EXPLORING THE BARRIERS TO URBAN CYCLING ADOPTION IN THE CITY OF KYIV

by

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CHAPTER 1. INTRODUCTION

Modern cities are grappling with significant transportation challenges. Rapid population growth, increased level of urbanization, and complex commuter behaviors call for fresh perspectives on urban transport solutions, especially in the emerging countries. A pressing issue in many major cities, including Kyiv, which had almost 3 million in population (according to the State Statistics Service of Ukraine) and was one of the largest cities in Europe in 2022, is traffic congestion. For instance, as reported by TomTom Traffic Index, residents of Kyiv spend an alarming average of 207 hours or 8.6 days per year in traffic jams. Such delays not only reduce economic productivity but also contribute to mounting environmental issues through excessive greenhouse gas emissions.

Amidst these challenges, cycling emerges as an efficient and sustainable mode of transport. Its advantages span multiple dimensions: from reducing traffic congestion and carbon emissions to promoting physical health. Cycling doesn't produce emissions, making it a sustainable choice for urban transportation. Switching from a car to a bicycle saves CO_2 emissions by 150 g per kilometre, translating into over 1 kg over a 7-kilometre trip. Additionally, regular cycling has been linked to improved cardiovascular health, immune system and general well-being. Regarding economic benefits, using bicycles can lead to decreased fuel consumption, reduced road maintenance costs, and healthcare savings from a more active and healthy population, as well as lower premature mortality. Moreover, bicycles often navigate urban settings more efficiently than cars, which can lead to shorter commutes and less road congestion (Yanocha, Mawdsley 2022).

However, even with these clear benefits, the acceptance and use of bicycles as a primary transport mode remain limited in cities like Kyiv. Various factors, from infrastructure gaps to cultural views on cycling, might be responsible.

This research seeks to identify the primary barriers that discourage daily cycling in Kyiv. By focusing on Kyiv's unique context and interacting with local participants, this research brings new insights to the matter of urban cycling. Through understanding city residents' views, attitudes, and habits, this study aims to provide insights that can guide businesses, urban planning authorities and policy decisions to make Kyiv more welcoming to cyclists.

CHAPTER 2. INDUSTRY OVERVIEW AND RELATED STUDIES

2.1 Economic, social and environmental benefits of urban cycling

The economic advantages of cycling in urban settings are multifaceted. Cities can realize substantial cost savings as infrastructure maintenance and construction for bicycles come at a fraction of the cost of their counterparts for cars, with bike lanes costing only 10.4 million USD per 1,000 passenger-kilometer compared to 1.5 billion USD for roads intended for motorized traffic (Fulton, Lewis 2021). Another dimension to consider is healthcare. Regular cycling acts as a preventive measure against several chronic illnesses. The global economy loses 2.9 trillion USD due to pollution-related premature deaths, sick leaves and other health problems. For instance, in Toledo, Spain, a 5% increase in share of cycling in total trips is associated with 250,000 USD savings per year, resulting from reduced deaths from non-communicable diseases (Yanocha, Mawdsley 2022). Using a bike instead of other types of transportation can materially reduce the level of congestion, especially during rush hour, which directly translates into economic benefits (Hamilton, Wichman 2018). For example, the US economy loses 120 billion USD annually due to traffic congestion, which also causes excessive air pollution. Additionally, investments in cycling infrastructure not only build a sustainable urban environment but also lead to job creation. According to the International Energy Agency, each 1 million USD invested in pedestrian and bike lanes creates up to 22.4 new jobs, whereas the employment multiplier of battery electric car manufacturing ranges only between 3.7 and 7.7 jobs per million dollars. Another study reveals that doubling the modal share of cycling could create up to 435,000 jobs in the EU. This includes jobs in bicycle manufacturing, retail, and maintenance, as well as indirect jobs in the steel and aluminium industries that provide materials for bicycle production. Additionally, cycling contributes more to the local economy than other modes of transportation, as cyclists are more likely to frequent local businesses (Blondiau, van Zeebroeck, Haubold 2016).

