EVALUATING MUNICIPAL STRATEGIC PLANNING PROCESSES FOR SUSTAINABLE MOBILITY IN AN ERA OF SMART CITIES
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Acknowledgements

I would like to show my gratitude to my mentor Professor Dr. George Papageorgiou for the help and guidance in preparation of this research paper. I would also like to expand my gratitude to all those who have directly and indirectly participated in the survey and assisted in this work.
Abstract

Nowadays, active transportation and physical activity has become a major issue with respect of health-related problems. According to a number of studies done, lack of physical activity is the leading risk factor for a number of health problems such as diabetes, anxiety and other diseases that are threatening public health. Researches show that Nicosia, the Capital of Cyprus, is unfortunately among the last cities with respect to walking and cycling. Although, Cyprus has such comfortable climate conditions, the population of Cyprus has one of the lowest walkability levels in Europe. The main purpose of the present study is to examine this paradox of a low walkability level in Cyprus.

Different countries exhibit vastly different travel behavior therefore the policies applicable in some countries might not be applicable in Cyprus. This is why a study specifically for Cyprus is necessary. There is no universal approach to transport planning that will be applicable everywhere. This study is essential as Cyprus has the right physical conditions for walking and cycling, but for some reason there is lack of effective strategic planning to promote sustainable mobility and also very low investment by local governments towards implementing smart technologies to promoting active traveling.

The reasons and factors that create this low level of walkability are revealed based on a survey carried out targeting local municipalities’ decision-making processes and the attitudes of citizens on aspects of walkability and sustainable development. Two questionnaires have been developed to achieve the research objectives of this paper. The first questionnaire was given to the municipalities’ representatives questioning their strategic planning and decision-making processes for promoting walkability and sustainable mobility in Cyprus. The second questionnaire was given to collect data from the population of Cyprus to get an insight on the attitudes of
citizens regarding the factors affecting walkability, the current conditions of the walking environment they live in.

This study proves that Cyprus has extremely high proportion reliance on cars and thus does not have a proper infrastructure for walking and public transportation. Results reveal that there is an urgent need by the citizens for more walkable areas in Cyprus attractive for recreational activities and active lifestyle, however there are very little resources devoted to fulfill this need. Policy-makers, organizations and municipalities not only lack of investment in promoting active lifestyle and active mobility, but also do not have efficient communication with the citizens with respect to their satisfaction of the municipalities’ service provided and the level of environment as a walkable community. The role of Information and Communication Technologies (ICT) was assessed to be crucial. Citizens’ declare their preferences for smartphone applications as modern mean of information on aspect of walkability in their community. These tasks might be challenging for the government but the benefits for urban life will be substantial.
Chapter 1
Introduction

1.1 Background

Over the last decades, the rapid development of new technologies has changed significantly the way people live, their daily routine and environment. With the technological advancement, everything got faster: from the transfer of data through the internet to transportation itself. It became way easier to move due to massive production of cars, buses, trains and underground subway lines since multiple transportation modes are now more and more available to citizens in almost every country around the world.

This technological advancement, however, led to negative consequences for both citizens and the environment itself. The global pollution has become a major problem nowadays mainly caused by passenger vehicles and heavy duty tracks as well. Health risks of air pollution became extremely serious as poor air quality increases respiratory ailments like asthma and bronchitis, heightening the risk of life-threatening conditions like cancer, and burdens our health care system with substantial medical costs. Additionally, government officials at the local, regional and national levels are facing dramatic increases in the frequency of chronic diseases, sedentary lifestyles, obesity, depression and anxiety. Many people that suffer the greatest negative health effects relating to chronic diseases and obesity are those experiencing poverty and social disadvantage.

Physical inactivity is a major contributor to all these problems. An inactive lifestyle leads to decrease of job satisfaction and productivity. Physical activity is associated with physical and mental wellbeing, positive emotions and moods (Kull, 2002). According to the World Health Organization (WHO) (2019), physical inactivity has been identified as the fourth leading contributor to diseases globally causing an
estimated 3.2 million deaths (about 6% of the total) and 8.3 million disability-adjusted life years lost each year in the European Region. It is estimated that 30% of the burden of coronary heart disease, 27% of diabetes, 21-25% of breast and colon cancer can be attributed to physical inactivity. Therefore, it becomes an international priority to increase physical activity.

Despite the fact that countries vary greatly, two thirds of the people aged 15 years and older in the European countries are not physically active at the recommended levels (Kahlmeier, 2015). In the European Region as a whole, every fifth adult engage in little or no physical activity. The level of inactivity is even higher in the eastern part of Europe. Across Europe, only about 30 percent of the schoolchildren appear to meet physical activity guidelines (WHO, 2017). These frightening findings reflect a continuing decline in physical activity across all age groups during the last decades. The decline is mostly caused by the increased mechanization of work and daily tasks, increases in sedentary work, the use of high technology labor-saving devices and an increase in inactive leisure habits, such as watching television, continuous using a mobile phone and a computer.

However, opportunities for being physically active should not only be limited to sports and organized recreation activities. People could simply use walking for their main transportation needs. Opportunities exist everywhere – where people live, work or study. Active living does not only contribute to individual physical and mental health but also positively affects social cohesion and community well-being. Whether in a developed or developing city, nearly all trips require walking either directly to a destination or to another mode of transport. The way the pedestrian environment is maintained and provides service to these trips directly affect the overall quality and mobility, efficiency of the urban transportation network and its accessibility for citizens and visitors. A significant number of trips are made by foot,
however pedestrian infrastructure, facilities and services are often neglected in municipal strategic planning, infrastructure master plans and budgets. Unfortunately, walking and cycling are considered time consuming, tiring and even inconvenient for the reason that many countries do not have a proper infrastructure and appropriate pedestrian conditions. The way we build our cities, design the urban environment and provide access to the natural environment can either lead to great encouragement or become a great barrier to active living and increasing casual physical activity. Various barriers exist in the social environments within which people work, play, live and learn. Facing rapid rates of motorization and the need to accommodate growing congestion, cities typically make improvements in vehicular rights of way, creating roads and parking areas at the expense of pedestrians. Inadequate city planning for pedestrians may have many negative consequences when the most significant being unnecessary fatalities and injuries. According to a WHO report (2017), addressing the needs of all citizens in different areas of everyday life should be a essential for ensuring equity and comprehensiveness in efforts to promote active living. This promotion requires the involvement of all levels of government, in particular national, regional and local, with identification of their clear roles and commitments for each level.

Local governments have a central role in creating environments and opportunities to enhance active lifestyle and physical activity. City leaders and decision-makers provide leadership, legitimacy and enable the development and implementation of the relative policies towards active transportation and living for all citizens. Local strategies and plans should aim at promoting physical activity among people of all ages, in all social circumstances and in all areas of our cities. Opportunities for physical activity should be created close to where people live, together with creating safer, greener, cleaner and more activities friendly local environments. Design
elements in built environment such as street layout, recreation facilities and parks can encourage or discourage physical activity.

The evidence on the built environment and physical activity comes from two major sources. The first major source concerns studies on urban planning that primarily examine the connection between the built environment and walking and cycling as modes of transport. The second major source concerns studies on physical activity that examine the connection between the urban environment and physical activity in its broadest sense such as active transport, sports and recreational activities. Together, these indicate the importance of accessibility dependent on transport system and land-use patterns. Also design and aesthetics in promoting physical activity and active living place a major role. People participation in physical activity is influenced mostly by the built and natural environment in which they live and work. Further, the social environment and personal factors such as gender, age, ability and motivation greatly influence engaging in active mobility.

According to the “State of European Cities” report (European Commission, 2016) Nicosia, the Capital of Cyprus, is unfortunately number one city in car usage in Europe and is among the last cities with respect to walking and cycling. Even though, Cyprus has one of the most comfortable climate conditions, the population of Cyprus has one of the lowest walkability levels in Europe. More and more people of Cyprus rely on their private cars as major transportation means instead of being more physically active by walking or cycling instead.

The study presented in this dissertation examines this paradox. The reasons and factors that create this low level of walkability are revealed based on a survey carried out in Cyprus. The survey study is targeting local municipalities’ decision-making processes and the attitudes of citizens on aspects of walkability and sustainable development. This is done to evaluate planning and propose improvement of the infrastructure and pedestrians conditions of cities in Cyprus.
1.2 Research Objectives

In response to the walkability issues raised, this paper aims to:

- identify the major factors affecting walkability in Cyprus;
- assess the communication process between citizens and municipalities;
- and develop recommendations to improve city planning procedures in the context of “smart cities”.

