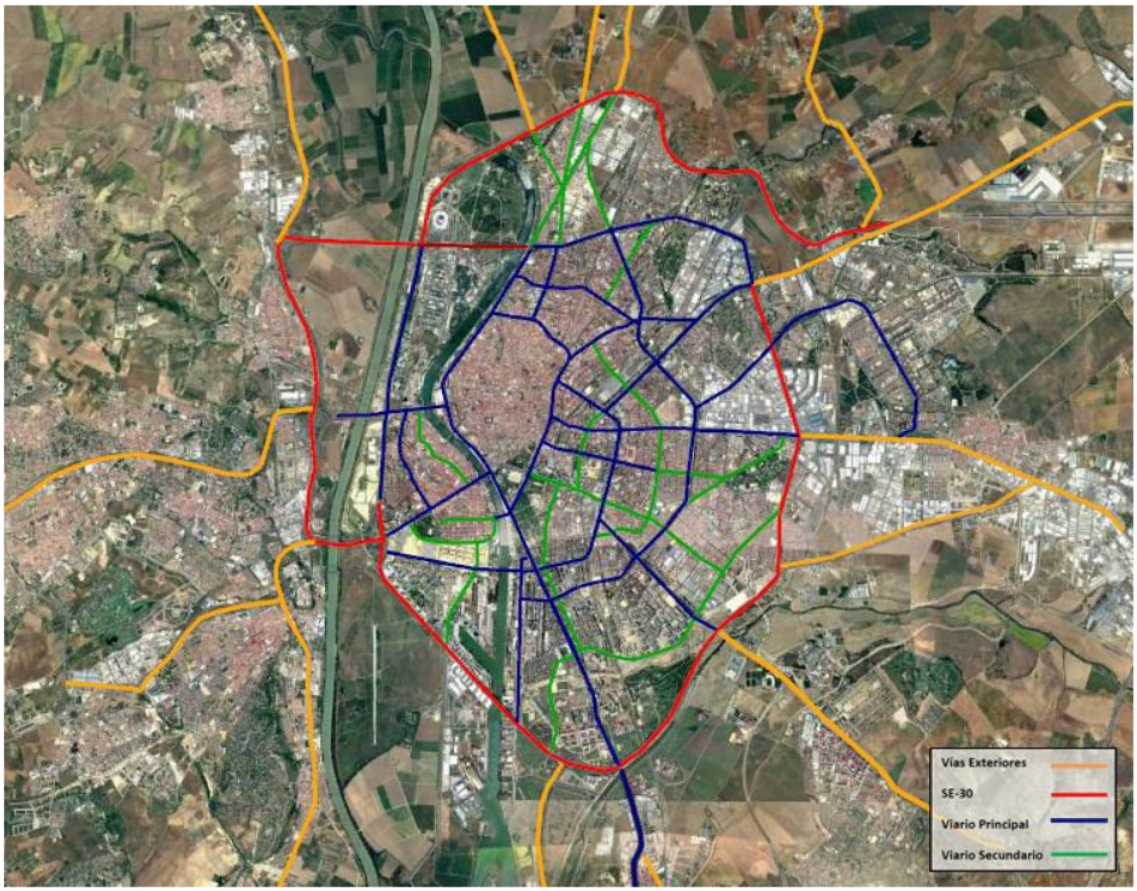

Figure 5.2.2 Street View of Seville

Source: Sevilla City Office, 2022b

The city has the most extensive bike network in Andalusia. In Seville there are 5 main types of bike paths displayed in figure 5.2.3, that are classified according to their location in the road network. There are 101.5 km of bikeway shared on sidewalks (aceras bici), 18.5 km of separate bikeway (pistas bici), 16.2 km of bikeway shared on streets (carril bici), 15.8 km of bikeway in parks and other natural areas (sendas bici) and 12.3 km of bikeway in pedestrian areas (vias compartidas) (Sevilla City Office, 2022b). In total the city has built 180 km in length of bikeways (Sevilla City Office, 2022c). With respect to its population, the city possesses 2.63 km/10,000 inhabitants.

[4] Please see Annex Item 3 for city centre graphic

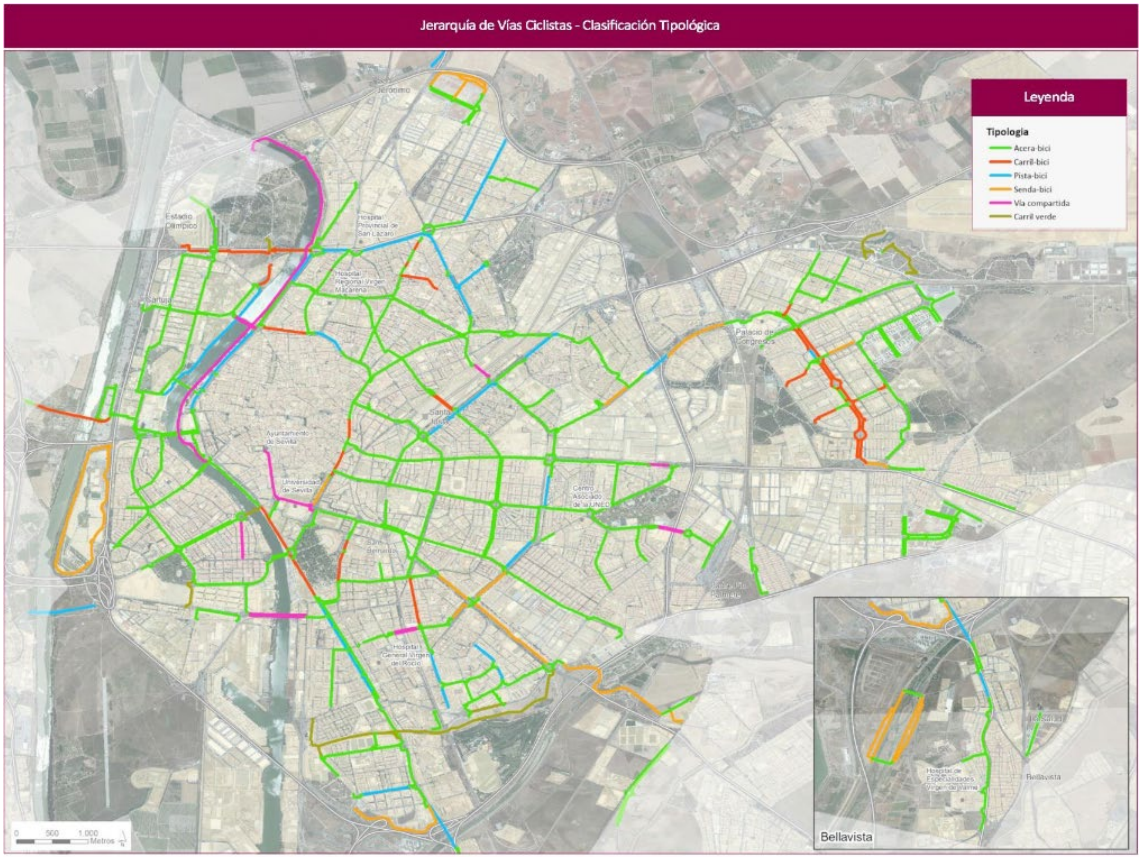

Figure 5.2.3 Bikeway Network of Seville

Source: Sevilla City Office, 2022b

The public transport network in Seville is poorly integrated thus it is impossible to find an official map that displays all the modes and their connections. In Seville there are 5 lines of suburban trains (cercanías), 1 line of metro, 1 line of tram and various lines of city buses (Renfe, 2022; Red Transporte, 2022; Tussam, 2022). The existing transport network maps consulted for this analysis[5] show that there are only few connections between the different modes of urban transport in Seville. The backbone of the city´s public transport network is the bus system as it offers the most possibilities to move around the city.

Seville´s main tourist resources, those most frequented by visitors, are almost all located within the city centre (Foronda-Robles et al., 2022). The core axes of the city centre of Seville have been pedestrianised and are now shared by pedestrians and the city´s tram line (Vázquez-Hisado, 2018). Thus, making access by car more inconvenient and promoting the use of bicycle and walking as tourist mobility.

In conclusion the factors that support the implementation of micromobilities in the city of Seville are foremost topography and climate. The barriers the city will face are primarily a poor public transportation network and regular street connectivity. Seville is a medium-sized city; however, the yearly tourism influx is more than quadruple the number of inhabitants. The location of tourist resources and the pedestrianisation of the historical centre further encourages the implementation of micromobilities.

[5] Please see Annex III Figure 1 and 2

5.3 KAOHSIUNG

Located in the south of Taiwan at 23°N and 120°E, as shown in figure 5.3, Kaohsiung is the second biggest city in Taiwan by population (www.LatLong.net, 2022; World Population Review, 2022c).

Figure 5.3 Location of Kaohsiung

Source: own elaboration based on Google Maps, 2022b

As portrayed in table 5.3 the city registered a total population of more than 2.7 million inhabitants and a population density of 934 inhabitants/km². In the case of Kaohsiung city official tourism statistics do not reflect the exact number of tourist arrivals neither for domestic nor international tourists. An appropriate system for collecting, processing and publishing tourism statistics does not seem to exist.

	Population (2021)	**Area**	**Population Density (2021)**	**Approximation: Number of annual tourists (2019*)**
Kaohsiung	2,744,691 inhabitants	2,938.64 km²	934 inhabitants/km²	3,002,859 tickets (sold at all tourist attractions) 795,992 tickets (sold at EDA World) 733,152 tickets (sold at National Science and Technology Museum)

*Measured by the number of visitors that bought a ticket to the main tourist attractions in 2019

Table 5.3 Statistics of Kaohsiung

Source: own elaboration based on Kaohsiung City Government, 2022a; Kaohsiung City Government, 2022b; Kaohsiung City Government, 2022c

The number of tourists arrivals is estimated based on the number of tickets bought to the main tourist attractions on an annual basis. The main errors of using this data are firstly that residents may also be included in this count and secondly that not all tourists may be included in this count. The tickets sold at the two main tourist attractions range between a little more than 700 thousand to almost 800 thousand tickets in 2019. According to this data tourism in Kaohsiung is rather insignificant.

The city´s climate is described as tropical monsoon climate, characterized on the one hand by dry winters and on the other hand by hot and wet summers (Kaohsiung City Government, 2022d). The average temperature of the coldest month, January, is registered to be 19.7°C and the average temperature of the warmest month, July, is estimated to be 29.4°C. The yearly rainfall amounts to approximately 1968.2 mm; during the rainiest period, comprised between May and September, more than 200 mm rainfall per month are recorded with its peak of 512.4 mm precipitation in August, whereas in the dryer months seldomly more than 30 mm rainfall per month are observed. The yearly hours of sunshine on average reach a total of 2,281.8 hours. During the winter months the monthly average of hours of sunshine never drops below 5 hours per day, whereas during the period from May to August it pivots around 7 hours of sunshine per day (Central Weather Bureau, 2022[6]).

The topographic map in figure 5.3.1 shows the elevation levels throughout the city. Lower elevations can be observed close to the harbour of the city and along the course of the city´s river, towards the north-east of the city the level of elevation increases. The city exhibits a mountain in its coastline with a peak of approximately 335 metres, other than that the minimum and maximum level of elevation observed in the topographic map of Kaohsiung are 0 metres and 36 metres respectively, therefore the difference in elevation measures 36 metres. The topographic map suggests the existence of smaller slopes rather than hills.