On the social front, the benefits are equally compelling. Regular cycling sessions can drastically cut the risks associated with heart diseases, diabetes, and even mental health conditions like depression. Cycling is an aerobic activity that improves cardiovascular fitness, increases muscle strength and flexibility, and improves joint mobility (Green, Sakuls, Levitt 2021). Beyond physical health, cycling fosters a sense of community. Furthermore, the improvement of cycling infrastructure translates to safer roads with a reduced number of deaths and injuries. Evidence from Bogota, Colombia indicates that despite the surge in cycling rate from 0.2% in 2000 to 7.0% in 2019, the proper infrastructure fostered the reduction in deaths and injuries by 34.0% and 8.0%, respectively.

From an environmental point of view, the adoption of cycling holds promise in combatting some of the most pressing ecological challenges. The total emissions associated with riding a bicycle amounts to 21 g of CO_2 per passenger-kilometer, including bicycle production, maintenance, and calories spent by cyclist during the activity. On the contrary, average passenger car emits 271 g of CO_2 per passenger-kilometer for trips like those, which can be taken by bicycle. It is estimated, that if modal share of cycling in urban trips increase from current 5% to 18% by 2050 with proportionate increase in public transit and walking, the total CO_2eq. emissions will decrease by 2 gigatons or more than 50% of the total emissions of the transportation sector in 2015. Finally, increased cycling will allow to free up more public space: a moving car occupies 28 times more space than a moving bicycle, whereas a parked car needs 10 times more space than a parked bicycle. Thus, repurposing car-related zones, such as parking lots, roads, and garages, can make transformative changes in urban landscapes. The conversion of these spaces can align with the broader goals of creating sustainable, livable, and community-centred cities.

2.2 The current state of urban cycling worldwide

Nowadays, Amsterdam and Copenhagen, are often regarded as the world's capital of urban cycling culture. However, it has not always been like that. The current excellence of cycling infrastructure is a result of explicit policies to prioritize non-motorized transportation.

The Netherlands introduced the "Stop de Kindermoord" (Stop the Child Murder) movement in the 1970s, responding to alarmingly rising traffic-related child deaths, which exceeded 400 in 1971. Aimed to move away from a car-centric approach to a safer and sustainable transportation system, it led to extensive traffic-reducing measures, including the broad network of cycling paths, installation of speed bumps, road narrowing, and pedestrian zones, all of which also benefited cyclists. Today, the Netherlands has more than 35,000 km of cycling paths, which represents around a quarter of the country's 140,000 km road network, whereas 27.7% of all trips are made by bicycle.

Likewise, Denmark was actively embracing car as transportation of the future during 1950s-1960s. In 1970s, oil crisis, rising concerns about air pollution, climate change, and the need for physical activity facilitated the comeback of cycling in Denmark. Now there are more than 12,000 km of cycle paths, while the county's capital Copenhagen itself has around 400 km of cycling dedicated routes, separated from both car traffic and pedestrian sidewalks. The share of cycling reaches 21% in trips under 10 km and 15% in total number of trips. Remarkably, male cyclists accounts for 47%. It is estimated that Danish society gains 0.8 euro per km travelled by bicycle in social and economic benefits. Since 2009, the government spent more than 200 million euros on cycling infrastructure and promotion campaigns and plans to invest another 500 million euros by 2035.

Another example of the successful implementation of cycling into the transportation system is Portland, US. Portland's transformation into a bike-friendly city can be traced back to its innovative "Bicycle Master Plan." Launched in 1970, this strategic framework targeted the creation of a 630-mile network of bikeways. Paired with the "20-minute neighbourhood" concept, where all essential services are within a 20-minute walk or bike ride, Portland aimed to ensure seamless cycling connectivity. Historically, the bike boom of the 1970s was a pivotal moment for Portland. The energy crisis during this era incited a widespread reevaluation of transportation habits across the United States, and in Portland, it fostered a burgeoning interest in cycling. A series of comprehensive plans, policies, and programs were instituted, setting the stage for the gradual expansion and

improvement of cycling facilities. In addition to physical infrastructure, Portland has implemented educational programs, promotional events, and awareness campaigns to foster a cycling culture. Initiatives such as the Naked Bike Ride and Pedalpalooza Bike Festival have played a significant role in encouraging cycling and raising awareness about the benefits of bicycle commuting. In 2016, the city launched a bike-share program, providing a fleet of more than 1,000 smart bicycles to the city centre.