Further on a literature review is conducted on the relevant studies regarding active transportation in different countries around the world. This is done in order to analyze the major aspects of walkability that affect the health and well-being of individuals and examine variables that influence commuters’ active transportation. The relationship between the walkability, built environment and municipalities’ planning procedures is investigated in relation to sustainable urban development.

There is little research carried out in Cyprus regarding the built environment, the decision-making process of municipalities and the communication between the municipalities and the citizens.

This paper aims to generate awareness of walkability as an important issue in Cyprus. Despite the fact that the population of Cyprus is actively participating in physical activities, such as indoor gyms, football, cross fit centers, they are far from participating in daily active transportation. Active travel defined as traveling between locations using an active mode such as walking or cycling, is one type of casual physical activity that has been declining recently but in Cyprus it is a major issue. Based on data collected via a survey questionnaire statistical analysis is further carried out to investigate this highly important issue.
1.3 Structure of the Thesis

The following chapter discusses theoretical and empirical studies on the relationship between the built environment and pedestrian satisfaction. Factors affecting walkability and the involvement of municipalities is investigated. Chapter 3 describes the present study’s context, survey questionnaire and methods used. Next chapter 4 presents the results of the survey study, which reveal city planning and citizens’ attitude towards walkability. Finally, the paper culminates with recommendations to municipalities and actions to be taken to improve planning procedures in order to promote walkability and thereby increase quality of life and the satisfaction level of the citizens.
Chapter 2
Literature review

In the last half century, walking-related topics have become a critical research area, especially for two main groups of researchers: transportation planners and urban designers. A range of methodologies and studies have been carried out to assess the pedestrian environment and give an insight to the factors that affect walkability of individuals. A lot of work has been done on the design of transportation space over the last 60 years, however pedestrian transportation and walking-related issues were mostly neglected. Previously, movement by foot or bicycle was considered mostly as recreational activities. Walking was not seriously considered by citizens as legitimate way of transportation. After introduction of Federal Highway Program’s Intermodal Surface Transportation Efficiency Acts of 1990-s (USA) there has been a major shift in transportation policy away from auto-oriented planning to assigned accommodation of the pedestrians and cycling in major federally supported transportation projects. Walking and cycling turned to be viewed as valid modes of transport and essential elements in an integrated, intermodal transportation system to provide travelers with transportation options and continuity from home to required destination (Southworth et al., 2005).

In the early 1960s, opposed to modern urban development and urban sprawl, which disregard the urban fabric, Jacobs (1961) argued in favor of rehabilitation to create vibrant and safe urban streets. Jacobs emphasized the value of mixed-use development, “eyes on the street,” and old buildings. According to Le Corbusier (1987), the street is “a machine for traffic, an apparatus for its circulation, a new organ, a construction in itself and of the utmost importance, a sort of extended workshop”. The street, as an ancient component of the built environment, not only provides accessibility and connection to different destinations in cities, but as a
public realm, it also contains a range of activities and plays a significant role in the life of cities. Handy (1996) stated that “because the pedestrian sees, hears, smells, and feels much of the surrounding environment, urban form is likely to play a greater role in the choice to walk”. The phrase that has been offered by Jane Jacobs effectively describes the importance of the street: “Think of a city and what comes to mind? Its streets. If a city's streets look interesting, the city looks interesting; if they look dull, the city looks dull” (Jacobs, 1931).

2.1 Built environment

In the early 1980s, a new term “built environment” emerged and came into widespread. Built environment was initially describing the products and processes of human creation throughout the history. In the late studies, more and more researchers started to refer to cities using the term built environment. This term can be defined in a number of ways but essentially encompasses not just the availability but also the quality of parks, green spaces, sidewalks, public spaces, zoning, traffic, drainage systems and all the other “human-made space” where people live, work, play and commute. Built environment can be described as “the sum of what we design and construct in the places we live, work, go to school and play - from the streets and highways to houses, businesses, schools and parks” (Hoehner, 2009). Also, Jacobs (1993) advocated for qualities such as similar-height buildings, transparent windows, green parks, and public spaces for recreational walking and rest as primary attributes of the “great street” when focusing on street environments. Urban design is an aspect of urban planning that focuses on creating a desirable environment for living. Conditions in the built environment can affect participation in physical activity both positively and negatively.

Built environment affects the well-being and health of the population through the safety, availability, safety, convenience and attractiveness of pedestrian and cycling
facilities, green areas, parks and playing fields and hence the tendency to take healthy exercise. Green spaces and parks provide citizens with opportunities to socialize and enjoy active recreational activities outdoors. Access to safe, freshwater lakes, rivers, sea and ocean beaches opens up a host of opportunities for swimming, sailing and other activities that attract both inhabitants and visitors to a city. The geography of the country or city (presence of hills or mountains) and its surroundings influence the type of activities that people can enjoy. Green forests and mountainous landscapes can encourage people to do hiking, explore nature, camping and do winter sports such as snowboarding, skiing and sledding.

On the other hand, urban sprawl, large shopping malls and centers on the urban outskirts and the geographical separation of living and working encourage the increase of car usage and thus reduce the opportunities for active transportation. For many years, the built environment has been largely shaped by land use and transportation factors, which in fact reflect a complex mix of decision making at both national and local levels. Across Europe, the expanding peripheral city areas exhibit a pattern of low-density, use-segregated and car-based development, which not only reduces the viability of local services but also makes walking impractical because of distance and it further deters cycling. More and more retail shops, office and even leisure parks typically rely on 90-95% car use. The segregation of land use in undermining the potential for integrated neighborhoods and local social capital. Other barriers to active living include fears about road safety, crime, pollution and transport emissions, problems with access and/or a lack of recreation and sport facilities and negative attitudes about physical activity and active transport (WHO, 2017). According to WHO (2017), traffic injuries from high vehicular speed and heavy traffic flow is a major reason why people are not keen to walk and cycle. In 2018, around 25 thousand road fatalities were reported by EU Member states. According to European Commission report (2018), within urban areas most of the
accidents account pedestrians and not car occupants having 40% of fatalities being pedestrians, 12% are cyclists and 18% power two-wheelers. This means that 70% of the total fatalities in urban areas are vulnerable road users. Outside of urban areas, this percentage is 34%. The safety of these users is a fundamental priority.

Lack of sidewalks and protected areas for walking can increase the chances of collisions involving children. Yu (2015) examined pedestrian injury severity indicating that individual characteristics, road environments and area characteristics around the crash location affect positively the pedestrian injury.

According to the WHO report (2017), car transport has increased by almost 150 percent since 1970 in European countries, travel by public transport has increased far less, whereas travel by foot and bicycle has diminished. However, even though many citizens and politicians are aware of the problems associated with urban sprawl, not much is done to improve the situation. The problems are mainly seen in air pollution, noise, traffic and road injury risks from the public health viewpoint. Crowded city centers and resurgence of urban living may make it difficult to find room for green spaces, especially regarding old, established European cities. Although some cities such as Stockholm (Sweden) and Bucharest (Romania) have access to green areas, 56% and 40% respectively, in some cities such as Torino and Prague, the share of green areas is only 20% and less (European Commission, 2018).

In many cities, cycling and walking have been marginalized in transport decision-making. Recently in the United States the federal and state governments spent $175 billion, or 6 percent of direct general spending, on highways and roads (US Local and State government finance data, Urban Institute and Brooking institution, 2016). Highways and roads were the sixth-largest source of direct general spending at the state and local level in 2016, and have been since 1996. Every year the federal government disperses just a small portion of its transportation funds — about $800 million, or less than 2 percent of the total — to states expressly to support walking
and cycling. Unfortunately, a growing number of states are opting to take Transportation Alternatives money and spend it on roads (Margo Pedroso, Safe Routes Partnership blog, 2017).

According to UK Departmental Allocation & Contribution to Cycling in 2018, the Land Transport capital budget is estimated at €1.2 billion and €1.5 billion in 2018 and 2019 respectively, this level of expenditure on cycling equates to 1.37% and 2.22% for those years – a long way from what is required to significantly impact on health, congestion, sustainability and climate change.

According to WHO (2018) estimates from both high-income, as well as low- and middle-income countries (LMICs) indicate that between 1–3% of national health care expenditures are attributable to physical inactivity. These estimates are recognized to be conservative due to limitations in available data and the exclusion of costs associated with mental health and musculoskeletal conditions. Unless there is openness on intended levels of investment, its impact on levels of cycling and a commitment to substantial funding, cycling advocates will continue to disagree.