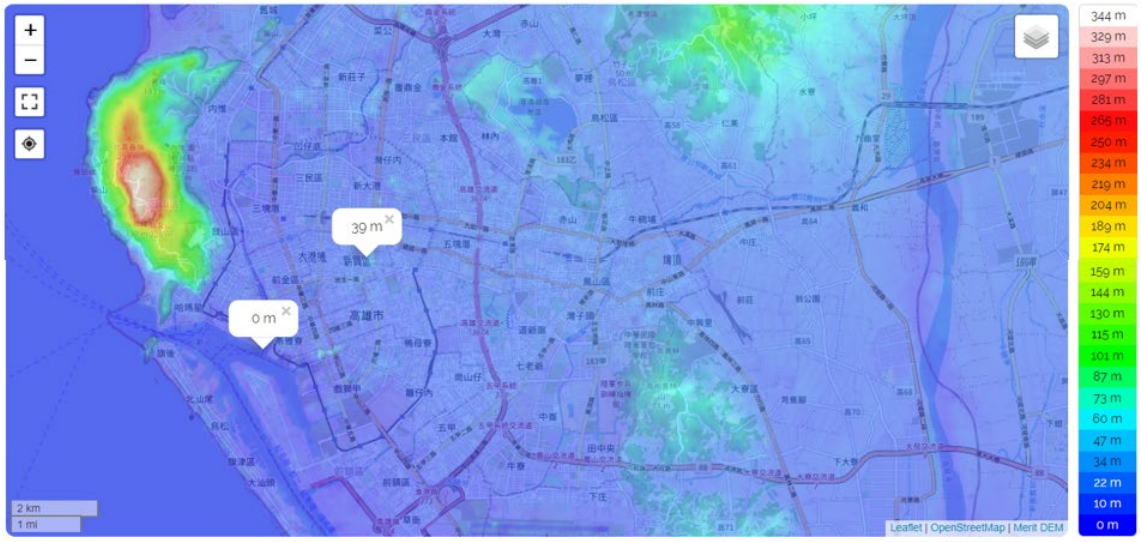

Figure 5.3.1 Topographic Map of Kaohsiung

Source: own elaboration based on Topographic-map.com, 2022c

Regarding the analysis of street connectivity, the analysis will be based on the image shown in figure 5.3.2 taken from google maps. The road network follows the chessboard pattern throughout most of the city, it is difficult to spot where the centrical part of the city is located. Rather than large streets, many small streets make up the city structure. The city is characterized by an incredibly dense road network.

[6] Climate data measured in the period 1991 - 2020

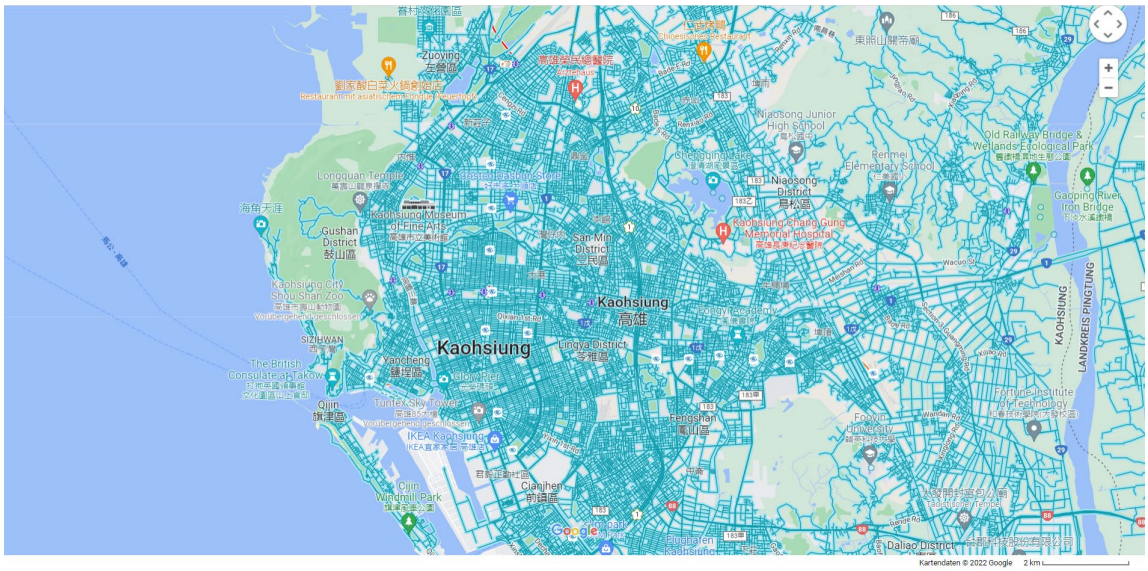

Figure 5.3.2 Street View of Kaohsiung

Source: Google Maps, 2022c

The city of Kaohsiung does not provide a map of bikeways or keep record of the total length of bikeways in the city. However, we can use google maps as an approximation in this analysis. Figure 5.3.3 shows Kaohsiung and all bike-friendly paths highlighted in different shades of green; paths suitable for riding a bike in light-green, bikeways in dark-green and streets suitable for riding a bike are marked by a green dashed line. The official bikeways are close to none and it can be observed that the majority of the existing road infrastructure cannot be considered suitable for biking.

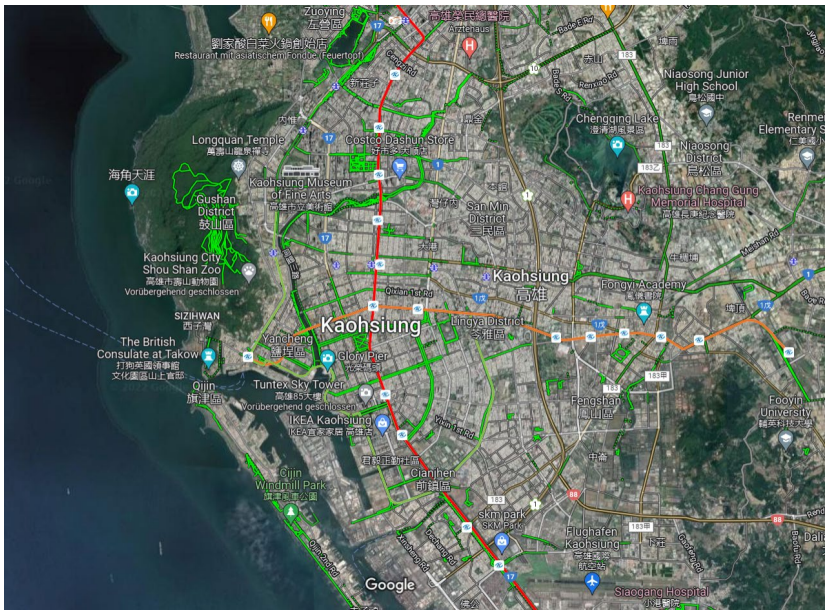

Figure 5.3.3 Biking Infrastructure of Kaohsiung

Source: Google Maps, 2022d

Figure 5.3.4 shows the public transport network of Kaohsiung City. It is composed of 2 lines of metro, 1 line of tram, furthermore, 1 daily operating ferry line and various lines of city buses (Kaohsiung City Government, 2022b). The metro lines started operations no earlier than in the year 2008 and the tram line is currently still under construction at parts. At present the public transport network provides no more than 3 connecting stations

between the metro and tram lines, according to the official map in figure 5.3.4 (Kaohsiung Rapid Transit Corporation, 2019).

Figure 5.3.4 Public Transport Network of Kaohsiung

Source: Kaohsiung Rapid Transit Corporation, 2022

In conclusion the factors that support the implementation of micromobilities in the city of Kaohsiung are mostly topography. The barriers the city will face are primarily a poor public transport network and lack of bikeways. Kaohsiung is a big city however the yearly tourism influx is not even a third of the city´s population. Tourism is not a factor that will support the massive implementation of micromobilities in Kaohsiung.

6 CULTURE AND MODE OF TRANSPORT CHOICE
ANALYSIS AND DISCUSSION OF RESULTS

The information presented up to this point is a compilation of secondary sources that provide some insight on the different aspects and concepts and their application in current research. In this chapter, we will present the findings of the surveys *Mode of transport choice - Munich*, *Mode of transport choice - Seville* and *Mode of transport choice - Kaohsiung*. The obtainment of primary data can on the one hand, revise the information from secondary sources for the sample collected and test the sample´s representativeness. On the other hand, it can explore a new hypothesis and make an approximation for future research, as a pilot project.

6.1 DOMINANT MODES OF TRANSPORT

Reflecting upon the information presented in chapter 3 of this paper, this abstract deals with the dominant mode of transport used by respondents and the people in their surroundings in each of the three cities.

Figure 6.1 shows the different modes of transport and the respondents´ personal use, counting only those modes of transport that are used on a regular basis, meaning 3 or more times a week.

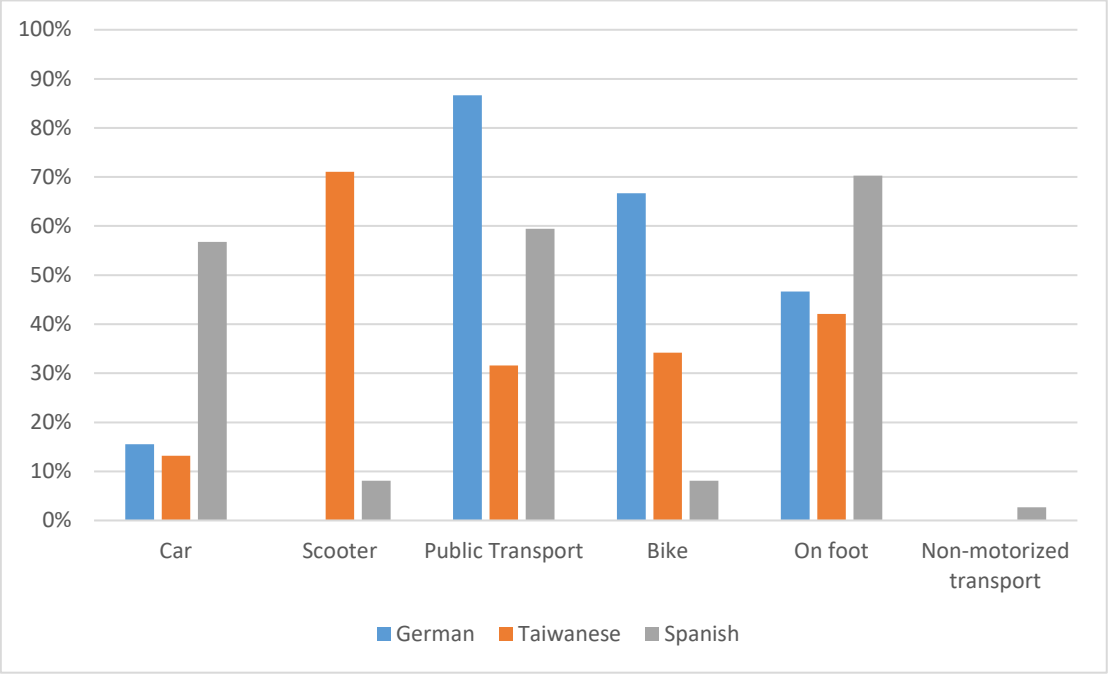

Figure 6.1 Regular use of Modes of Transport[7]

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

[7] Percentage of the total number of respondents for each city separately, question with multi-choice possibility

In the case of Munich, the majority of respondents use both public transport (86.7%) and bicycle (66.7%) regularly, only a small minority frequently uses the car (15.6%) for displacements within the city. Looking at the respondents´ environment, most stated that their friends and family use public transport either as their first (53.3%) or second option (31.1%), followed by a significant number of respondents that stated that their friends and family use the car either as their first (33.3%) or second (33.3%) option. More than half of the respondents (55.6%) agree that the social norm of mode of transport choice in Munich is taking public transport.

Based on the respondents´ answers it could be interpreted that in Munich amongst the younger generation public transport and bike are popular whereas older generations are still adapting to this shift presenting a stronger connection to car use in comparison.

In the case of Seville, the majority of respondents walk (70.3%) regularly but also frequently uses public transport (59.5%) or the car (56.8%) for displacements within the city. Looking at the respondents´ environment, most stated that their friends and family use the car either as their first (70.3%) or second (10.8%) option, followed by a significant number of respondents that stated that their friends and family use public transport either as their first (18.9%) or second (48.6%) option. More than one third of the respondents (37.8%) are uncertain whether or not there is a social norm in Seville regarding the mode of transport, the rest of respondents either believe the social norm is taking the car (29.7%) or taking public transport (24.3%).