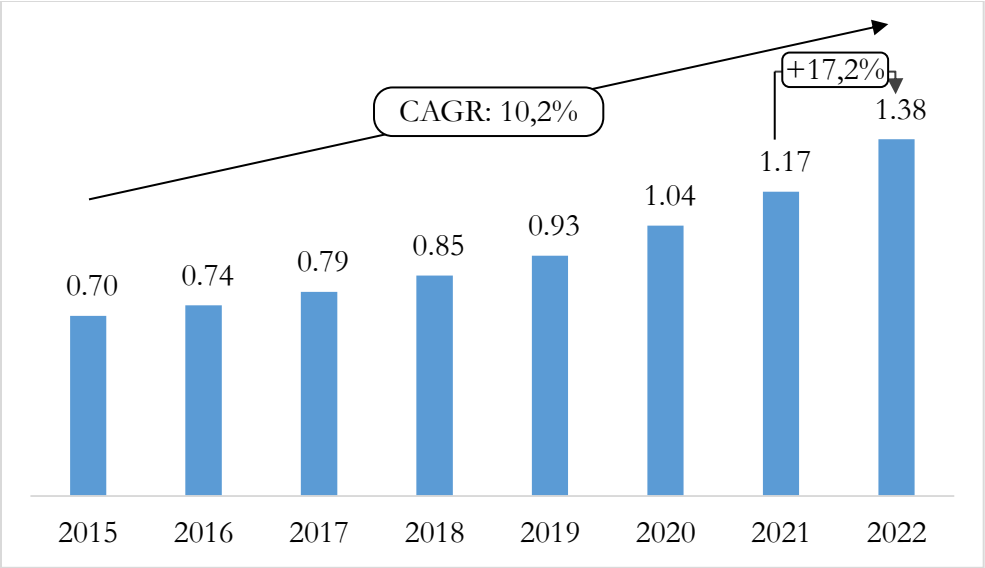
Across these cities, certain shared strategies stand out. For instance, many adopt a tiered approach to cycling infrastructure: main cycling arteries for longer distances, secondary networks for city-wide connectivity, and localized paths for neighborhood access. Another common thread is the integration of cycling with public transport, enabling multi-modal commutes. Urban areas like these have not only built infrastructure but have also complemented it with awareness campaigns, safety training for both cyclists and motorists, and fiscal incentives, such as subsidies for e-bike purchases or tax breaks for cycling to work.

In essence, the best cycling cities have not merely built lanes but have reimagined urban landscapes. They've instilled a vision of sustainable mobility, reinforced by a blend of progressive policies, innovative design, and persistent public engagement.

2.3 Transportation problems and current state of urban cycling in Kyiv

Kyiv, the capital of Ukraine, exhibits a diverse transportation profile with multiple highly complicated unresolved issues, influenced by a lack of expertise and consistently poor urban planning decisions.