It was suggested that a good pedestrian and cycling infrastructure can play an important role in promoting active mobility habits to citizens regardless of educational background, leisure-time and occupational physical activity (Maki-Opas, 2013). The benefits of pedestrianizing an area are very significant and were identified by a study from Soni and Soni (2016). The benefits were divided into five categories, that is transportation related, social, environmental, economic and health related. Some of the transportation related benefits are mobility and accessibility improvement, reduction in car use, congestion and parking need, road crashed and injury reduction. In their research, it was shown that pedestrian and cyclist safety structure were positively correlated with physical activity, while lack of sidewalks and streetlights were negatively correlated with physical activity. Further, Zuniga-Teran et al. (2017) suggest a “Walkability Framework” to be used as a model to
measure interactions between built environment and physical activity. The study integrates walkability categories with the two main purposes of walking, which is pleasure and transportation.

Recommendations by WHO (2018) concluded that creating or improving access to places for physical activity can result in 25% increase in the percentage of people who exercise since people easily access key destinations such as parks, green spaces, workplaces and shops. According to Southworth (2008), walkability is “the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network”.

There are many different ways to address "walkability". Some studies showed that street connectivity is statistically significantly correlated with walkability (Berrigan, 2010). More specifically, an explicit geographic approach can strengthen studies of the built environment and physical activity and specifically active transportation. This shows that connectivity is a major factor for walkability. Connectivity can be enhanced by providing the necessary information to travelers and this can be achieved by appropriate smart phone applications, social media webpages, information kiosks or guidebooks. In addition, green space and living in different travel-related urban zones can contribute to active transportation. Finally, Schwartz (2009) examines associations of the built environment surrounding worksites and of work policies with walking behaviors. Results showed that when locating sites for work premises that are walkable and when also applying some policies at the same areas, then employees become influenced to actively commute to their work more often.

Another study carried out by Center for the Built Environment and Health (2016) in Australia stated that the impact of micro-design elements such as street trees and
landscaping although more easily implemented is likely to be too small on their own
to exert any fundamental influences on travel and recreational behavior in a low
density, homogenous residential neighborhood. In contrast, the implementation of
macro urban planning features such as street connectility with sufficient residential
densities provide the foundation of walkable communities and result in more
compact neighborhoods that support the provision of neighborhood centers and
quality public open spaces. Together these are the principal underlying determinants
of walking within the neighborhood, and the most difficult to retrofit.
Overall, research on built environment shows the strong correlation between
physical activity and the infrastructure of neighborhoods. In particular, there is a
higher activity level in citizens living in communities with a large availability of
destinations within walking/cycling. Good connectivity between public transport,
pedestrian sidewalks, good infrastructure, green areas, parks, shops in the
neighborhood, educational institutes and centers - all of those affect the physical
activity of the inhabitants. Shift from automobiles to non-motorized vehicles for
short trips enhance activity mobility.

2.2 Determinants of Health

An increased number of urban planners started paying attention to the environment
as a major key determinant of health. Modern city planning has its roots in the
unhealthy industrial cities of the nineteenth century when the majority of people
suffered from various problems of sanitation, poor water supply, light and air
pollution, which led to a need of not only infrastructure engineering but also
effective urban design (Barton, 2009). The original health objectives of clean water
and air are deeply entrenched in planning and building control systems but
contemporary planning policies have facilitated the powerful trends towards car-
dependent and privatized life-styles with their negative effects on health (Plouffe, 2010).

Physical inactivity is nowadays one of the greatest challenges facing health care providers and policy makers, it leads to significant health problems, such as asthma, obesity, high blood pressure, heart disease and diabetes, which cost health care systems significant amounts of money (Brownson, 2000). The natural environment has been recognized as an important determinant of health and urban planning has been considered as a mechanism of environmental control, which influences health in systematic ways.

The relationship between active commuting and physical and mental wellbeing was also examined by Humphreys et al. (2013). The results showed that active commuting is associated with high levels of physical wellbeing. The relationship between active travel and psychological wellbeing has also been examined by Martin et al. (2014). With the use of fixed effects regression models, the study showed how travel mode choice, commuting time, and switching to active travel affected the overall psychological wellbeing. It was investigated that travel mode choice affects specific psychological symptoms. There is strong relationship between overall psychological wellbeing and active travel as well as public transport when compared to car travel. Additionally, active transportation is associated with reductions in the likelihood of experiencing some specific psychological symptoms when compared to car travel.

Positive psychological wellbeing effects should be considered in interventions when seeking to promote active travel. Mulley (2013) supports that there are important health benefits from active transport modes, for example each additional hour spent in a car per day was associated with a 6% increase in the likelihood of obesity. On the other hand, each additional hour spent on walking per day was associated with a 4% decrease in the chance of obesity. In addition, there is an association between
active transportation, recreational and total physical activity. Sahlqvist (2012) found, that adults who used active travel report significantly higher total physical activity as well as they are healthier and happier as compared to those who did not. Based on this study substantial physical activity can be accumulated through active travel. This also shows that active travel is very much associated with pre–determined factors such as willingness of people to be physically active.

Nowadays, evidence of the interconnection between the built environment through the planning process and health is steadily building. Low participation in health-enhancing activities substantially affects the overall population health. It is reported by WHO (2018) that physical inactivity causes an estimated 3.2 million deaths per year in the European Region. A loss of almost 5 million years of healthy life expectancy each year is caused by premature mortality and inactivity. In addition to the effects on human suffering, governments also deal with the financial burdens that are associated with these conditions. A recent report from UK Smart Transport (2020) estimated that the yearly cost of physical inactivity (excluding the costs of obesity) at £7.4 billion. The study made by Dr. Ding, Australia (2013), estimated global cost of physical inactivity to be in 2013 to be $67.5 billion per year in direct health care with additional $14 billion attributable to lost productivity. Inactivity accounts for 1–3% of national health care costs, although this excludes costs associated with mental health and musculoskeletal conditions. According to the research done by WHO (2016) the estimated health care costs for unhealthy diets ranged from €3.5 per capita in China to €63 in Australia and €156 in the United Kingdom. For low physical activity, the estimated annual per capita health care costs ranged from €3 in the Czech Republic to €48 in Canada.

Alternatively, a United States study (2018) shows that physically active people have lower annual direct medical costs opposite to inactive people and concluded that an increase in regular daily physical activities among inactive adults might lead to a
reduction of annual national direct medical costs by billions of dollars. Employers also benefit if its workforce is physically active since it this can lead to reductions in absenteeism and as a result increased productivity.

Along with dietary changes, declining participation in physical activity has always been a leading contributor to high levels of obesity in Europe over the last decades. In some countries, more than half of the adults are overweight. It was reported that more than 14 million children in the European Union are overweight, of which 3 million are obese. The number of overweight or obese young children and infants (aged 0 to 5 years) increased dramatically from 32 million globally in 1990 to 41 million in 2016 (WHO, 2016).

WHO Healthy Urban Planning (WHO HUP) initiative was borne out of the growing conviction that urban planning should be related to the activities that influence determinants of health. The survey by WHO (2016) found that regular cooperation between health agencies and strategic planning departments occurred in only 25% of the decision-making process cases. Nearly 30% of the planning heads officials considered that planning policies were actually incompatible with health. This especially applied to zoning and design. Anti-health issues highlighted also were focus on private profit with lack of attention to the everyday needs of citizens and excessive levels of motorized traffic (Barton, 2009). As the relationships between health and urban planning were more deeply explored, urban planners around Europe emphasized the need to address environmental, social and economic issues in a coordinated way. The issues in quality of life, well-being and health in cities were reconsidered.

Sustrans (2007), a national charitable group promoting active transport in the United Kingdom, has introduced a guide for health care organizations on how to promote healthy travel for staff and visitors. The guide starts with promotion of walking and cycling and then public transport and finally car travel. As a rule of thumb, the
distance up to 3 kilometers is considered as walkable for many people and a distance up to about 8 kilometers is reasonable to cycle. They also encourage choosing venues and rooms according to healthy travel as well as access to people with disabilities. In this light, it is clear that human well-being and health are seen as fundamental targets of urban planning. The WHO HUP (2016) emphasized the importance of a health-integrated spatial plan to be presented which involves the wider community in these issues. Community empowerment activities and overall neighborhood regeneration have provided an important vehicle for implementing the health-oriented goals of the general municipal plan. Healthy cities should make a collective approach to promote and integrate health into a wide range of local, regional and national policies and projects. Such tools as quality of life matrix and strategic environmental assessment were developed by WHO HUP to assist this process.