The survey data implies that in Seville although respondents often walk for displacements the preferred modes of transport are the car and public transport. While younger generations show a weaker tendency for taking the car than older generation it is still very popular. Public transport seems to be the alternative mode of transport that is gaining importance for mobility in Seville for younger generations now.

In the case of Kaohsiung, the majority of respondents use the scooter (71.1%) regularly, only about a third of the respondents frequently use one or more alternative modes of transport such as walking (42.1%), cycling (34.2%) or public transportation (31.6%). Looking at the respondents´ environment, most stated that their friends and family use the scooter either as their first (57.9%) or second (21.1%) option, followed by a significant number of respondents that stated that their friends and family use public transport either as their first (15.8%) or second (42.1%) option. The vast majority of respondents (84.2%) agree that the social norm of mode of transport choice in Kaohsiung is riding a scooter.

The respondents´ answers lead to believe that in Kaohsiung the habit of riding a scooter is widely spread both among younger and older generations. Respondents that don’t ride a scooter are forced to use alternative modes of transport.

Furthermore, this data permits us to reflect upon the information presented in chapter 5 of this paper, about the characteristics of a city that influence the use of micromobilities in general. Based on the cities´ features it would be expected that more respondents in Seville than in Munich or Kaohsiung use micromobilities, meaning walk, ride a bike or take e-micromobilities. Nevertheless, the survey data shows that 84% of the respondents in Munich use one of the 3 types of micromobilities, whereas in Seville and Kaohsiung only 73% and 53% respectively make use of them. This supports the idea that there must be other factors influencing mode of transport choice for respondents, such as culture.

6.2 CONVENIENT URBAN MOBILITY: THE PUBLIC TRANSPORTATION NETWORK

Before discussing the influence of culture on mode of transport choice, I would like to analyse the urban transport system as a whole. As mentioned prior to this chapter, micromobilities have great potential as a mode of transport when being integrated into the urban transport network, especially public transport. Thus, with respect to the

information provided in chapter 4, this abstract deals with the role of the different modes of transport in the context of urban mobility and furthermore portrays the perception of the public transport network in each of the three cities.

In the case of Munich, respondents are more likely to live farther away from the university, more than 15 km (44.4%) or between 6 km and 15 km (31.1%), and still the majority of respondents (75.6%) choose public transport for their commute, taking into account in most cases (70.6% of PT commuters) ride times of more than half an hour. When it comes to displacements for leisure purposes, respondents accept journeys of any distance below 15 km. Between 6 km and 15 km is the most common distance for displacement when taking public transport (50% of PT commuters) and less than 2 km when riding a bike (60% of bike commuters). Respondents taking public transport for their commute estimate their ride time to be between 16 min and 30 min (50% of PT commuters) whereas respondents riding a bike for their commute often only estimate between 5 min and 15 min (40% of bike commuters).

The survey responses indicate that the area of movement within the city for respondents is rather big therefore the main mode of transport is public transport. However, for short distances and leisure purposes other modes of transport like the bike are also considered convenient. Thus, it can be concluded from the survey that the tendency to take public transport is stronger when the distance increases.

In the case of Seville, respondents either live very close to the university, less than 2 km (43.2%), or farther away, between 6 km and 15 km (24.3%) and accordingly choose their mode of transport. The majority of respondents (45.9%) choose to walk, especially for a short commute, others choose public transport (27%) or taking the car (18.9%), especially for longer commutes. Respondents that choose to walk in most cases (41.2% of walkers) take between 5 and 15 minutes or often (35.3% of walkers) also less. Respondents that take public transport (80% of PT commuters) usually take more than 30 minutes. When it comes to displacements for leisure purpose respondents choose walking (37.8%), taking public transport (32.4%) or the car (21.6%), travelling mostly (59.5%) shorter distances between 2 km and 5 km. Whether taking the car or walking, the time for displacement approximates between 5 and 15 minutes (75% of car commuters, 57.1% of walkers), whereas the ride time when taking public transport mostly estimates between 16 and 30 minutes (58.3% of PT commuters).

The survey results let conclude that the area of movement of respondents in Seville is rather limited, but depending on the distance respondents select one or another mode of transport for the commute. It is important to highlight the very dominant role of walking as a form of displacement within the city of Seville.

In the case of Kaohsiung, respondents are more likely to live close to the university, less than 2 km (71.1%), and still the majority of respondents (52.6%) choose the scooter for their commute whereas others (39.5%) choose to walk. Indifferent to the mode of transport selected most respondents (63.2%) take into account a ride time or walk time of 5 min to 15 min or less (26.3%). When it comes to displacements for leisure purposes, most respondents (65.8%) stay within a distance of 2 km to 5 km. Typically respondents choose to take the scooter (65.8%) or public transport (21.1%) for their commute. Respondents´ answers indicate that generally ride time when taking the scooter has the tendency to be a little shorter, 5 min to 15 min (64% of scooter commuters), than when taking public transport, 16 min to 30 min (62.5% of PT commuters).

The survey results imply that the area of movement of respondents in Kaohsiung is rather small but regardless the main mode of transport is the scooter. For very short distances walking is considered the alternative to taking the scooter but as distance increases it becomes more convenient to take public transport instead however the scooter is always the most popular option.

Figure 6.2 shows the different modes of transport and the respondents´ evaluation of the modes of transport with regard to convenience in the context of urban mobility in each of the cities. The question asked respondents to sort the modes of transport from 1, least convenient mode of transport, to 6, most convenient mode of transport. The values of the figure correspond to the mean of each mode of transport for each set of respondents, the highest score is 6 and the lowest score is 1.

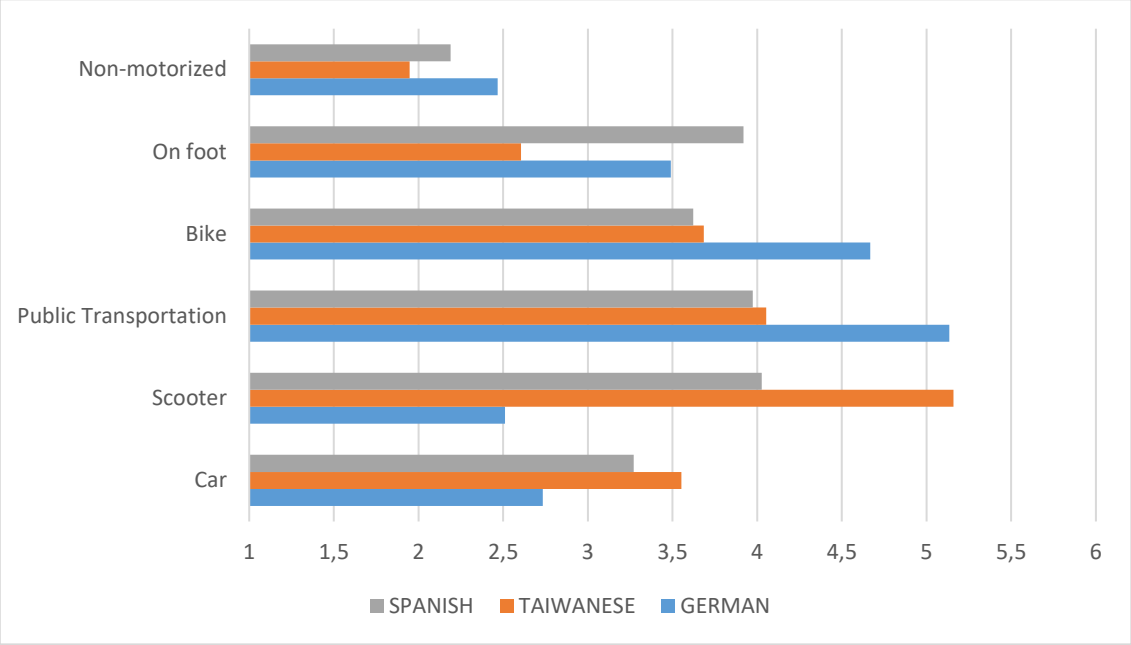

Figure 6.2 Convenience of Modes of Transport

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

In the case of Munich, respondents consider public transport to be the most convenient of all modes of transport giving it an average score of 5.13, closely followed by the bicycle with 4.67 and walking with 3.49 on average. In the case of Seville, respondents consider the scooter with a mean score of 4.03, public transport with an average of 3.97 and walking with an average score of 3.92 equally convenient. In the case of Kaohsiung, respondents consider the scooter on average to be the most convenient of all modes with 5.16 average points, followed by public transport with 4.05 and bicycle with 3.68 on average.

According to the survey results motorized modes of transport, such as car and scooter, do not play an important role in Munich where public transport and micromobilities, such as cycling and walking dominate. This suggest that, indeed, the more convenient the public transport network is for citizens the more likely they are to combine it with the use of micromobilities. Whereas, in Kaohsiung and Seville these motorized modes of transport do play an important role; especially the scooter is considered very convenient.

Although public transport is considered one of the more convenient modes of transport in any of the three cities, the weight varies between Munich, Seville and Kaohsiung. Figure 6.3 shows the respondents´ perception of the public transport network in each of the cities, with regard to 4 key attributes: extension, reliability, frequency, punctuality. Respondents rated these attributes on a 5-point Likert scale.

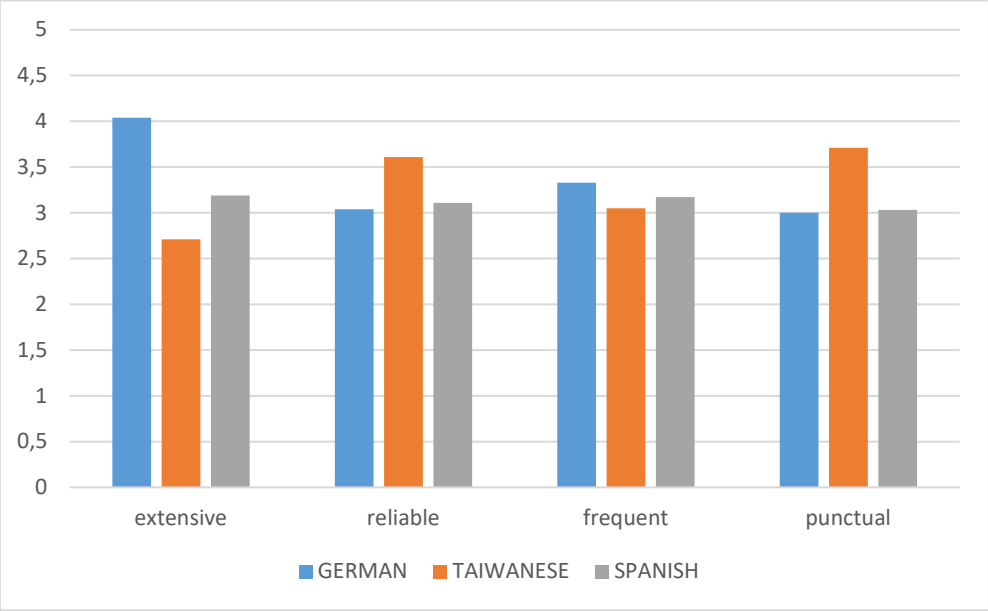

Figure 6.2 Perception of Public Transport Network

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

In the case of Munich, respondents positively highlight the extension of the public transport network with a rating of 4.04, with regard to the remaining attributes respondents perceive the public transport network rather neutral. In the case of Seville, respondents perceive all aspects neither positive nor negative. In the case of Kaohsiung, respondents positively highlight both reliability and punctuality with ratings of 3.61 and 3.71 respectively, however respondents rate extension with 2.71, reflecting a slightly negative tendency.

As discussed previously, German respondents reflect the highest use of public transport this makes believe the public transport network in Munich is superior than that in Seville or Kaohsiung. Therefore, considering the use and perception of public transport of respondents, it can be deducted that the most important variables for an effective public transport network are extension and frequency.