Figure 1. Number of cars registered in Kyiv, in millions



Source: Ministry of Internal Affairs of Ukraine

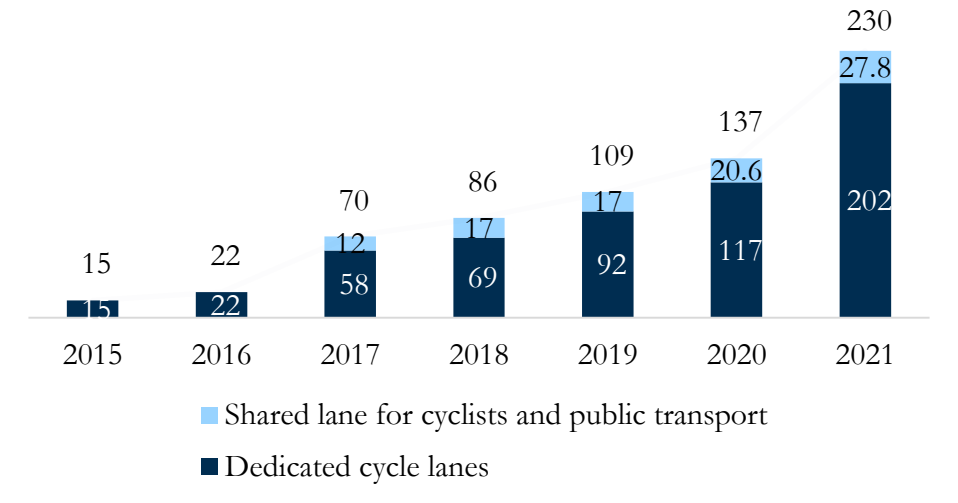
A notable trend observed in Kyiv over the past decades is the increasing reliance on private vehicles: the number of registered cars grew at a Compound Annual Growth Rate (CAGR) of 10,2% over 2015-2022 at expanded by 17,2% in 2022. Additionally, the growth rates reached double-digit values in 2020, 2021 and 2022. This upsurge in personal car ownership has led to frequent congestion on major thoroughfares, particularly during peak commuting hours. The economic implications of such congestion are significant (Sweet, Matthias 2014). Extended commute times result in reduced productivity, and the associated costs, both direct and indirect, strain the city's economy.

Kyiv's authorities fail to realize that expanding the existing road infrastructure causes a phenomenon called induced demand rather than solving the traffic problem. The concept of 'induced demand' postulates that expanding roadways to accommodate higher traffic capacities leads to increased traffic volumes and a subsequent return to previous congestion levels. When roads are widened, the apparent reduction in congestion incentivizes more drivers to use them, thereby negating the intended relief. Changing these perceptions is challenging; even traffic engineers and students in the field might lack

knowledge about induced demand. Addressing the issue isn't solely about roadway planning, but also involves considering factors such as parking availability and cost, which can further induce vehicle use. Despite the mounting evidence against the effectiveness of road widening, state and local authorities continue to fund such projects, overlooking potentially effective but unpopular solutions like congestion pricing, toll lanes, and freeway removal. Policymakers and planners thus face a significant challenge in advocating for practical solutions in the face of popular political promises of congestion relief through roadway expansion.

Parallel to this, Kyiv's public transportation system, which encompasses subway, buses, trolleybuses, and trams, plays a crucial role in the daily mobility of a significant portion of the capital's population. In pre-war 2021, the subway system itself was used 319 million times, which translates into 874 thousands of passengers per day. However, this network faces challenges such as aging infrastructure, inadequate funding, overcrowding, and inconsistencies in service delivery. In 2022, the transportation and road maintenance budget for 2023 was cut by 0.5 billion UAH, so that its share in the total budget decreased from 19.5% to 19.0%. Furthermore, certain city zones have limited access to efficient public transportation.

Figure 2. Cycling infrastructure in Kyiv, in km



Source: NGO "Kyiv – a cycling city"

The introduction of cycling infrastructure in Kyiv, though commendable, does not meet the needs of the city nor does it show an adequate development dynamics. Despite the establishment of dedicated bike lanes, very few of them maintain the connectivity between specific points of destinations. The large share of cycling lanes are built separately from one another and does not create a integral network Additionally, cycle lanes lack clear demarcations from road traffic or pedestrian zone, presenting safety challenges.