2.3 Factors Affecting Physical Activity

There are several individual determinants which influence participation in physical activity such as sex, gender, age, ability or disability, personal beliefs, attitudes and motivation. The main barriers include a perceived lack of time, lack of motivation and concerns about safety and security. Cities became interesting and dynamic places, but also noisy, polluted, difficult to navigate, isolating, and crime ridden. More than 55% of the world’s population live in cities and this figure is estimated to increase substantially in the coming years (United Nations Department of Economic and Social Affairs (UN DESA), 2018). Modern cities offer the best options for housing, education, employment, social interaction and cultural and leisure activity and are considered to be a key to future sustainable development according to the UN’s Sustainable Development Goals. Further, there is an emphasis on road safety, transportation, air quality and accessible green and public places as well as health and wellbeing.
Addressing these barriers is critical in order for people to engage in physical activity. For instance, if residents believe that a cycle lane or a path is dangerous, they are keen not to use it. On the other hand, factors which positively associated with active living include self-efficacy, a belief in one’s own ability to be active, pleasure and an expectation of benefits. It is noted that incidental foot and bike trips are affected by a number of geographical variables such as density, distance, form and layout. Recreational activity is influenced by the accessibility of parks and other amenities, the provision of pavements and bikeways and the perceived aesthetic quality of the neighborhood (Handy, 2005).

Government policy and planning initiatives determine the way cities and towns are developed and therefore play a vital role in shaping the neighborhoods where residents can safely and conveniently be physically active. According to studies on commuter satisfaction, there is a higher level of satisfaction for pedestrians and cyclists but also train commuters are significantly more satisfied than drivers and bus and metro users (Louis, 2014). The choice of transportation mode is depended on weather conditions. When weather conditions are good people prefer to walk or to bike, but when weather conditions are adverse then people tend to use their cars or public transport (Louis, 2014). Except from weather, other factors that affect the choice of transportation mode is efficiency and flexibility (Simsekoglu, 2015). The ones who want to be more efficient and flexible choose to commute by car. On the other hand, those who prioritize safety and comfort prefer to use the public transport. Also, high risk perception is related to car use. Further, Loong et al. (2017), shows that commuters who use their car should revisit their choice as they bound to experience low levels of punctuality. This is contrary to their intuition that car mode of transport will give them higher efficiency. Furthermore, the choice and decisions of commuters is shaped by the constantly changing and fluid nature of commuters’ social activity.
Pedestrian-friendly neighborhoods with nearby destinations and services encourage its citizens to walk and decrease car dependence, thereby contribute to active and healthy communities. Proximity to key destinations and services is an important aspect of the urban design decision-making process, in particular in the areas that adopt a transit-oriented development approach to urban planning, whereby densification occurs within walking distance of transit nodes.

The social environment includes several dimensions that have an influence on participation in physical activity. These dimensions include socioeconomic status and equity. Socioeconomic status is inversely correlated with the participation in leisure-time physical activity, which according to Stalsberg (2018) can be explained by people with low income having less discretionary time and less access to exercise facilities and green spaces. Culture directly influences attitudes and beliefs about who should be active and the types of physical activity that are appropriate for different age groups and sexes. More active people tend to have more social support and encouragement of family and friends, co-workers and others.

Also, physical activity provides opportunities to enhance social cohesion in neighborhoods, cities and regions. The Council of Europe defines social cohesion as “the capacity of a society to ensure the welfare of all its members, minimizing disparities and avoiding polarization” (2010). The natural environment in and around the city also directly influences participation in physical activity. Weather, especially extreme heat or cold and icy conditions, constrains participation in outdoor activities such as walking, cycling or playing at the park. Poor air quality makes being active outdoors more difficult (Public Health England, 2019).

A specific issue is how the physical design of many neighborhoods has increasingly been seen as detrimental to social interactions, civic participation or community engagement (Semenza, 2009). This is important because reduced community engagement is linked to poorer health, including chronic non-communicable disease
and mental health issues (Harraka, 2002). Social and community ties are key components of a more encompassing concept of social capital, which is described as the social networks and interactions that inspire trust and reciprocity among citizens. Within the literature, there is a myriad of terms used to discuss concepts similar or related to community engagement. For instance, civic engagement is often discussed as a form of community development that has political inclinations (Semenza, 2009). For the purposes of this review, we define community engagement as the ability of a group or network of people, bound either by interest or by geography, to interact with one another for support, to promote inclusivity and to organize social activities. Community engagement can be seen as a social determinant that influences the health of individuals. Higher community engagement within neighborhoods can be linked to better physical and mental health of the community (WHO, 2017). Social safety network and social inclusion are specific, documented social determinants of health that mutually influence community engagement and interaction (Mikkonen, 2010). Community engagement is often discussed within the context of social capital. Social capital can be defined as the social interactions, networks and relations that underlie perceived trust, reciprocity and action.

People tied to locality, the decline in local facilities, reduction in pedestrian movement and neighborly street life, all of these reduce opportunities for the supportive social contacts which are so vital for healthy well-being. A growing number of researchers agree that social networks and community involvement have positive health consequences. Persons that are socially engaged with the others and actively involved in their communities tend to live longer and be healthier physically and mentally. They are also more likely to trust or to think kindly of others. Social capital has been found to be linked not to just good health but also proper functioning of democracy, prevention of crime and enhanced economic development (Erikkson, 2011). Studies show that there is correlation between the built environment and the
degree to which people are involved in their communities and with each other (Carlson, 2012).

It was further shown that neighbourhoods, which are more traditional, typically found in the older rural towns, are walkable, enable residents to perform daily activities, like grocery shopping and taking children to school, without use of the car. Many of these neighbourhoods have places of worship, local taverns, coffee shops and restaurants within walking distance. These type of neighbourhoods encourage walking since the pedestrians are not enforced to compete with cars in traffic on the highway or walk across expensive parking lots. According to the research made, people living in traditional neighbourhoods tend to walk 2.5 times more than those from modern areas of the city (Li, 2018). Also being able to walk in the community makes pedestrians feel engaged with the society.

Today’s version of the neighborhood though contains only houses and daily needs are no longer met in the area. They are instantly fulfilled in the megastores in malls. Unfortunately if the residents want to shop, they must travel by car. Many suburban neighbourhoods do not even have sidewalks and citizens need to drive to find a place to exercise or to go for a walk. Social capital is built through communication via invitation or chance encounter which makes life to take place only within the home and therefore does not encourage social capital. There is a trend of building car-dependent subdivisions which not just the fault of developers but the whole governmental planning process. Change in this trend requires political will and shift in land use and transportation priorities and policies.

Studies reveal that gender, car ownership and journey distance have the largest effect on the use of non-motorized transport, whereas manual related professions and families with children experience the lowest likelihood of non-motorized commuting. Also, cycling is the most preferable commuting mode and specifically three times more likely to be chosen by males (Lawson et.al., 2013). Similarly,
Mathews (2009) supports that there are significant differences among race, sex and age when it comes to be physically active as well as the type, location, and purpose of activity. In their study, they concluded that men engage in pedestrian activity for going to work while women were more likely to walk for escorting their children to school and running errands and for shopping. Further, Yang (2012) through their study for identifying the association between time spent in active commuting, support that men are using bicycles more than women. Greater active commuting leads to higher levels of moderate to vigorous physical activity mostly for women. Age also plays an important role for being active since young people tend to walk more and use their bikes more than older people (Richard, 2017). A study by Hallal (2012) shows that a large percentage of 95% of adults are physically inactive. Women and boys are more active than men and girls. Also, inactivity rises with age and is increased in high-income countries.

Another factor that influences active transportation is the population-level patterns. Based on spatial estimates of bicycle and pedestrian traffic it has been shown that travel correlates with street functional class and proximity to high traffic roads. Also, it is seen that the highest rates of active travel are in neighborhoods with high levels of population density, land use mix, open space, and retail area (Buehler, 2018). Therefore, it is recommended that walking and bicycling can be enhanced through infrastructures development and built environment enhancements as well as workplace programs.

2.4 The role of municipalities

According to a study performed by the institutions participating in the Center for Disease Control and Prevention-funded Physical Activity Policy Research Network, it was identified that the main barriers to the consideration of physical activity are related to community design and layout decisions as reported by the municipal
The study also explored the differences in these barriers among municipal decision makers representing a wide range of departments and job functions in a geographically diverse sample (CDC, 2004).

According to research carried out by Journal of public health management and practice (Goins, Karin Valentine et al., 2013), the most commonly reported barrier to consider physical activity in the community design and layout decision making process was the lack of will (23.5%), followed by the limited staff (20.4%), lack of collaboration across municipality departments (16.2%), business community opposition (14.6%) and resident opposition (10.2%).

Given the recommendations regarding the improvement of land use and transportation processes to increase physical activity and reduce overweight and obesity, it was noted how crucial it is to build collaboration between officials of municipalities (Zwald et al., 2017). Internal barriers such as political will, collaboration, lack of staff were perceived to be greater barriers than external opposition across job positions. Health professionals were keener to point internal barriers compared to professionals of other positions.