Not only residents but also visitors contribute to and interact with the urban transport system. With respect to tourist mobility, most respondents (75.6%) believe tourists visiting Munich primarily use public transport and others (17.8%) think tourists move within the city on foot. As for Seville, most respondents (48.6%) think that tourists visiting Seville primarily walk around the city, whereas others (35.1%) believe tourists move around the city using public transport. Some (10.8%) even propose tourists mainly use e-micromobilities when visiting Seville. In Kaohsiung most respondents (42.1%) believe tourists visiting the city foremost use the scooter whereas others (28.9%) think tourists use public transport.

6.3 CULTURE AND SUSTAINABLE MODE OF TRANSPORT CHOICE

This abstract deals with the cultural background of respondents, trying to test whether the theories represented in the chapter 5 could be applied for this set of respondents.

Even though individualism vs. collectivism and uncertainty avoidance as proposed by Hofstede are considered very relevant for this analysis, the sample could not reflect the same values for the three nationalities as the author himself. The survey data was inconclusive for the Hofstede dimensions.

Pace of Life is a rather ambiguous concept calculated using the indicators walking speed, working speed and accuracy of clock time. The survey took a different approach and analysed pace of life as a combination of punctuality, waiting times, time consciousness and stress. The survey results can offer some insight on pace of life however this is no confirmed measurement of pace of life.

In the case of Munich, respondents consider punctuality as arriving up to 10 minutes early or just at the agreed time and usually only wait a few minutes or maximum 10 minutes. Respondents portray themselves as very time conscious but not too stressed in their daily routine. In the case of Seville, respondents consider punctuality as arriving at the agreed time rather than earlier and typically wait at least 5 minutes most likely even longer. Respondents declare themselves as time conscious and rather stressed in their daily routine. In the case of Kaohsiung, respondents consider punctuality as arriving up to 10 min early or more but commonly wait between 5 and 10 minutes. Respondents picture themselves as not too time conscious but rather stressed in their daily routine. The results of the survey imply that pace of life is faster in Munich and Kaohsiung than in Seville, considering primarily aspects of punctuality and waiting times.

Materialism and postmaterialism are levels of development that comprise different sets of values that potentially impact mode of transport choice. Post materialist values amongst others are suggested to be related to progress, quality of life and open-mindedness, as such it is likely to be related to sustainability too. The survey measures this concept for students in the three cities using Inglehart´s modern-postmodern value index and a slightly adapted and more updated version of the index. Figure 6.3.1 shows the adapted version of the modern-postmodern value index for the three nationalities that to great extent, less for Spanish respondents than for the other nationalities, shows the same tendency as the original Inglehart index.[8]

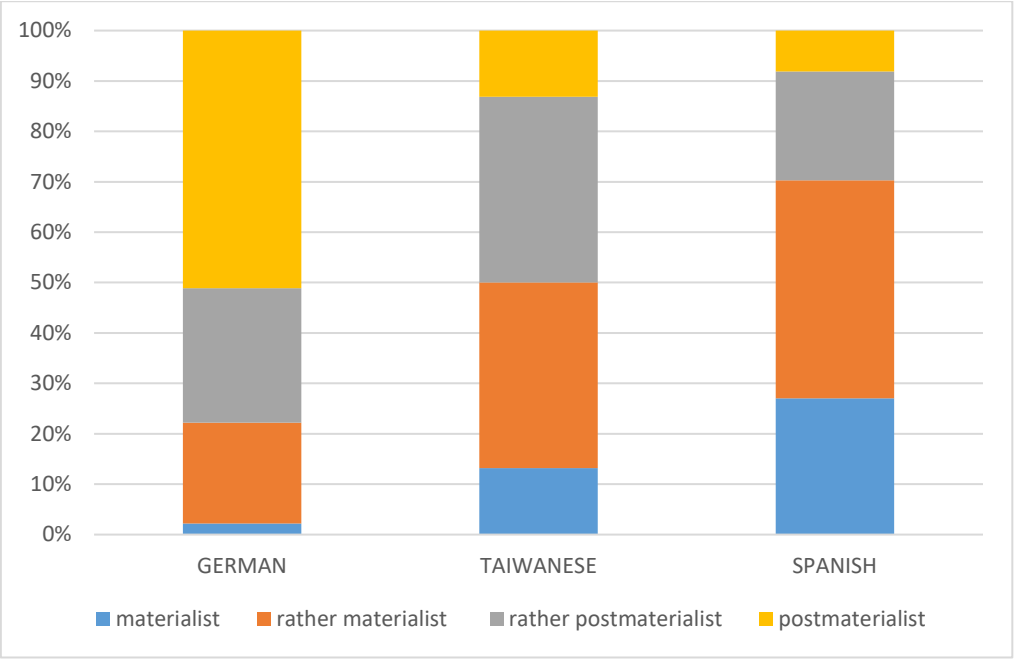

Figure 6.3.1 Updated Modern - Postmodern Value Index

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

[8] Please see Annex II Figure 1

In the case of Munich, the trend observed by respondents´ answers is towards postmaterialism, the majority of respondents (51.1%) are classified in this group. In the case of Seville, the two indices slightly change the tendency. In the original Inglehart index most respondents (43.2%) are classified rather postmaterialist whereas in the updated index most respondents (43.2%) are classified rather materialist. In the case of Kaohsiung there is no clear trend, the distribution of respondents´ answers is symmetrical.

Given these results, it is of interest to test the relationship between materialism and nationality. Are these variables statistically independent or are they correlated? Table 6.3.1 shows the values of the chi square test of independence with respect to this matter. This statistical method states that the variables are related when the chi square statistic is bigger than the critical value. The outcome therefore is that these two variables are indeed correlated according to the sample (JMP Statistical Discovery LLC, 2022).

	Nationality - Materialism
Chi Square Statistic	32.67
Critical Value (df = 2; α = 0.05)	12.59

Table 6.3.1 Nationality – Materialism[9]

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

Therefore, in the next step of the analysis, the relationship between culture, indicated by nationality, which is correlated to materialism, and sustainable mode of transport choice was tested using the chi square test of independence. The analysis tested on the one hand the correlation with sustainable mode of transport choice on a level of thinking and on the other hand on a level of acting. Table 6.3.2 represents the key data of this analysis.

	Nationality - 'Sustainable' M.o.T. Choice	**Nationality - Sustainable Commute to University**	**Nationality - Sustainable Commute to Leisure Areas**
Chi Square Statistic	10.79	20.04	25.57
Critical Value (df = 2; α = 0.05)	5.99	5.99	5.99

Table 6.3.2 Nationality – Sustainable M.o.T. Choice

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

The analysis shows that in the case of the respondents of this survey the Null hypothesis, culture and sustainable mode of transport choice are independent variables, needs to be rejected, the chi square statistic is bigger than the critical value. The higher the value for chi squared the higher the correlation of the tested variables (Statistics How To, 2022).

These findings support the hypothesis proposed according to Inglehart´s modernization theory, German respondents characterised by more post-materialist values do indeed

[9] Please see Annex II Figure 2

take sustainable modes of transport more than Spanish and Taiwanese respondents. Thus, it can be concluded that they will show higher acceptance of e-micromobilities than the other respondents.

6.4 E-MICROMOBILITIES AS A MODE OF TRANSPORT

E-Micromobilities are hoped to be used commonly for tourism purposes amongst others in the future, as mentioned in the previous chapters of this paper. Therefore, it is of interest to know which modes of transport respondents currently use as a tourist in different cities and which mode of transport respondents would wish to use.

In the case of Munich, respondents´ answers stated the use of public transport (64.4%) and on foot (26.7%) as the most important modes for urban tourist mobility. In an ideal scenario a significant number of respondents (15.6%) would wish to use the bike instead of public transport. In the case of Seville, respondents´ answers reflect the use of public transport (54.1%) and on foot (32.4%) as the most important modes for urban tourist mobility. In an ideal scenario a significant number of respondents would prefer to use the bike (16.2%) or even e-micromobilities (10.8%) instead. In the case of Kaohsiung, respondents´ answers show that the use of public transport (52.6%), scooter (23.7%) and car (15.8%) are the most common modes for urban tourist mobility. Nevertheless, in an ideal scenario a high number of respondents (23.7%) do not wish to use public transport, the majority of respondents (15.8%) would prefer to use the car instead.

The respondents´ use of transport as tourists in other cities shows the same tendencies as the respondents´ habits regarding every-day mobility in their residential cities.

Furthermore, it is of interest to know the respondents´ openness towards this kind of ICT-based format for transport, whether it supposes a barrier to users or not. Regarding the preparedness to use digital applications for e-micromobilities, respondents were generally asked about the use of urban transport applications in their daily life. Figure 6.4.1 shows the different types of applications and their use by respondents.

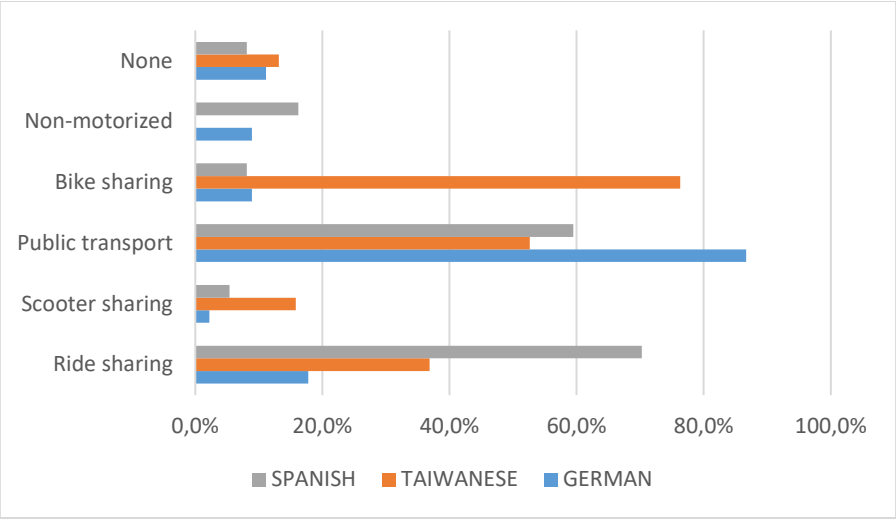

Figure 6.4.1 Transport Application Use*[10]

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

[10] Percentage of the total number of respondents for each city separately, question with multi-choice possibility

In the case of Munich, close to all respondents (86.7%) declare the use of public transport apps, various respondents (17.8%) also use ride sharing apps and some respondents (8.9% each) even state the use of bike sharing and e-micromobility apps. In the case of Seville, a vast majority of respondents (70.3%) use ride sharing apps, more than half of the respondents (59.5%) also use public transport apps and a few respondents (16.2%) even use e-micromobility apps. In the case of Kaohsiung, a great majority of respondents (76.3%) confirm the use of bike sharing apps, a significant number of respondents also state the use of public transport apps (52.6%) and ride sharing apps (36.8%).

Even though not many respondents use any applications for e-micromobilities at present, this should not pose an obstacle to the development of e-micromobilities based on the common use of other apps for transport.