Table 1. Comparison of cycling infrastructure in Kyiv and in other European cities

	Kyiv	Copenhagen	Amsterdam	Berlin	Warsaw
Population	2,950,702	644,461	882,633	3,755,251	1,795,000
Cycling lanes, km	202	385	515	1,500	530
Kms of cycling lanes per 100,000 of population	6.85	59.74	58.35	39.94	29.53

Source: Statista website; National statistics offices; Media overview

Table 1 above clearly exhibits the extent of the gap between Kyiv and other European cities in terms of cycling infrastructure relative to city population. Evidently, Kyiv dramatically lags behind the leading cycling cities in the world, which have a long-standing tradition of bike commuting and already have a well-established cycling infrastructure. Moreover, it largely underperforms in comparison with Berlin and Warsaw – cities with comparable populations, which are not as famous as Copenhagen and Amsterdam in terms of urban cycling. Thus, Kyiv authorities, businesses in the cycling industry, as well as the common population need to put a substantial effort to catch up with global trends and avoid the collapse of the transportation system.

From an environmental perspective, Kyiv's increasing reliance on motorized transportation poses concerns related to air quality. Emissions from vehicles contribute to urban air pollution, with implications for both environmental sustainability and public health.

Historical urban planning decisions have further complicated Kyiv's transportation matrix. Past decisions may not have adequately anticipated the city's current population density and associated transportation demands, nor it considered the modern urban planning approaches and methods. Consequently, Kyiv suffers from numerous and extremely complex transportation problems, which has been piling up for decades of incompetence and corruption of city authorities.

Cultural and societal perceptions further shape transportation choices. The status associated with car ownership in certain demographics may deter the adoption of alternative, sustainable modes of transportation. Overcoming such perceptions requires a combination of policy measures, public awareness campaigns, and tangible incentives.

In conclusion, Kyiv's transportation landscape, while facing multifaceted challenges, also holds promise for innovative solutions. Learning from global best practices, while tailoring solutions to Kyiv's unique context, will be crucial. As urban planners and policymakers consider the way forward, a holistic approach that integrates infrastructure development, environmental considerations, and societal needs will be imperative.

2.4 Literature review

In the era characterized by rapid urbanization and escalating environmental concerns, the promotion of sustainable modes of transportation has emerged as a significant challenge for cities worldwide. Among these alternatives, urban cycling presents itself as a promising solution, offering a plethora of advantages, including diminished congestion, enhanced air quality, and improved public health. European cities have been

at the forefront of advocating for cycling as an integral component of their urban transport systems for an extended period. However, notwithstanding these commendable efforts, several obstacles impede the widespread adoption of cycling, thus obstructing its realization of full potential as a sustainable mobility option.

To illustrate, an article authored by Dunlap, Rose (2018) sheds light on the prevalence of autocentrism, a paradigm that underscores the dominance of automobiles as the primary mode of transportation in urban planning and infrastructure development. Autocentrism encapsulates a resistance to changes in well-established transportation norms. Grasping and addressing autocentrism is imperative to fostering cycling as a viable alternative.

Iwinska, Blicharska (2018) undertook a study examining perceived facilitators and barriers as reported by both cyclists and non-cyclists. Their research offers valuable insights into strategies for promoting urban cycling in Warsaw, particularly within the context of Eastern Europe. As outlined by the authors, primary barriers encompass a lack of public awareness and comprehension of the benefits associated with cycling, perceptions of cycling as a slow and inconvenient mode of transport, deficient cycling infrastructure, safety apprehensions, and a misalignment between expert knowledge-based planning and the needs and perceptions of prospective cyclists.

The research conducted by Brezina, Lemmerer (2022) also delves into the examination of barriers hindering the adoption of urban cycling. This research primarily focuses on the psychological obstacles faced by respondents. The findings suggest that older individuals tend to assign lower priority to cycling, implying a potential generational divide in recognizing the significance of cycling within urban transportation. Moreover, disparities in quality awareness between urban and rural areas assume significance; urban areas tend to exhibit greater awareness of the necessity for high-quality cycling infrastructure. The research also posits that certain deficiencies in the planning of cycling infrastructure may stem from a lack of knowledge rather than a lack of intention.