In a study carried out by Guldbrandsson (2009) the results of investigation of the municipalities programs on promotion of physical activity and healthy eating habits by structural measures showed that there is a lack of agreement between what was reported in the contents of local policies and plan of actions and what was actually found when the research was carried out. The study analyzed the structural variables that include municipal measures towards motivating children and teenagers to be more physically active and develop healthy eating habits. In the study, variables were divided into four question groups – political, economic, physical and socio-cultural environments. The political environment did not seem to be related to measures implemented in municipalities and town communities towards promoting physical activity and healthy eating habits among schoolchildren. However,
statistical significant correlation appeared between the socio-cultural environment and the physical environment. This could imply that in municipalities where public officials and politicians have a positive attitude to physical activity and health promotion, more and better measures are taken to invest in physical environment. The main finding of this study showed that official policy documents and municipalities’ plans of action aiming to promote physical activity and healthy eating habits among schoolchildren did not seem to be connected to the ongoing health-promoting measures (Guldbrandsson, 2009). A similar study was held in USA (Zwald et al., 2017) regarding municipal officials’ attitudes, behaviors and beliefs with respect to public policies related to built environment and promotion of physical activity. According to this study, government officials’ perceived importance of economic development in their day-to-day job responsibilities and support from residents to address economic development were strongly related to their participation in municipal transportation policies. A positive correlation between increased investment in transportation infrastructure and economic development was demonstrated over the last years. Individuals and organizations who are working towards implementing municipal transportation policies in order to encourage walking and bicycling may need to express messages on how these policies can affect communities differently, from a transportation and health lens to an economic one. Perceived importance of traffic congestion in their day-to-day job responsibilities was also strongly related to officials’ involvement in a municipal transportation policy. It was found that traffic congestion was an important motivation for adopting land use policies among local planning officials. Importance of health topics, such as lack of physical activity and overall decrease in public health, were not as influential in municipal officials’ transportation policy participation. However, local policy strategies supportive of active transportation infrastructure and public
transportation improvements, transportation pricing reforms, and transportation demand management can help reduce traffic congestion, as well as impact health outcomes. Therefore, it was concluded that more appropriate collaboration and advocacy at the local level may be addressing traffic congestion.

Both public health and transportation professionals should examine ways to translate evidence that demonstrates a positive relationship between transportation improvements, economic development and reduced traffic into effective and convincing messages for these audiences. Public health professionals play a significant role in communicating transportation policies that support physical activity, and mainly the impacts of these policies, to local policymakers. This includes developing and implementing strategies to expand the knowledge of local decision makers and support transportation policies that encourage physical activity; establishing and maintaining relationships with local municipalities, the media, and other stakeholder groups that are engaged in related policies (Zwald et al, 2017).

It was also found that departments’ collaborations and partnerships are an important aspect of participation in a transportation policy by municipal officials. In the recent study (The Future of Mobility, 2019), individuals that perceived a lack of collaboration among departments as a challenge were significantly less likely to be involved in the development, adoption, or implementation of a transportation policy. The research emphasized the importance of coordination among government agencies to support the successful implementation of local policies promoting physical activity, suggesting it can save funds and create more opportunities for physical activity.

2.5 Conclusion

Chapters 1 and 2 highlighted the importance and challenges of municipal strategic planning for promoting walkability, physical activity, health, quality of life,
productivity, sustainable economic development. There is a clear issue raised with respect to the major physical diseases, mental health problems, safety and well as environmental concerns caused by inappropriate cities’ infrastructures, cars dependency and as a result physical inactivity. Built environment, as a sum of everything that surrounds us in our everyday life, what we design around us where we live and work, affects our well-being and health through the availability and convenience of pedestrian facilities. Green spaces and parks do not only provide citizens with attractive surroundings but also give us the opportunities to socialize and have activities outdoors.

However, one of the barriers identified during the study is the fear of crime and road safety, pollution and negative attitudes about active transport. Many researches showed that traffic injuries and heavy traffic flow are the reason why people are not quite fond of walking and cycling. Another factor affecting walkability is pedestrian-friendly neighborhoods people live in, with proximal destinations and all the necessary services in place that encourage walking and therefore decrease car dependence. However, today neighborhoods only contain houses where daily needs can no longer be met without usage of the car.

Government innovations and attempts to improve walkability over the last years was often hampered by path dependency – old infrastructure, fixed capital and inherited working practices – which makes it harder to tackle problems (Divall et al., 2016). The future of today’s challenges such as congestion, urban disparities and pollution depends on the policy choices made. It also is shaped through changing travel behaviors and mentality by implementing of new technologies, among others. These actions combined may shape the public’s relationship with data, technology and transport, and their appetite for and acceptance of technology options. Active transport is vital. It is important for social cohesion, health and wellbeing as it allows for personal choice, freedom and access to opportunities.
Walkability in Cyprus as shown in the literature review is at the lowest levels as compared to other European countries. Despite this finding research done to analyze this problem situation is very limited. Therefore, it becomes necessary to carry out a study on municipal strategic planning for promoting walkability with respect to: citizens’ attitudes towards active transportation; governmental decision-making process; changes to be made to the infrastructure of the cities to improve the current situation in the context of today’s technological advancement with the concept of smart cities.

Different countries exhibit vastly different travel behavior, even similar-sized towns can have highly contrasting travel behaviors and needs, therefore the policies applicable in some countries might not be applicable in Cyprus. This is why a study specifically for Cyprus is necessary. There is no universal approach to transport planning that will be applicable everywhere. Thus, a study in Cyprus is important to capture the differences in the perception of people and municipal managers towards planning for active traveling. Further, this study is essential as Cyprus has the right physical conditions for walking and cycling, but for some reason there is lack of effective strategic planning to promote sustainable mobility and also very low investment by local governments towards implementing smart technologies to promoting active traveling. The present study aims at evaluating the current situation and revealing any barriers to effective strategic planning for sustainable mobility.
3.1 Questionnaires

Although there are numerous studies on walkability, not enough research has been carried out regarding the strategic planning process of municipalities for promoting walkability and sustainable mobility. Especially in Cyprus very little has been done in this area and the problem with walkability and sustainable mobility is huge. In this study a survey was carried out on municipalities in Cyprus as well as citizens to collect the primary data via questionnaires. Two questionnaires have been developed to achieve the research objectives of this paper. The first questionnaire was given to the municipalities’ representatives questioning their strategic planning and decision-making processes for promoting walkability and sustainable mobility in Cyprus. Also, an assessment of the city infrastructure for sustainable mobility is carried out through the survey. The questionnaire was distributed to a representative sample of 30 municipalities of various districts of Cyprus with the population on average of 6,000 people. The questions given to the municipalities were evaluating the importance of walkability in Cyprus as well as the actions taken by municipalities towards implementing plans for sustainable mobility. This would include events taken place to promote walkability, investments in the infrastructure of the country and means of information used by each municipality to spread awareness on walking areas in Cyprus. The survey also addressed issues of technology towards the vision of a smart city.

The second questionnaire was given to collect data from the population of Cyprus to get an insight on the attitudes of citizens regarding the factors affecting walkability, the current conditions of the walking environment they live in. A multi-dimensional questionnaire with likert-scale questions was employed with the use of
Google Forms platform. Questionnaires were distributed to citizens as well as foreigners living in Cyprus of different social class, position, age group and gender. Then, questions were asked on traveling habits regarding the mode of transportation (car, bus, motorbike, bicycle or walking). Further, the importance citizens assign on the various walkability factors and their satisfaction level of the pedestrian conditions and the level of service provided in Cyprus was drawn via the survey. Finally, citizens were asked about possible improvements of the pedestrian network. The questionnaire was answered by 160 respondents from various classes who were selected randomly from our sampling frame. The respondents were made sure to have enough time to answer the questions and clarifications were also provided when necessary in a non-leading manner. The questionnaires are presented in Appendix I and Appendix II of this thesis.