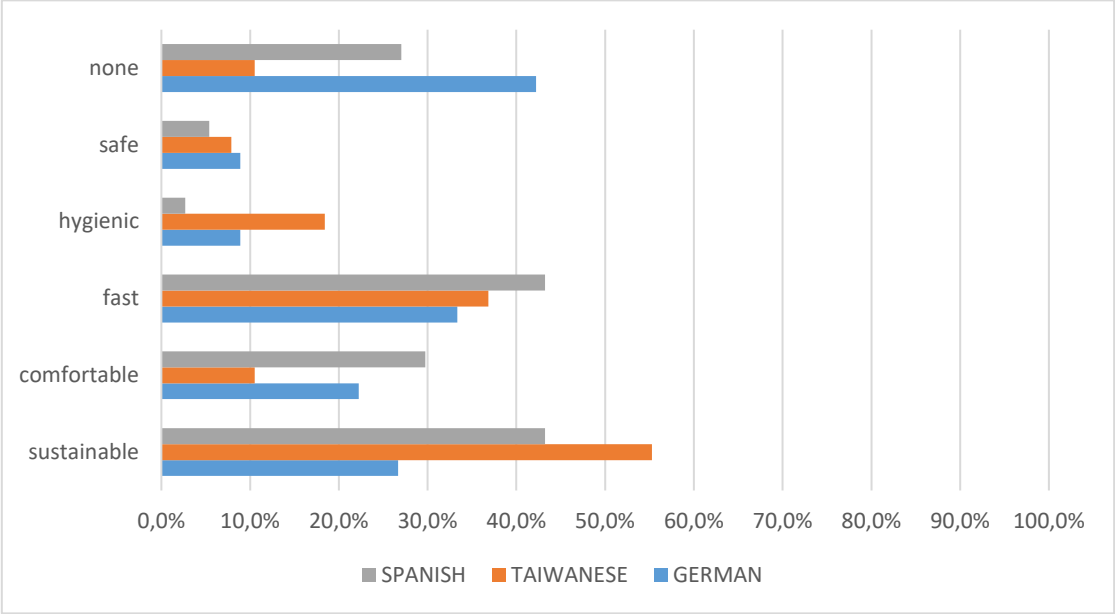

Figure 6.4.2 Perception of E-Micromobilities[11]

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

Figure 6.4.2 portrays the respondents´ perception of e-micromobilities. Note that a large number of respondents did not select any characteristic, possibly because they have not yet experienced e-micrombilities and thus cannot state their opinion. In the case of Munich, respondents consider e-micromobilities to be fast (33.3%), sustainable (26.7%) and comfortable (22.2%). In the case of Seville, respondents consider e-micromobilities fast (43.2%), sustainable (43.2%) and comfortable (29.7%). In the case of Kaohsiung, respondents consider e-micromobilities to be sustainable (55.3%), fast (36.8%) and hygienic (18.4%).

To improve the implementation of e-micromobilities it is of interest to know what respondents value most when choosing the mode of transport. All respondents, indifferent to their place of residence, value ‘fast’ as an attribute more than any other attribute however the survey results leave room for the conclusion that this criterion is a way to filter out those modes of transport that are too slow but does not determine a single mode of transport that respondents will choose.

[11] Percentage of total number of respondents for each city separately, question with multi-choice possibility

In the case of Munich, respondents also value sustainable and comfortable modes of transport, selected 21 and 20 times respectively (out of a total of 45 respondents) as the first or second most important attribute. Whereas in Seville, respondents value safe and comfortable modes of transport, chosen 20 and 16 times respectively (out of a total of 37 respondents) as the first or second most important attribute. As for Kaohsiung, the attributes valued are primarily safe, checked 30 times (out of a total of 38 respondents) as the first or second most important attribute and possibly comfortable, with 9 votes as first or second most important attribute.[12]

Considering the respondents´ criteria when choosing the mode of transport and the perception of micromobilities, it can be concluded that in the case of Munich respondents should be very accepting of e-micromobilities, in Seville the acceptance should also be somewhat positive, whereas in the case of Kaohsiung respondents will show lower acceptance of e-micromobilities.

[12] Please see Annex II Figure 3, 4, 5

7 CONCLUSION

The theoretical analysis found on the one hand that a warm and sunny climate, a plane topography, an extensive built environment and a high tourism influx are factors that favour the implementation and use of micromobilities. As such I found that the infrastructure and geographical settings in Seville are more supportive of micromobilities than the ones in Munich that again encourage the use of micromobilities more than the infrastructure and geographical settings in Kaohsiung.

On the other hand, the theoretical framework displayed that individualism (Hofstede), post-materialism (Inglehart) and faster pace of life make users more acceptive of e-micromobilities as a new mode of transport. Thus, it found that the cultural values and background in Germany are more agreeable to the use of e-micromobilities than Spanish culture which again is more in line with adopting e-micromobilities than Taiwanese culture.

The survey firstly reflected upon the current use and perception of urban mobility and found that the connection to sustainable modes of transport, public transport and micromobilities, is stronger among German respondents than Spanish respondents and lastly Taiwanese respondents, despite the city features that would suggest a different order. Respondents generally imply that the public transport network´s requirements for utility are to be extensive and frequent. It is demonstrated that in Munich, where this is realized better, respondents actually make more use of micromobilities. Furthermore, respondents of the 3 cities consider that tourists visiting their cities mainly use sustainable modes of transport for displacements within the city, therefore they shall be welcoming e-micromobilities as a complementary option to the existing means of transport.

Secondly the survey analysis tested the correlation between culture, defined by Inglehart, and sustainable mode of transport choice for this sample. The findings were (I) nationality and materialism are correlated and (II) nationality and sustainable mode of transport choice are also correlated. Thus, the analysis implies culture does influence mode of transport choice and culture could be a more determinant factor of influence for mode of transport choice than the urban environment itself. This effect will become even clearer when more members of Generation Z adopt these post-materialist values, as such the future tourists will value sustainable modes of transport, such as e-micromobilities, more than their previous generations.

Lastly, the survey aimed to analyse the current position of e-micromobilities for this sample. Whereas most respondents, of Munich and Seville, still primarily consider public transport and bike for tourist mobility within the sustainable modes of transport, the shift from these active micromobilities to e-micromobilities is on the verge. The same is observed for every day routine, although respondents don't declare regular use of e-micromobilities a small number of respondents do state the use of the corresponding applications for e-micromobilities just like other transport apps. On the contrary, the use of e-micromobilities in Taiwan seem to be close to non-existent.

Generally, it can be observed that all respondents, indifferent of their nationality and resident city, have a reduced area of movement for leisure purposes, mostly less than 5 km, so e-micromobilities would always be an efficient, fast and accessible, alternative for these displacements. That's not necessarily the case for displacements to the university campus, especially in Munich the distances are very long, nevertheless, considering that the main mode of transport used by respondents to go to university is public transport, e-micromobilities could be used as an efficient mode of transport to cover first and last mile journeys, trips to and from public transport stations.

The perception of e-micromobilities varies amongst the respondents of the three cities and more importantly the aspects that influence mode of transport choice vary amongst the respondents of the three cities too. Based on the respondents´ perception of e-micromobilities and the respondents´ consideration of important aspects for mode of transport choice, as well as other issues analysed beforehand regarding mode of transport choice it can be expected that micromobilities will gain more importance in Munich and Seville than in Kaohsiung.

With regard to the limitations of this paper, it has to be recognized that this is merely an exploratory study. It could be observed that secondary data was scarce and not completely accurate for this research. The topic of e-micromobilities is very recent and there is a very limited amount of scientific research and investigation available for consultation. Furthermore, the approach of this study is very unique and innovative; it combines a different set of aspects and includes aspects that most authors do not treat in their research. Thus, it is even more challenging to find scientific research and investigation appropriate and supportive for this paper.

With regard to the primary data, it is important to highlight that the sample is reduced in size but sufficient to be taken as a basis for this pilot project that can help test the questionnaire for future research. Thus, this survey can help to reduce respondent/sample bias and errors of interpretation of the results when conducted in the future. Despite the limitations, this paper has given me the possibility to explore this new research approach and find some relevant information justifying future research.

Finally, based on the findings of this exploratory study, it is advisable that future studies investigate the influence of cultural values and background on mode of transport choice. As such aspects that should be taken into account are firstly collecting a representative sample, then results could be interpreted with more confidence and certainty.

Secondly, it is recommendable to focus the scope of the study more. For example, it seems interesting to reduce the geographical scope and focus solemnly on Europe since in this region e-micromobilities are currently growing rapidly and a great number of cultures can be contrasted.

Lastly, another suggestion that could be of interest in further research is to exclusively compare the different types of sustainable modes of transport with the idea to discover the reasons why users prefer public transport, active micromobilities or e-micromobilities. Following this line of thinking, it could also be interesting to compare the different types and pricing of services in order to generate results that can be of practical use for urban transport planning.

Bibliography

Aaker, J. L. (1997). Dimensions of brand personality. *Journal of Marketing Research*, *34*(3). https://doi.org/10.2307/3151897

Aranburu, I., Plaza, B., & Esteban, M. (2016). Sustainable cultural tourism in urban destinations: Does space matter? *Sustainability (Switzerland)*, *8*(8). https://doi.org/10.3390/su8080699

Bayerisches Landesamt für Statistik und Datenverarbeitung. (2022a). *Tourism Statistics 2018 - July.* Retrieved from: https://www.munich.travel/en/topics/about-us/data-facts-and-market-research

Bayerisches Landesamt für Statistik und Datenverarbeitung. (2022b). *Tourism Statistics 2018 - August.* Retrieved from: https://www.munich.travel/en/topics/about-us/data-facts-and-market-research

Bayerisches Landesamt für Statistik und Datenverarbeitung. (2022c). *Tourism Statistics 2018 - September.* Retrieved from: https://www.munich.travel/en/topics/about-us/data-facts-and-market-research

Bayerisches Landesamt für Statistik und Datenverarbeitung. (2022d). *Tourism Statistics 2018 - October.* Retrieved from: https://www.munich.travel/en/topics/about-us/data-facts-and-market-research

Bayerisches Landesamt für Statistik und Datenverarbeitung. (2022e). *Tourism Statistics 2018 - December.* Retrieved from: https://www.munich.travel/en/topics/about-us/data-facts-and-market-research

Beugelsdijk, S., & Welzel, C. (2018). Dimensions and Dynamics of National Culture: Synthesizing Hofstede With Inglehart. *Journal of Cross-Cultural Psychology*, *49*(10). https://doi.org/10.1177/0022022118798505

Central Weather Bureau. (2022). *Monthly Mean.* Retrieved from: https://www.cwb.gov.tw/V8/E/C/Statistics/monthlymean.html

Climate-Data.org. (2022a). *Climate Munich (Germany).* Retrieved from: https://en.climate-data.org/europe/germany/free-state-of-bavaria/munich-6426/

Climate-Data.org. (2022b). *Clima Sevilla (España).* Retrieved from: https://es.climate-data.org/europe/espana/andalucia/sevilla-2933/

Climatestotravel.com. (2022a). *Climate – Munich (Bavaria).* Retrieved from: https://www.climatestotravel.com/climate/germany/munich

Climatestotravel.com. (2022b). *Climate – Seville (Andalusia).* Retrieved from: https://www.climatestotravel.com/climate/spain/seville

Davidson, A., Habibi, M. R., & Laroche, M. (2018). Materialism and the sharing economy: A cross-cultural study of American and Indian consumers. *Journal of Business Research*, *82*. https://doi.org/10.1016/j.jbusres.2015.07.045

Davies, N., Blazejewski, L., & Sherriff, G. (2020). The rise of micromobilities at tourism destinations. *Journal of Tourism Futures*, *6*(3). https://doi.org/10.1108/JTF-10-2019-0113

de Bortoli, A. (2021). Environmental performance of shared micromobility and personal alternatives using integrated modal LCA. *Transportation Research Part D: Transport and Environment*, *93*. https://doi.org/10.1016/j.trd.2021.102743

Debevec, K., Schewe, C. D., Madden, T. J., & Diamond, W. D. (2013). Are today's Millennials splintering into a new generational cohort? Maybe! *Journal of Consumer Behaviour*, *12*(1). https://doi.org/10.1002/cb.1400

Dorocki, S., & Wantuch-Matla, D. (2021). Power two-wheelers as an element of sustainable urban mobility in europe. *Land*, *10*(6). https://doi.org/10.3390/land10060618

Elmashhara, M. G., Silva, J., Sá, E., Carvalho, A., & Rezazadeh, A. (2022). Factors influencing user behaviour in micromobility sharing systems: A systematic literature review and research directions. *Travel Behaviour and Society*, *27*. https://doi.org/10.1016/j.tbs.2021.10.001

Entina, T., Karabulatova, I., Kormishova, A., Ekaterinovskaya, M., & Troyanskaya, M. (2021). Tourism industry management in the global transformation: Meeting the needs of generation z. *Polish Journal of Management Studies*, *23*(2). https://doi.org/10.17512/pjms.2021.23.2.08