Consequently, addressing these knowledge gaps may necessitate educational and awareness-raising initiatives.

A comparable study carried out in Spain by Caicedo, Mayorga (2021) revealed that concerns regarding one's appearance while cycling can act as a deterrent to the adoption of urban cycling, particularly among cyclists. Additionally, issues related to safety, travel distances, physical fitness, weather conditions, and the imperative to enhance awareness emerged as common barriers to regular urban cycling. Regional peculiarities also exert influence on respondents' decisions, exemplified by extreme weather conditions like the high temperatures prevalent in Spain, which can impede cycling.

The removal of existing barriers necessitates an integrated approach. Study by Amaral (2022) explored how European countries can promote cycling in their urban centers. This study employs cluster analysis on a sample of regular cyclists from six European nations to identify shared patterns, behaviors, and attitudes. The research underscores the imperative of adopting a holistic strategy for cycling development, encompassing governmental leadership, infrastructure enhancement, and financial incentives. Specifically, the authors recommend reducing value-added tax (VAT) rates on the sale of bicycles and e-bikes, ensuring that cycling competes on an equitable footing with other modes of transportation, and securing the support of government officials and cross-party consensus. These efforts are essential to forge safer, more appealing, and sustainable transportation alternatives throughout the European Union.

Many researchers in recent years have undertaken an analysis of diverse approaches aimed at mitigating or eliminating barriers associated with regular cycling in European countries. In particular, Fraboni (2022) underscores the advantages of employing market segmentation to customize communication and intervention strategies, thereby enhancing the safety and allure of cycling. This entails recognizing that distinct segments of the population possess unique needs and preferences pertaining to cycling, and addressing these disparities is imperative in surmounting obstacles to the adoption of cycling. The

authors advocate for a gentle approach, emphasizing incremental interventions that centre on management and marketing initiatives, as opposed to more substantial infrastructural modifications. They posit that communication and marketing strategies may be indispensable in dispelling psychological and behavioral barriers to cycling.

In recent years, a multitude of studies across various European countries have been dedicated to identifying and adressing barriers that impede the widespread embrace of cycling as a sustainable mode of urban transportation. However, there was not comprehensive research focused explicitly on Kyiv and its unique environment. By concentrating on the specific context of Kyiv and engaging with local respondents, this study introduces fresh perspectives to the ongoing discourse on the adoption of urban cycling. It not only improves understanding of existing barriers but also provides insights that can inform the development of targeted strategies aimed at promoting cycling as a viable transportation option within this urban environment.

CHAPTER 3. METHODOLOGY

The Methodology section outlines the approach utilized in the research. This study's primary objective is to gain insight into the factors inhibiting the use of bicycles as a mode of urban transportation among residents of Kyiv. Additionally, it aims to offer valuable insights for urban planners, policymakers, and the cycling industry, all of whom are interested in establishing more sustainable and comfortable urban environments.

The methodology employed in this study encompasses data collection and analysis, as well as surveys and interviews with Kyiv's residents. Furthermore, it includes a comparative analysis with the experiences of European cities where cycling is a prominent feature of urban mobility. The study will result in a comprehensive analysis of the barriers identified and their influence on public sentiment and citizen behaviour. The first stage involves conducting a survey among Kyiv residents to identify the barriers to daily bicycle commuting. This survey will cover topics such as existing commuting habits, barriers to bike commuting, awareness of cycling infrastructure, and attitudes toward potential improvements.

The survey encompassed the following key sections:

- Respondents age.

- Respondents by primary modes of transportation. Survey participants were requested to specify their primary mode of transportation to assess the current modal distribution.

- The role of bicycles in respondents' daily lives. The survey encompassed various inquiries concerning the role of bicycles in the daily lives of respondents, with the objective of ascertaining the significance of bicycles in their routines.

- Self-assessment of respondents' physical fitness and cycling abilities. Participants in the survey were asked to rate their own physical fitness and their capacity to engage in regular cycling, providing insights into their perceived physical abilities as potential barriers or facilitators to cycling.