Because the overall aim of this paper is to identify the factors which would increase walkability in Cyprus, our analyses tested the following hypotheses:

**Hypothesis 1.** There are significant differences between municipalities’ perception and citizens’ on the variety of issues regarding walkability

**Hypothesis 2.** Lack of available information on walkable areas is considered as a significant factor related to low walkability of the citizens in Cyprus

**Hypothesis 3.** There is little implementation of technologies with respect to available information on walkable areas for the purpose of improvement of walkability in Cyprus

**Hypothesis 4.** There is little analysis made by municipalities with respect to the level of service that the walkable environment provides to citizens

**Hypothesis 5.** Lack of local and central funding to develop a pedestrian networks is considered to be a major barrier for providing a better pedestrian environment in cities of Cyprus and affects the overall investments in the development of walkable communities
**Hypothesis 6.** There is a strong correlation between the perceived importance of walkability and investments in the development of the relevant infrastructure

**Hypothesis 7.** There is lack of adequate planning for promoting sustainable mobility in Cyprus

The collected data from both questionnaires was statistically analyzed using IBM SPSS and Microsoft Excel and the results are presented in the next section.
Chapter 4
Results

4.1 Results

This section presents the main results from two surveys carried out in Cyprus. More detailed analysis of the collected data is presented in the Appendix III and IV. Overall, we see that Cyprus does not have high quality of service regarding walking areas and therefore has low level of walkability. As shown in figure 1 more than 80% of the population walk less than 1 hour on average per day which is an extremely low indicator in respect of walkability.

Graph 1. How much do you spend walking (minutes) on average per day

As shown in figure 2 almost 100% of the governmental officials consider walking and cycling important in Cyprus, however as shown in figure 3 only 60% of municipalities consider themselves to be a walkable community. It is encouraging that municipal officials consider walking as an important transport mode, on the other hand for some reason they do not plan for it as required.
From the viewpoint of people, more than 60% of citizens believe that walking is important in Cyprus (figure 4), however only 35% of the citizens consider their municipality a walkable community whereas the other 32% of respondents were negative about this statement (figure 5).
The above results prove the stated hypothesis that municipalities tend to evaluate themselves as walkable environments whereas citizens are not as happy with the surrounding areas as then would want to be.

Graph 4. I consider walking/cycling important in Cyprus (by gender)

Graph 5. I consider my municipality a walkable community (by age group)
As shown in figures in 6 and 7, only 22% of the citizens stated to be satisfied with the quality of the pedestrian networks in their municipalities, whereas, while, more than 40% of the citizens were believed to be satisfied by the pedestrian network according to the views of the government officials. Results in table 1 below show that older generation (36-59 years old) does not consider their municipality as walkable community in contrast to the younger respondents. This can be explained by the need of older people in places to walk for improving their physical fitness as well as walk their children to school, whereas younger people do prefer to use a car in most occasions. Older group of respondents also showed higher interest in the use of a smartphone application that provides information on the walking conditions in the city.

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-59</td>
<td>11</td>
<td>2.45</td>
<td>1.036</td>
<td>.312</td>
</tr>
<tr>
<td>20-35</td>
<td>141</td>
<td>3.09</td>
<td>1.118</td>
<td>.094</td>
</tr>
<tr>
<td>36-59</td>
<td>11</td>
<td>4.18</td>
<td>.982</td>
<td>.296</td>
</tr>
<tr>
<td>20-35</td>
<td>141</td>
<td>3.48</td>
<td>1.280</td>
<td>.108</td>
</tr>
</tbody>
</table>

Table 1. Average response by the age groups
Graph 6. How satisfied are you with the quality of the pedestrian network of your municipalities

Graph 7. How satisfied do you think the citizens are with the quality of the pedestrian network of your municipality?

Despite the fact that many municipalities considered themselves quite walkable environments, there was a positive correlation identified between being a walkable
environment and often incidents of having cars being parked on the pavements (0.44) and driving on the sideways (0.21) (graph 8,9). These results clearly show that municipalities may be overseeing such important factors of walkable community as safety and obstacles. Cars being parked and driving on the sideways may affect the overall satisfaction of the environment by the citizens and therefore lead to the disagreement between the citizens and the municipalities.

Graph 8. Correlation between municipalities being walkable environment and incidents of parking of sidewalks
These results show that there is a clear disparity in the assessment of the pedestrian networks in Cyprus by government representatives and the citizens themselves. This shows that there is a possible lack of communication between the two groups. One of the reasons for this disparity may be lack of assessment procedures and consideration of citizens satisfaction. According to the results of the questionnaires with municipalities, only half the respondents agreed to be having a formal procedure for assessment of walkable conditions in their community and only 25% of the sample performs the assessment on a monthly basis. More that 50% of municipality respondents do not have a formal procedure in place for assessment of the citizens’ satisfaction of municipality services and more than 60% of municipalities do not perform a formal assessment of the citizens’ satisfaction regarding the walkable environment. Only 20% perform these assessments on a monthly basis.

However, the survey showed that 80% of government officials give high importance to pedestrian networks in the development master plans. Further, the majority of the
municipalities are planning to increase their investments in developing the pedestrian networks in the future in comparison with the current actual expenditures as shown in figure 10. The Chi squared-test in the table 2 below shows that there is a significant correlation between the importance of the pedestrian planning in the master plan and the level of funding/ resources devoted to the walkable infrastructure development. According to the results of the correlation analysis shown in the figure 11 and 12, there is a noticeable correlation between how important municipalities consider walking and cycling within the master plan and the respective assessment of the communities in terms of being a walkable community (0.40) and the level of funding and resources devoted to the pedestrian infrastructure planning (0.45).

![Graph 10](image-url)  
Graph 10. How much did you invest in developing pedestrian infrastructure this year / planning to invest next year
Graph 11. Correlation between municipal funding/ resources devoted to pedestrian planning and importance of cycling/walking in the municipality

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>43,362*a</td>
<td>15</td>
<td>.000</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>28,217</td>
<td>15</td>
<td>.020</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>5,815</td>
<td>1</td>
<td>.016</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 23 cells (95.8%) have expected count less than 5. The minimum expected count is .07.

Table 2. Interdependence between the importance of pedestrian networks in the master plan and level municipal funding/ resources devoted to pedestrian planning
Graph 12. Correlation between municipal funding/resources devoted to pedestrian planning and importance of cycling/walking in the municipality

The table below also shows that the higher importance is given to the pedestrian networks planning within the city master plan, the higher it is believed the satisfaction by the citizens.

<table>
<thead>
<tr>
<th>How much importance do you give to pedestrian networks development within the city master plan or transportation plan</th>
<th>Average of How satisfied do you think the citizens are with the quality of the pedestrian network of your municipality?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2.000</td>
</tr>
<tr>
<td>3</td>
<td>4.000</td>
</tr>
<tr>
<td>4</td>
<td>2.889</td>
</tr>
<tr>
<td>5</td>
<td>3.824</td>
</tr>
</tbody>
</table>

Table 3. Correlation between the importance of pedestrian network within the master plan and the level of satisfaction
Although the officials stated that it is important to invest in the pedestrian networks, according to the figure 1, only 10% of representatives believe there are no funds devoted to pedestrian planning, 27% assessed the funding as insufficient to provide a high-quality service and 15% believe the funds are enough only for a short period of time. Only 30% assessed that the investments are enough to sustain a high quality service in the long term.

Graph 13. Degree of municipal funding and resourcing devoted to pedestrian planning

According to the results, lack of central government funding is considered a major barrier for improving the walking conditions in the municipalities. Analysis also shows that the above-mentioned barrier is stated as the main issue by the municipalities that invest the least in the pedestrian networks (graph 14, table 4).
Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>31.472a</td>
<td>15</td>
<td>.008</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>27.931</td>
<td>15</td>
<td>.022</td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>.397</td>
<td>1</td>
<td>.529</td>
</tr>
</tbody>
</table>

N of Valid Cases 30

a. 24 cells (100.0%) have expected count less than 5. The minimum expected count is .07.

Table 4. Interdependence between lack of central funding as a barrier and level municipal funding/resources devoted to pedestrian planning.

Graph 14. Correlation between investments in pedestrian networks and lack of central funding as a barrier.

Further 95% of municipalities surveyed never participated in any European projects for promoting walkability via improving the pedestrian network. These results raise a concern in respect to the allocation of the municipalities’ budget, lack of
investments in the pedestrian infrastructure in the communities and lack of communication between local municipalities and central government of Cyprus. Not only municipalities do not get enough funding, more than 60% of the municipalities’ admitted that there are no events in their community to promote walking and cycling. The remaining respondents do hold cycling events and marathons on an annual basis only.

The results of the survey also showed that 22% of municipalities do not provide information to their citizens through any communication channel, whereas 35% use the website or provide information through social media such as Facebook, Instagram, etc. Only 5% provide information through smartphone applications and 3% provide information through the info kiosks as shown in figure 15.

The results of the citizens questionnaire show a higher tendency for people to obtain information easy and fast via applications on the mobile devices (23%). However the most preferable means of information was assessed to be social networks (32%) which are easy accessible through the smartphone as well as shown in figure 13.