Esztergár-Kiss, D., & Lopez Lizarraga, J. C. (2021). Exploring user requirements and service features of e-micromobility in five European cities. *Case Studies on Transport Policy*, *9*(4). https://doi.org/10.1016/j.cstp.2021.08.003

Foronda-Robles, C., García-López, A.M.y Navarro-Franco, I. (2022). The redistribution of the Tourist Flow in Destination (TFD) from spatial-temporal concentration. Seville is flowing. *Investigaciones Turísticas (23),* pp. 1-23. https://doi.org/10.14198/INTURI2022.23.1

Google Maps. (2022a). *München*. Retrieved from: https://www.google.com/maps/@48.1326499,11.5509203,13z

Google Maps. (2022b). *Kaohsiung*. Retrieved from: https://www.google.com/maps/place/Kaohsiung,+Gushan+District,+Kaohsiung,+Taiwan/@30.3073795,121.219976,5.39z/data=!4m5!3m4!1s0x346e04fd209f4835:0x54511e7d86c87c09!8m2!3d22.6350591!4d120.3355193

Google Maps. (2022c). *Kaohsiung*. Retrieved from: *https://www.google.com/maps/@22.6421521,120.3101917,13z*

Google Maps. (2022d). *Kaohsiung*. Retrieved from: *https://www.google.com/maps/@22.6312301,120.3055843,13284m/data=!3m1!1e3!5m1!1e3*

Groth, S., Hunecke, M., & Wittowsky, D. (2021). Middle-Class, Cosmopolitans and Precariat among Millennials between Automobility and Multimodality. *Transportation Research Interdisciplinary Perspectives*, *12*. https://doi.org/10.1016/j.trip.2021.100467

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, *2*(1). https://doi.org/10.9707/2307-0919.1014

Hofstede Insights. (2022). *Country Comparison Tool.* Retrieved from: https://www.hofstede-insights.com/

Hosseinzadeh, A., Karimpour, A., & Kluger, R. (2021). Factors influencing shared micromobility services: An analysis of e-scooters and bikeshare. *Transportation Research Part D: Transport and Environment*, *100*. https://doi.org/10.1016/j.trd.2021.103047

Hsu, T.-P., Sadullah, A. F. M., & Nguyen, X. D. (2003). A comparison study on motorcycle traffic development in some Asian countries - case of Taiwan, Malaysia and Vietnam. *The Eastern Asia Society for Transportation Studies (EASTS) International Cooperative Research Activity*.

Instituto de Estadística y Cartografía de Andalucía. (2022). *Sevilla*. Retrieved from: https://www.juntadeandalucia.es/institutodeestadisticaycartografia/sima/ficha.htm?mun=41091

International Organization of Motor Vehicle Manufacturers. (2022). *Motorization Rate 2015 – Worldwide.* Retrieved from: https://www.oica.net/world-vehicles-in-use-all-vehicles-2/

JMP Statistical Discovery LLC. (2022). *Chi-Square Test of Independence.* Retrieved from: https://www.jmp.com/en_au/statistics-knowledge-portal/chi-square-test/chi-square-test-of-independence.html

Kaohsiung City Government. (2022a). *Population Statistics Query*. Retrieved from: https://cabu.kcg.gov.tw/Stat/StatRpts/StatRpt1.aspx?yq=110&mq=12&dq=

Kaohsiung City Government. (2022b). *Density Distribution Statistics.* Retrieved from: https://housing.kcg.gov.tw/LFA/LFA03/LFA03007004.jsp

Kaohsiung City Government. (2022c). *2018 Tourism Statistics Annual Report.* Retrieved from: https://admin.khh.travel/zh-tw/touriststatistics/newsdetail/121

Kaohsiung City Government. (2022d). Climate. Retrieved from: https://www.kcg.gov.tw/EN/cp.aspx?n=4892E8B8F5C0E174

Kaohsiung City Government. (2022b). Transport Options in Kaohsiung City. Retrieved from: https://khh.travel/en/traffic/local-transport

Kaohsiung Rapid Transit Corporation. (2019). History. Retrieved from: https://corp.krtc.com.tw/eng/About/page?id=a15ed12a586b42eb9e3fd0af7dfd353b

Kaohsiung Rapid Transit Corporation. (2022). *Guide Map.* Retrieved from: https://www.krtc.com.tw/eng/Guide/guide_map

Kiley, K., & Vaisey, S. (2020). Measuring Stability and Change in Personal Culture Using Panel Data. *American Sociological Review*, *85*(3). https://doi.org/10.1177/0003122420921538

Lam, D., & Head, P. (2011). Sustainable urban mobility. In *Energy, Transport, & the Environment: Addressing the Sustainable Mobility Paradigm* (Vol. 9781447127178). https://doi.org/10.1007/978-1-4471-2717-8_19

Landeshauptstadt München. (2022). *Unterwegs auf Wegen und Straßen.* Retrieved from:https://muenchenunterwegs.de/angebote/unterwegs-auf-wegen-und-strassen

Le-Klähn, D. T., Gerike, R., & Michael Hall, C. (2014). Visitor users vs. non-users of public transport: The case of Munich, Germany. *Journal of Destination Marketing and Management*, *3*(3). https://doi.org/10.1016/j.jdmm.2013.12.005

Le-Klähn, D. T., Michael Hall, C., & Gerike, R. (2014). Analysis of visitor satisfaction with public transport in Munich. *Journal of Public Transportation*, *17*(3). https://doi.org/10.5038/2375-0901.17.3.5

Levine, R. v., & Norenzayan, A. (1999). The pace of life in 31 countries. *Journal of Cross-Cultural Psychology*, *30*(2). https://doi.org/10.1177/0022022199030002003

Lippke, S., Schalk, T. M., Kühnen, U., & Shang, B. (2021). Pace of life and perceived stress in international students. *PsyCh Journal*, *10*(3). https://doi.org/10.1002/pchj.426

Lyons, G. (2018). Getting smart about urban mobility – Aligning the paradigms of smart and sustainable. *Transportation Research Part A: Policy and Practice*, *115*. https://doi.org/10.1016/j.tra.2016.12.001

Matzler, K., Strobl, A., Stokburger-Sauer, N., Bobovnicky, A., & Bauer, F. (2016). Brand personality and culture: The role of cultural differences on the impact of brand

personality perceptions on tourists' visit intentions. *Tourism Management*, *52*. https://doi.org/10.1016/j.tourman.2015.07.017

Miskolczi, M., Földes, D., Munkácsy, A., & Jászberényi, M. (2021). Urban mobility scenarios until the 2030s. In *Sustainable Cities and Society* (Vol. 72). https://doi.org/10.1016/j.scs.2021.103029

Münchner Verkehrs- und Tarifverbund. (2022). *Tarifzonen*. Retrieved from: https://www.mvv-muenchen.de/en/tickets-and-fares/tariff-structure/zones/index.html

Noland, R. B. (2021). Scootin' in the rain: Does weather affect micromobility? *Transportation Research Part A: Policy and Practice*, *149*. https://doi.org/10.1016/j.tra.2021.05.003

Oeschger, G., Carroll, P., & Caulfield, B. (2020). Micromobility and public transport integration: The current state of knowledge. *Transportation Research Part D: Transport and Environment*, *89*. https://doi.org/10.1016/j.trd.2020.102628

Red Transporte. (2022). *Movilidad y transporte público en la provincia de Sevilla.* Retrieved from: https://www.redtransporte.com/sevilla/

Regmi, M. B. (2020). Measuring sustainability of urban mobility: A pilot study of Asian cities. *Case Studies on Transport Policy*, *8*(4). https://doi.org/10.1016/j.cstp.2020.08.003

Renfe. (2022). Mapa de líneas. Retrieved from: https://www.renfe.com/es/es/cercanias/cercanias-sevilla/mapas

Robinson, V. M., & Schänzel, H. A. (2019). A tourism inflex: Generation Z travel experiences. *Journal of Tourism Futures*, *5*(2). https://doi.org/10.1108/JTF-01-2019-0014

Santarius, T., & Bergener, J. (2020). Does the Use of ICT speed up the Pace of Life? *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3401335.3401642

Şengül, B., & Mostofi, H. (2021). Impacts of e-micromobility on the sustainability of urban transportation—a systematic review. In *Applied Sciences (Switzerland)* (Vol. 11, Issue 13). https://doi.org/10.3390/app11135851

Signorile, P., Larosa, V., & Spiru, A. (2018). Mobility as a service: a new model for sustainable mobility in tourism. *Worldwide Hospitality and Tourism Themes*, *10*(2). https://doi.org/10.1108/WHATT-12-2017-0083

Society of Automotive Engineers. (2022). *Electric Scooters and beyond - micromobility risks.* Retrieved from: https://www.swissre.com/institute/research/sonar/sonar2021/electric-scooters.html

Statistics How To. (2022). *Chi Squared Table.* Retrieved from: https://www.statisticshowto.com/tables/chi-squared-table-right-tail/

Statistisches Amt München. (2022). *Bevölkerung, Fläche und Bevölkerungsdichte am 31.12.2021 in den Stadtbezirken.* Retrieved from: https://stadt.muenchen.de/infos/statistik-bevoelkerung.html

Sevilla City Office. (2022a). Datos de Actividad Turística Año 2018. Retrieved from: https://www.visitasevilla.es/profesionales/2018

Sevilla City Office. (2022b). Plan de Movilidad Urbana Sostenible Sevilla. Retrieved from: https://www.sevilla.org/actualidad/blog/plan-de-movilidad-urbana-sostenible-de-sevilla

Sevilla City Office. (2022c). *A city for bikes.* Retrieved from: https://www.visitasevilla.es/en/history/city-bikes#:~:text=If%20you%20come%20to%20Seville,This%20is%20the%20life

Tian, M., Deng, P., Zhang, Y., & Salmador, M. P. (2018). How does culture influence innovation? A systematic literature review. In *Management Decision* (Vol. 56, Issue 5). https://doi.org/10.1108/MD-05-2017-0462

Topographic-map.com. (2022a). *Munich*. Retrieved from: https://en-gb.topographic-map.com/maps/lp9z/Munich/

Topographic-map.com. (2022b). *Seville*. Retrieved from: https://es-es.topographic-map.com/maps/6oo8/Sevilla/

Topographic-map.com. (2022c). *Kaohsiung*. Retrieved from: https://en-us.topographic-map.com/maps/dc0p/Kaohsiung/

Tussam. (2022). *Red de Líneas.* Retrieved from: https://reddelineas.tussam.es/?lang=es#

Vázquez-Hisado, J. C. (2018). El proceso hacia la movilidad sostenible en Sevilla: centro histórico peatones y ciclistas. *Ciudad y Territorio Estudios Territoriales*, *50*(196).

Veiga, C., Santos, M. C., Águas, P., & Santos, J. A. C. (2017). Are millennials transforming global tourism? Challenges for destinations and companies. *Worldwide Hospitality and Tourism Themes*, *9*(6). https://doi.org/10.1108/WHATT-09-2017-0047

World Population Review. (2022a). *Population of Cities in Germany (2022).* Retrieved from: https://worldpopulationreview.com/countries/cities/germany

World Population Review. (2022b). *Population of Cities in Spain (2022).* Retrieved from: https://worldpopulationreview.com/countries/cities/spain

World Population Review. (2022c). *Population of Cities in Taiwan (2022).* Retrieved from: https://worldpopulationreview.com/countries/cities/taiwan

World Tourism Organisation. (2022). *Glossary of Tourism Terms.* Retrieved from: https://www.unwto.org/glossary-tourism-terms

World Values Survey Association. (2022). *The Inglehart-Welzel World Cultural Map (2020).* Retrieved from: https://www.worldvaluessurvey.org/WVSContents.jsp?CMSID=Findings

www.LatLong.net. (2022). *Latitude and Longitude Finder.* Retrieved from: https://www.latlong.net/

Annex

Annex I: Survey Mode of Transport Choice (own elaboration)

Part 1: General Questions

1. Age: __
2. Gender: __Female __Male
3. Nationality: __German/Spanish/Taiwanese __Other
4. Are you a university student? __Yes __No
5. Are you studying in your hometown or place of habitual residence? __Yes __No
6. What are the housing conditions of your university accommodation?

   __I live with my parents __I live in my own apartment/studio __I share an apartment with others __I share a room with others
7. How do you consider your socioeconomic level?

   __Above the average of my environment __Equal to the average of my environment __Below the average of my environment
8. If you are working, how many hours?

   __I don't work __Yes, but I work sporadically, I don't work on a regular basis. __Yes, up to 10 hours/week __Yes, 11-20 hours/week __Yes, more than 20 hours/week

Part 2: Questions regarding mode of transport choice

9. Select all the modes of transport that you regularly use. (regularly = more than 3 times a week)

   __Car __Scooter __Public Transport __Bike __On foot (more than 20 minutes) __Other non-motorized modes of transport (electric scooter, segway, electric bike, etc.)
10. When moving around the city, is it common that you need to take various modes of transport to get to your destination? (public transport is just considered one mode of transport) __Yes __No
11. Select the modes of transport that your family and close friends frequently use to move around the city.

	Car	Scooter	Public Transport	Bike	On foot (more than 20 minutes)	Other non-motorized modes of transport (electric scooter, Segway, electric bike, etc.)
Priority 1						
Priority 2						

12. Which mode of transport do you use to go from your accommodation to class/university?

    __Car __Scooter __Public Transport __Bike __On foot (more than 20 minutes) __Other non-motorized modes of transport (electric scooter, segway, electric bike, etc.)
13. What is the approximate distance you need to cover to go from your accommodation to class/university?

    __Less than 2 km __2 km – 5 km __6 km – 15 km __More than 15 km
14. What is the approximate time it takes you to go from your accommodation to class/university?

__Less than 5 minutes __5 min – 15 min __16 min – 30 min __More than 30 minutes

15. Which mode of transport do you use to go from your accommodation to leisure areas?

    __Car __Scooter __Public Transport __Bike __On foot (more than 20 minutes) __Other non-motorized modes of transport (electric scooter, segway, electric bike, etc.)

16. What is the approximate distance you need to cover to go from your accommodation to leisure areas?

    __Less than 2 km __2 km – 5 km __6 km – 15 km __More than 15 km

17. What is the approximate time it takes you to go from your accommodation to leisure areas?

    __Less than 5 minutes __5 min – 15 min __16 min – 30 min __More than 30 minutes

18. Do you use any kind of digital application related to transport?

    __Ride sharing apps __Scooter sharing apps __Public transport apps __Bike sharing apps __Non-motorized modes of transport apps __None

19. What mode of transport do you usually use as a tourist in a different city?

    __Car __Scooter __Public Transport __Bike __On foot (more than 20 minutes) __Other non-motorized modes of transport (electric scooter, segway, electric bike, etc.)

20. What mode of transport would you ideally like to use as a tourist in a different city?

    __Car __Scooter __Public Transport __Bike __On foot (more than 20 minutes) __Other non-motorized modes of transport (electric scooter, segway, electric bike, etc.)

Part 3: Questions regarding urban mobility and mode of transport perception

21. Sort the following modes of transport according to their convenience in the context of urban mobility in Munich/Seville/Kaohsiung. (range from worst to best)

	1 – least convenient	2	3	4	5	6 – most convenient
Car						
Scooter						
Public Transport						
Bike						
On foot						
Other non-motorized modes of transport (electric scooter, Segway, electric bike, etc.)						

22. How do you evaluate the following modes of transport?

	sustainable	comfortable	fast	hygienic	safe	none
Car						
Scooter						
Public Transport						
Bike						

On foot						
Other non-motorized modes of transport (electric scooter, Segway, electric bike, etc.)						

23. Sort the following attributes according to the importance they have for your mode of transport choice. (range from worst to best)

	1 – least important	2	3	4	5	6 – most important
Sustainable						
Comfortable						
Fast						
Hygienic						
Safe						

24. I feel that the public transport network in Munich/Seville/Kaohsiung is…

	1 – strongly disagree	2 disagree	3 - neutral	4 - agree	5 – strongly agree
Extensive (I can go anywhere in the city)					
Reliable (I can count on its good functioning)					
Frequent (I can take it every few minutes)					
Punctual (I can arrive at my destination on time)					

25. Do you feel like there is a social norm established in Munich/Seville/Kaohsiung on which mode of transport is considered the 'normal' one to use? If yes, please select the mode of transport considered normal by the population of Munich/Seville/Kaohsiung.

    __No __Yes, car is the normal mode of transport __Yes, scooter is the normal mode of transport __Yes, public transport is the normal mode of transport __Yes, bike is the normal mode of transport __Yes, walking is the normal mode of transport __Yes, non-motorized modes of transport (electric scooter, Segway, electric bike, etc.) is the normal mode of transport

26. Which mode of transport do you feel that tourists in Munich/Seville/Kaohsiung use most?

    __Car __Scooter __Public Transport __Bike __On foot (more than 20 minutes) __Other non-motorized modes of transport (electric scooter, segway, electric bike, etc.)

Part 4: Questions regarding cultural aspects

27. You are meeting your friends at 5 pm, when do you plan to be at the agreed location?

    __More than 10 min early, before 16:50 __Up to 10 min early, approximately 16:50-16:59 __On time, 17:00 __Up to 10 min late, approximately 17:01-17:10 __More than 10 min late, after 17:10

28. When you are meeting your friends, how long do you usually wait for them to arrive?

    __No waiting __Less than 5 min __5 min-10 min __11 min-15 min __more than 15 min

29. Are you a time conscious person?

__Yes, I check the time very often __So so, I only check the time when I am on a schedule __No, I seldom check the time

30. In university, what kind of assignments do you prefer?

    __group work __individual work

31. What kind of task structure do you prefer?

    __personalized feedback on my work __general feedback

32. Amongst the following items, which do you consider most important?

	Maintain order in the country	Give people more say in important government decisions	Fight rising prices	Protect freedom of speech
Priority 1				
Priority 2				

33. Amongst the following items, which do you consider most important?

	Stimulating economic development	Securing environmental protection	Introducing digitalisation and innovation	Diversifying the labour market
Priority 1				
Priority 2				

34. To what level of detail do you plan your freetime activities?

    __every detail is prepared __a good plan __just a rough idea __no plan at all

35. Do you feel stressed in your daily routine?

    __Yes, I easily feel stressed __So so, I am doing fine __No, I seldom feel stressed

36. How do you feel about the following statement? Rules should not be broken, even when having good intentions.

    __Yes, I agree __So so, depends on the situation __No, I disagree

Annex II: Survey Results

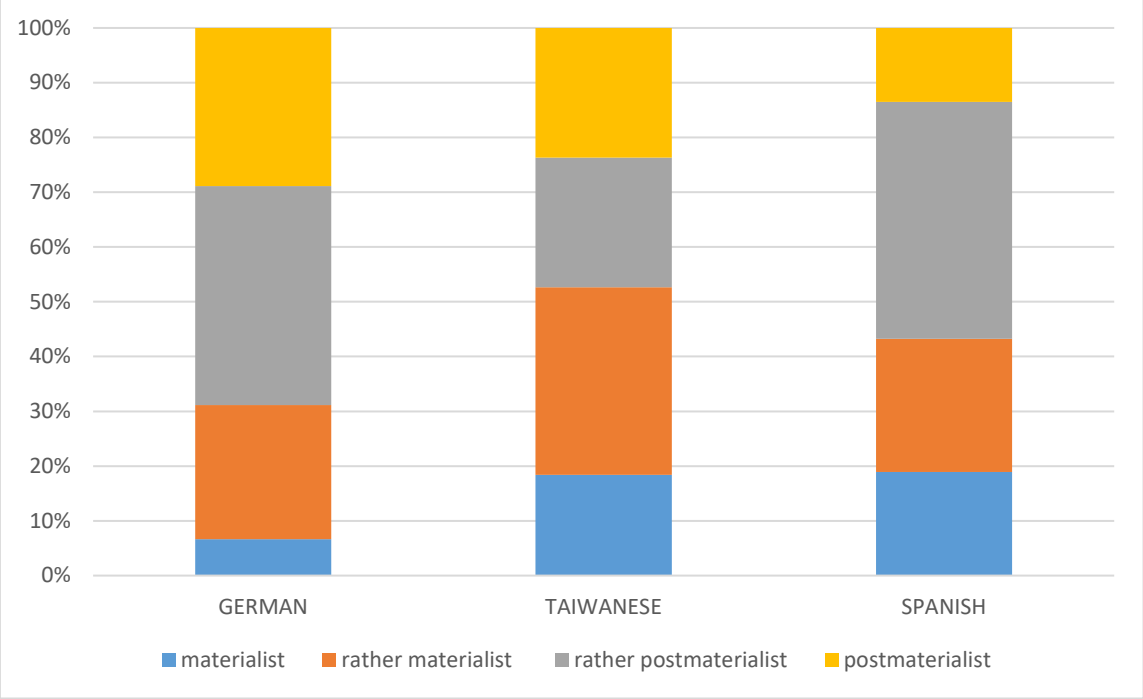

Figure 1: Inglehart Index

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

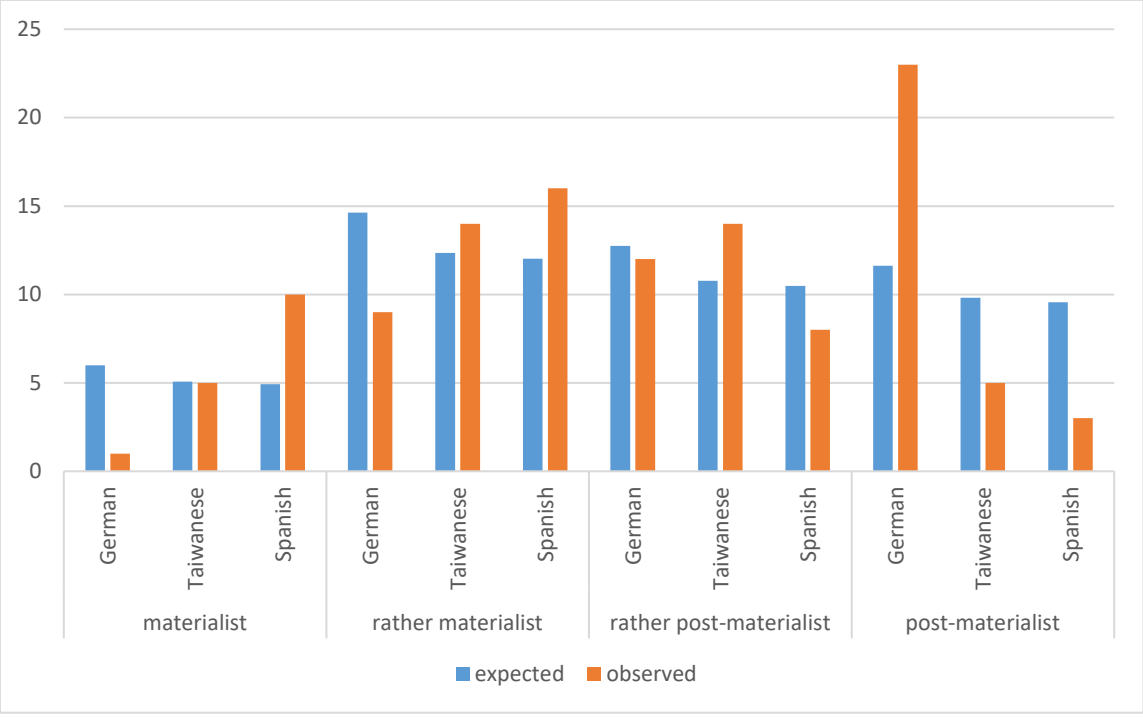

Figure 2: Chi Square Test - Nationality vs Materialism

Source: own elaboration based on Munich – Mode of Transport Choice, Seville – Mode of Transport Choice, Kaohsiung – Mode of Transport Choice