The table 5 below show that there is a highest interest in the features of the smartphone application such as information on walking areas, shopping stores and centers in the area, connectivity with public transport mostly by the older respondents.
### Group Statistics

<table>
<thead>
<tr>
<th>Information</th>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on walking parks</td>
<td>20-35</td>
<td>141</td>
<td>4.19</td>
<td>0.978</td>
<td>0.082</td>
</tr>
<tr>
<td></td>
<td>36-59</td>
<td>11</td>
<td>4.45</td>
<td>0.820</td>
<td>0.247</td>
</tr>
<tr>
<td>Events held in the nearby areas</td>
<td>20-35</td>
<td>141</td>
<td>4.18</td>
<td>0.891</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td>36-59</td>
<td>11</td>
<td>4.27</td>
<td>0.786</td>
<td>0.237</td>
</tr>
<tr>
<td>Information on available cafes/restaurants (open</td>
<td>20-35</td>
<td>140</td>
<td>4.21</td>
<td>1.016</td>
<td>0.086</td>
</tr>
<tr>
<td>hours)</td>
<td>36-59</td>
<td>11</td>
<td>4.18</td>
<td>1.079</td>
<td>0.325</td>
</tr>
<tr>
<td>Information on shopping stores/centers (open</td>
<td>20-35</td>
<td>141</td>
<td>3.99</td>
<td>1.140</td>
<td>0.096</td>
</tr>
<tr>
<td>hours)</td>
<td>36-59</td>
<td>11</td>
<td>4.36</td>
<td>0.809</td>
<td>0.244</td>
</tr>
<tr>
<td>Connectivity with public transportation</td>
<td>20-35</td>
<td>141</td>
<td>4.25</td>
<td>1.036</td>
<td>0.087</td>
</tr>
<tr>
<td></td>
<td>36-59</td>
<td>11</td>
<td>4.55</td>
<td>0.688</td>
<td>0.207</td>
</tr>
<tr>
<td>Information on nearby public restrooms</td>
<td>20-35</td>
<td>139</td>
<td>3.78</td>
<td>1.216</td>
<td>0.103</td>
</tr>
<tr>
<td></td>
<td>36-59</td>
<td>11</td>
<td>4.36</td>
<td>0.809</td>
<td>0.244</td>
</tr>
</tbody>
</table>

Table 5. Average response by the age groups

Graph 15. Which means municipalities use to provide information on walkable areas within the city
More than 55% of the citizens admitted to be interested in the mobile applications to facilitate walking, finding features such as information on parks (80%), connectivity with public transport (80%), alternative walking routes (74%), information on nearby events (80%), information on available cafes/restaurants (75%) and shopping stores (72%) important. This gap between the responses of the citizens and municipalities in respect of the mobile application and a high level of interest by citizens indicate the need for improvement and opportunities for growth. Government officials confirmed that more than 70% of the habitants in their municipalities use cars and only 15% are actually walking. Around 8% use motorbikes and only 3% use buses or use bicycles. This extremely high proportion reliance on cars not only indicate that Cyprus may not have a proper infrastructure
for walking and public transportation but also indicates a possible threat for a high level of air pollution.

Citizens demand available walking areas (47%), better pavement conditions (35%) and higher fines for illegal parking (10%). This would motivate the habitants to move towards walking more instead of using cars. Most of the municipalities agreed that parking on the sidewalks often happens in their municipalities (20%).

The analysis of the questionnaires shows that Cyprus is currently indeed not a walkable friendly environment and there is a great need for the government to address the issue of a low walkability index. The major areas of focus should be an improved budgeting process with higher investments in improving pedestrian networks. The communication between the citizens and the local governments is assessed to be very weak and an active interaction is required in order for the government to obtain feedback and take actions towards satisfying the needs of its people. The communication with citizens can help municipalities to understand the needs of their habitants and organize events which would assist to create awareness.

A fast speeding development of technologies also require municipalities to be up to date and provide citizens with the necessary information via the most used social platforms and mobile applications. As shown in this study, local municipalities are also lacking communication and support from the central government with respect to creating environments and opportunities, which would enhance physical activity and an active lifestyle. Local strategies and plans do not include enough actions for promoting physical activity. Budgeting seems to be insufficient to support the improvement of infrastructure in the long term. There is a need and room for development of better communication between citizens and municipalities and information to be given on the status of the pedestrian conditions.
Chapter 5
Conclusion

Physical inactivity is considered to be one of the leading issues nowadays in many European cities since it is identified as a leading contributor to the global diseases causing significant amount of deaths. Cyprus is among the lowest countries ranked with respect to walkability in Europe. Therefore, it is crucial to address the needs of citizens in different settings of their daily life and make ensuring equity and comprehensiveness in efforts to promote active lifestyle a priority. The results of the presented study verified that Cyprus is not considered to be a very walkable country neither by the citizens nor by the municipalities themselves. There is a lack of investments by the government towards pedestrian infrastructure as well as lack of communication between the municipalities and the citizens which leads to a low level of satisfaction of the pedestrian infrastructure. There is a need by the citizens for more walkable areas attractive for recreational activities and active lifestyle, however there seems to be not as much resources devoted to fulfill this need. Investments in design elements of built environment such as street layout, recreation facilities and parks require investments to promote active lifestyle. It is suggested that a good pedestrian and cycling infrastructure would play an important role in promoting active transportation regardless of educational background, leisure-time and occupational physical activity. However, this promotion should include the participation of all the levels of government with their clear commitment. Urban environments influence the livability of the city, both for health and people’s behaviour, encouraging or discouraging the latter to be active, improving the ability of individuals to strive against an unhealthier lifestyle. The elements that compose the urban environment relate themselves to several factors, which can promote walkability. By making cities more walkable and cyclable the
government effort may lead to improvement of the physical factors—as buildings features, land use mix, densities, street design—in order to create a more convenient, comfortable, safe and attractive place to walk and ride.

Policy-makers, organizations and municipalities are the main stakeholders to direct the evidence-based results of the analysis, providing them a general reference frame able to show the current status and suggest to follow the required steps for interventions. Moreover, the aim of the research should be to generate a conscious image of the current situation and allow stakeholders to be aware of the general condition of the pedestrian environment.

Emphasis will need to shift from automobile dependency to acceptance and promotion of pedestrian and bicycle access at all levels. The regulatory environment will need to shift toward encouragement of walkability, and the design and planning professions will need to work toward creation of integrated pedestrian access at all scales of movement. Moreover, involvement of the public through educational activities and participation in the planning process can be crucial since the research showed lack of communication between the municipalities and citizens of the island. Here the role of Information and Communication Technologies (ICT) is crucial. This is also reported by the citizens’ responses declaring preference for smartphone applications so that they are informed on aspect of walkability in their community.

The tasks are challenging but the benefits for urban life will be substantial. A focus on the walkable city will transform the way we live in fundamental ways, benefiting human health, social relations, and the natural environment.
Appendix I
Questionnaire for municipalities

My name is Valeriia Sukhikh and I am a graduate student at European University Cyprus MBA Program. For my final project, I am examining the decision making process by the municipalities in respect of investments towards walkability in Cyprus. Therefore, I am inviting you to participate in this research study by completing the attached surveys. The following questionnaire will require approximately 5 minutes to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please do not include your name. Copies of the project will be provided to my EUC instructor.

Questionnaire

General information
City .................................................................
Municipality department ........................................

Questions:
(In case of 1-5 questions, please refer to 1 as “poor/strongly disagree” and 5 – “very/strongly agree”)

1) I consider my municipality a walkable community

1 2 3 4 5

2) I consider walking/cycling important in Cyprus

1 2 3 4 5

3) How much did you invest in developing pedestrian infrastructure last year (2017)?


4) How much do you plan to invest the following year?


5) How much importance do you give to pedestrian networks development within the city master plan or transportation plan


6) Please rate degree of municipal funding and resources devoted to pedestrian planning?

- Enough to sustain a high-quality service in the long-term
- Sufficient for the short-term, but not for the long term
- Neutral
- Insufficient to provide high quality service
- Non-existent

7) Which means do you use to provide information on walkable areas within the city?

- Website
- Smartphone application
- Info kiosk
- Social networks (e.g. Facebook, Instagram etc.)
- Other, please specify …………………………………………………
- None, please specify why not………………………………………..

8) Do you have a formal procedure for assessing walkable conditions in your city?

☐ YES ☐ NO

If the answer is YES, how often do you perform the assessment?

- Monthly
- Quarterly
- Semi-annually
- Annually

If the answer is NO, please advise if you are planning to introduce a procedure for assessment in the near future?

☐ YES ☐ NO

9) Do you have a formal procedure for assessing citizen satisfaction on the municipal services?

☐ ☐
YES                     NO

If the answer is YES, how often do you perform the assessment?

- Monthly
- Quarterly
- Semi-annually
- Annually

If the answer is NO, please advise if you are planning to introduce a procedure for assessment in the near future?

[ ] YES  [ ] NO

10) Do you have a formal procedure for assessing citizen satisfaction on the walkable environment?

[ ] YES  [ ] NO

If the answer is YES, how often do you perform the assessment?

- Monthly
- Quarterly
- Semi-annually
- Annually

If the answer is NO, please advise if you are planning to introduce a procedure for assessment in the near future?

[ ] YES  [ ] NO

11) How satisfied do you think the citizens are with the quality of the pedestrian network of your municipality?

1  2  3  4  5

12) Please state the proportion (percentage) of the following transportation means in your municipality?

- Automobile ........................................
- Motorized two-wheeler .........................
- Public bus ........................................
- Bicycle ........................................
- Walking ........................................
- Other .......................................... 

13) Are there any events in your community to promote walking/cycling?

[ ] YES  [ ] NO

If the answer is YES, how often do you hold this type of events?

[ ] Weekly  
[ ] Monthly  
[ ] Quarterly  
[ ] Semi-annually  
[ ] Annually

Please, specify the type of events

........................................................................................................................................

14) Lack of central government funding is a barrier to improving the walking conditions in my city

1 2 3 4 5

15) Did you participate in any European funded projects on improving the walking conditions in your community/city

[ ] YES  [ ] NO

If the answer is YES, please specify the title of the funded project and the funding agency

........................................................................................................................................

16) To which extent do you have incidents regarding the following:

- Accidents that involve pedestrians
  1 2 3 4 5

- Parking on sidewalks
  1 2 3 4 5
- Driving/riding on sidewalks
  1  2  3  4  5

- Drunk driving
  1  2  3  4  5
Appendix II
Questionnaire to the population

My name is Valeriia Sukhikh and I am a graduate student at European University Cyprus MBA Program. For my final project, I am examining the decision making process by the municipalities in respect of investments towards walkability in Cyprus. Therefore, I am inviting you to participate in this research study by completing the attached surveys. The following questionnaire will require approximately 5 minutes to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please do not include your name. Copies of the project will be provided to my EUC instructor.

General information
1. Gender
   □ female
   □ male

2. Disabled
   □ yes
   □ no

3. Have small children
   □ yes
   □ no

4. Age
   □ 15-19
   □ 20-36
   □ 37-59
   □ 60+

5. Neighbourhood (please name the area/municipality) ______________________

6. Do you own:
   □ Bicycle
   □ Motor two-wheel
   □ Car
   □ Other, please specify __________________
   □ None
Walking profile
(In case of 1-5 questions, please refer to 1 as “poor/strongly disagree” and 5 – “very/strongly agree”) 

7. I consider my municipality a walkable community

1  2  3  4  5

8. I consider walking/cycling important in Cyprus

2  3  4  5

9. Which means do you use to gain information on walkable areas within the city?
   - Website
   - Smartphone application
   - Info kiosks
   - Social networks (e.g. Facebook, Instagram etc.)
   - Other, please specify ………………………………………………
   - None, please specify why not……………………………….

10. How interested would you be for a smartphone application to facilitate walking?

1  2  3  4  5

11. How important would you rate the following features? (likert scale)
1. Suggest alternative walking routes
2. Information on walking parks
3. Connectivity with public transportation
4. Events held in the nearby areas
5. Information on available cafes/restaurants (open hours)
6. Information on shopping stores/centres (open hours)
7. Information on nearby public restrooms

12. How satisfied are you with the quality of the pedestrian network of your municipality
   (1 –not at all, 5 – satisfied)

   1  2  3  4  5

13. Are walking paths in your area
   - Blocked with obstruction (poles, parked cars)
   - Congested with non-pedestrian traffic (bicycles)
   - Adequate for blind or disabled people
   - Poorly lit at night
   - Covered with litter
   - Uneven and hard to walk on
14. Are there any events in your community to promote walking/cycling?

☐ YES
☐ NO
   If the answer is YES, how often are this type of events held?
   ☐ Weekly
   ☐ Monthly
   ☐ Quarterly
   ☐ Semi-annually
   ☐ Annually
   Please, specify the type of events
   ………………………………………………………………………………………………………………………………

15. How much do you spend walking (minutes) on average per day

☐ Less than 30 minutes (1)
☐ 30 minutes -1 hour (2)
☐ 1-2 hours (3)
☐ More than 2 hours
☐ Other, please specify (0) ______________

16. How long on average do you spend walking to work each day

☐ Less than 5 minutes (1)
☐ 5 -15 minutes (2)
☐ 15 minutes -30 minutes (3)
☐ More than 30 minutes (4)
☐ Other, please specify (0) ______________

17. How long does it take you to take transit to work (total trip)

☐ Less than 15 minutes
☐ 15 minutes -30 minutes
☐ 30 minutes -1 hour
☐ More than 1 hours
☐ Other, please specify ______________

18. How long does it take to walk to nearest transit stop from home

☐ Less than 5 minutes
☐ 5 -15 minutes
☐ 15- 30 minutes
☐ More than half an hour
☐ Other, please specify ______________
19. List top three places you normally walk to
   □ Work
   □ Shop (local grocery store, kiosk)
   □ Park
   □ Beach
   □ Mall
   □ University
   □ Café/ coffee shop/ restaurant
   □ Other, please specify __________________________

20. What would motivate you to walk more?
   □ Higher fines for illegal parking/ higher fees for parking
   □ Better pavements conditions
   □ Available pedestrian ways and walking streets
   □ Increased price on petrol
   □ Other, please specify __________________________

21. List three top things the city should do to improve walkability conditions
   □ Create walking streets/ paths
   □ More parks and special places for walking
   □ Improve the pedestrian sidewalks
   □ Available information on the places to visit in Cyprus
   □ Strict rules in respect of parking on the sidewalks
   □ Other, please specify __________________________
Appendix III
Results of the questionnaires with municipalities

Graph 1. Do you consider your municipality as walkable community

Graph 2. Do you consider walking/cycling importance of walking in Cyprus
Graph 3. How much importance do you give to the pedestrian networks development within the city master plan?

Graph 4. Degree of municipal funding and resourcing devoted to pedestrian planning.
Graph 5. Do you have a formal procedure for assessing walkable conditions in your city (how often)

Graph 6. Do you have a formal procedure for assessing citizen satisfaction of municipality services (how often)
Graph 7. How much did you invest in developing pedestrian infrastructure this year / planning to invest next year
Graph 8. Which means do you use to provide information on walkable areas within the city

Graph 9. Please state the proportion (percentage) of the following transportation means in your municipality
Graph 10. Do you have a formal procedure for assessing citizen satisfaction on the walkable environment (how often)

Graph 11. How satisfied do you think the citizens are with the quality of the pedestrian network of your municipality
Graph 12. Are there any events in your community to promote walking/cycling (how often)

Graph 13. Lack of central government funding is a barrier to improving the walkable conditions in my city
Graph 14. Did you participate in any European funding projects on improving the walking conditions in your community?

Graph 15. To which extent do you have incidents regarding parking on sidewalks?
Graph 16. To which extent do you have incidents regarding accidents that involve pedestrians

Graph 17. To which extent do you have incidents regarding driving on sidewalks
Graph 18. To which extent do you have incidents regarding drunk driving
Appendix IV
Results of the questionnaires with citizens

Graph 1. I consider walking/cycling important in Cyprus (by gender)

Graph 2. I consider my municipality a walkable community (by gender)
Graph 3. I consider walking/cycling important in Cyprus (by age group)

Graph 4. I consider my municipality a walkable community (by age group)
Graph 5. Means of information used to know about walkable areas

Graph 6. How interested would you be for a smartphone application to facilitate walking
Graph 7. How satisfied are you with the quality of the pedestrian network of your municipality

Graph 8. How much do you spend walking (minutes) on average per day
Graph 9. How long does it take you to take transit to work (total trip)

Graph 10. How long does it take you to the nearest stop from home
Graph 11. What would motivate you to walk more

Graph 12. Top places you normally walk to
Graph 13. How important would you rate the following feature - Information on walking parks

Graph 14. How important would you rate the following feature - Connectivity with public transportation
Graph 15. How important would you rate the following feature - Suggest alternative walking routes

Graph 16. How important would you rate the following feature - Events held in the nearby areas
Graph 17. How important would you rate the following feature - Information on shopping stores/centres

Graph 18. How important would you rate the following feature - Information on cafes/restaurants
Graph 18. How important would you rate the following feature - Information on nearby public restrooms

Graph 19. Top things the city should do to improve walkability conditions
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