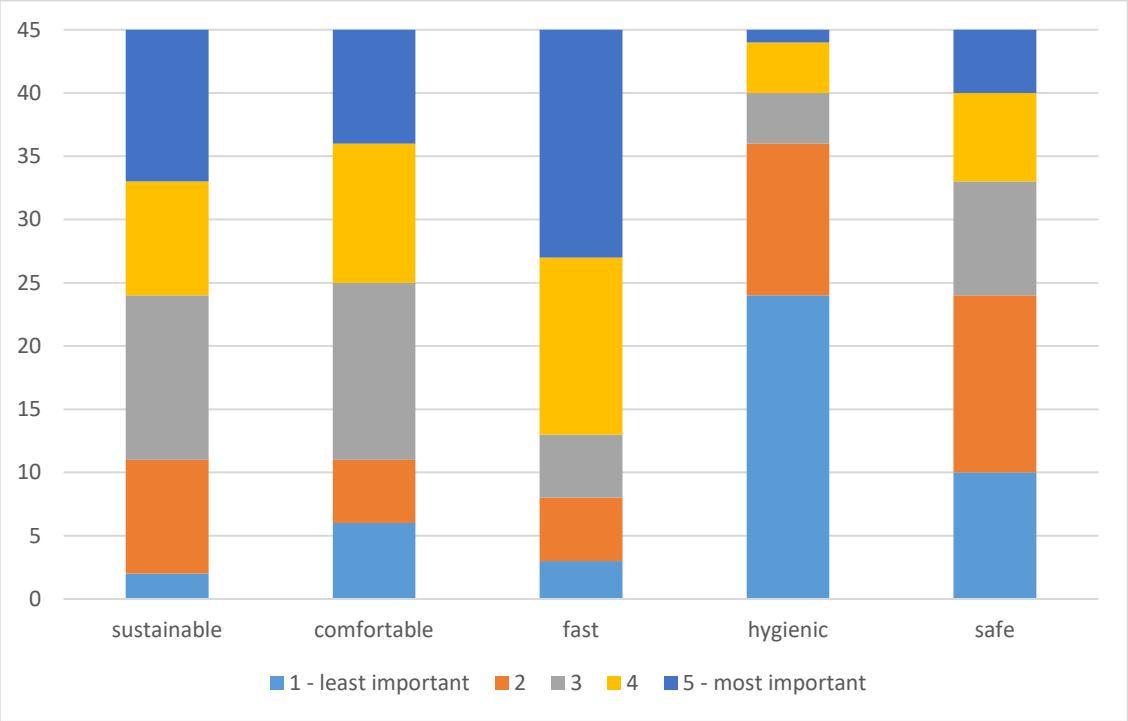

Figure 3: Important Attributes for Mode of Transport Choice in Munich

Source: own elaboration based on Munich – Mode of Transport Choice

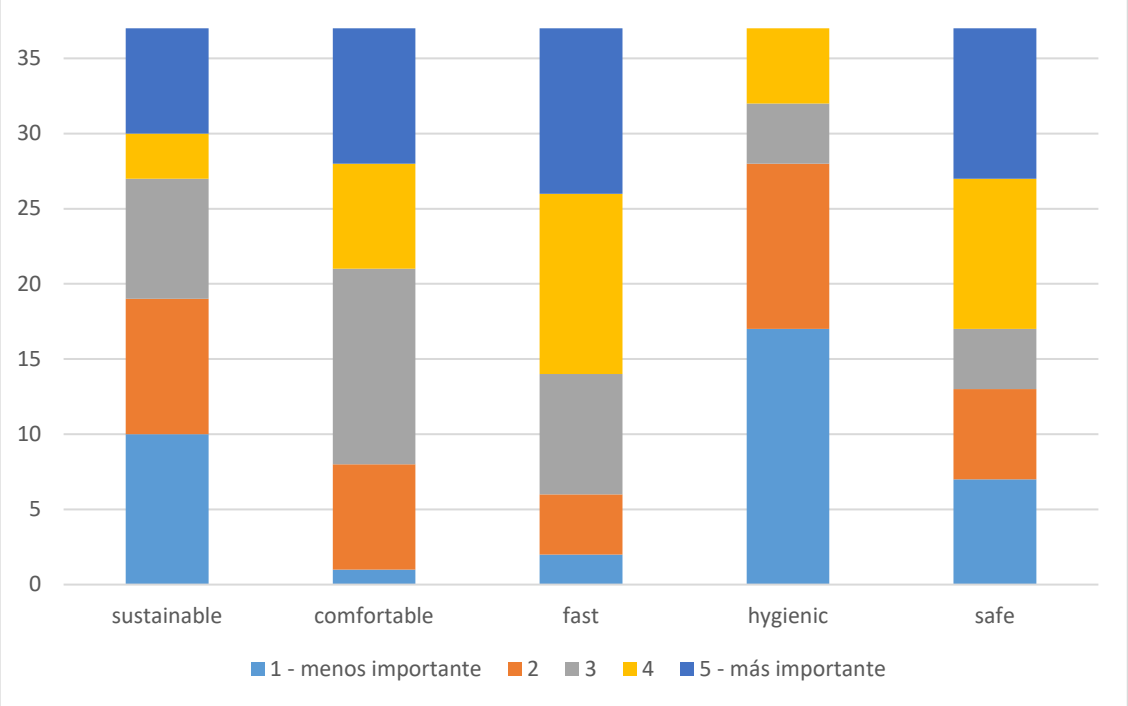

Figure 4: Important Attributes for Mode of Transport Choice in Seville

Source: own elaboration based on Seville – Mode of Transport Choice

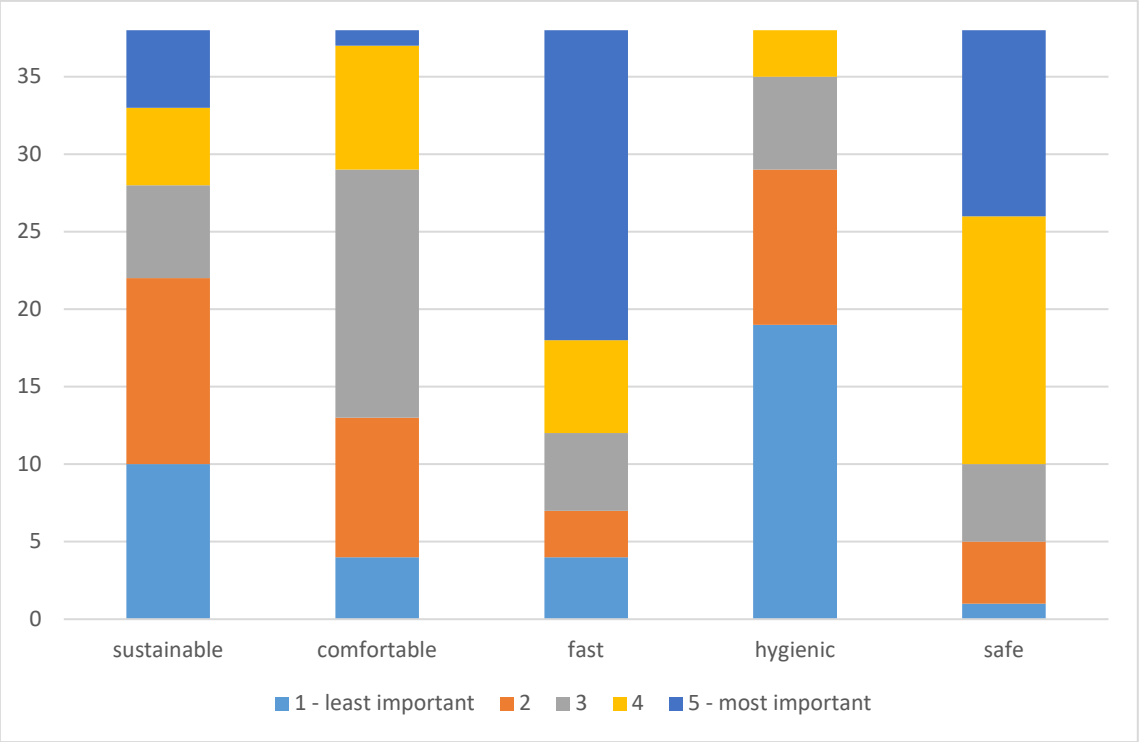

Figure 5: Important Attributes for Mode of Transport Choice in Kaohsiung

Source: own elaboration based on Kaohsiung – Mode of Transport Choice

Annex III: Information and Complementary Graphics

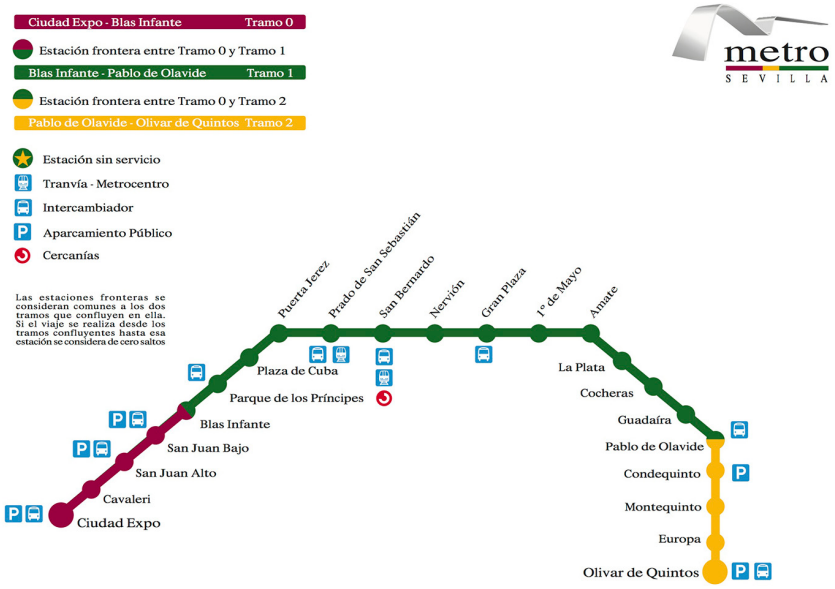

Figure 1: Plan Metro Seville

Source: Red Transporte, 2022

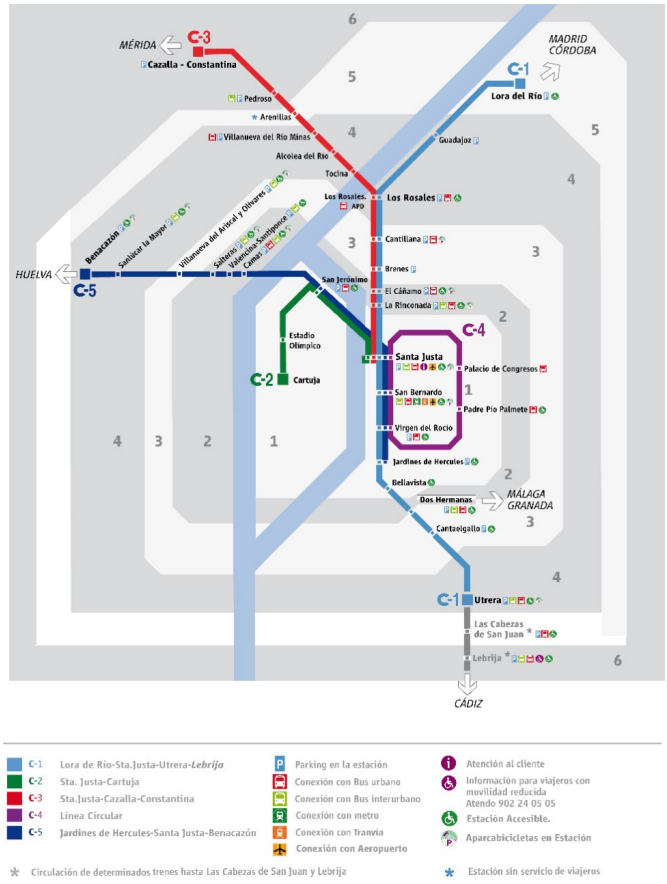

Figure 2: Plan Cercanías Seville

Source: Renfe, 2022