- Percentage of respondents considering daily bicycle usage. The survey measured the proportion of respondents contemplating daily bicycle usage, serving as an indicator of potential adoption.

- Primary obstacles to cycling. Respondents were requested to rank the top three barriers they perceived in using a bicycle for daily commuting.

- Necessary improvements. Respondents were also asked to identify and rate the top three enhancements they deemed essential for the promotion of urban cycling.

Thus, by utilizing both quantitative (data collection and analysis) and qualitative (surveys and interviews) approaches, the study is able to capture a comprehensive view of the current situation. This combination provides both statistical evidence and personal insights, ensuring a well-rounded understanding. The methodology doesn't rely on a single data source, which can be limiting or biased. Instead, it pulls from multiple sources (local residents, data sets, and international case studies) to provide a more complete and objective overview. This kind of mixed-method approach is scalable and can be replicated in other cities or regions, making it a useful model for similar research projects elsewhere.

Participants were recruited from diverse locales within Kyiv, with a systematic approach ensuring a representative sample across income levels, gender, and age brackets. The primary aim of the survey was to obtain a heterogeneous sample, the insights from which could be generalizable to the population of the entire city. The inclusion criteria for participation were set between the ages of 18 and 80 years, justified

by the premise that individuals above this age threshold may exhibit diminished capability to operate a bicycle, a factor attributable to advancing age. The dissemination of the questionnaire transpired over the months of August and September in the year 2023. In the subsequent data analysis phase, only those respondents who provided a complete dataset were retained from the overall pool of questionnaires received.

The initial segment of the questionnaire was dedicated to accruing socio-demographic data of the participants, encompassing variables such as age, gender, educational background, income, and preferred transportation modes. Figures 3 and 4 illustrate the age-based and preferred transportation mode distributions of the study participants, respectively.

Figures 5 and 6 provide graphical representations of the participants' preferences and associations concerning bicycle usage. This encompasses frequency of bicycle use, motivations behind choosing this particular mode of transport, self-assessed levels of basic physical activity, among other variables. The study delineates between active cyclists (defined as individuals who engage in cycling at least once a month), non-cyclists (those who have not cycled in the preceding year), and potential cyclists (individuals who have cycled at least once in the past few months). This categorization facilitates a nuanced understanding of the varying degrees of engagement with cycling across different demographic cohorts.

In order to systematically evaluate the responses of the participants, a multitude of methodologies were employed. Specifically, a survey depicted in Figure 6 solicited the participants' subjective evaluations of their own physical fitness levels. For this purpose, a five-point Likert scale was utilized, wherein each point on the scale was subsequently assigned a numerical value. This ranged from 1, indicative of a complete absence of exercise, to 5, representative of a professional athlete's level of fitness.

It is important to note that while there exists a multitude of Likert scales suited for assessing perceptions of efficacy, the present study elected to employ the aforementioned five-point Likert scale, a tool previously utilized in the study by Teixeira (2023). In their research, the authors implemented the Likert scale to gauge the significance of various deterrents that hinder individuals from availing bike and e-scooter sharing systems.

Consequently, it is of paramount importance to investigate the manner in which diverse demographic sectors within an urban environment perceive barriers to adopting urban cycling. Furthermore, it is crucial to discern potential variations in cycling perceptions across distinct citizen cohorts. In light of this, the present study is primarily focused on addressing the ensuing research queries:

1. How do disparate population segments in Kyiv perceive the integration of cycling into their daily routines, and what factors serve as impediments to this integration?

2. Which strategies are most efficient in mitigating these predicaments, particularly for those demographic groups that currently demonstrate negligible levels of cycling adoption?

By delving into these research questions, this study aims to unveil the perceived challenges and obstacles tied to urban cycling in Kyiv. The ultimate goal is to furnish authorities and businesses from the cycling industry with data-driven and equitable strategies, thereby catalyzing an uptrend in cycling adoption across the entire population spectrum.

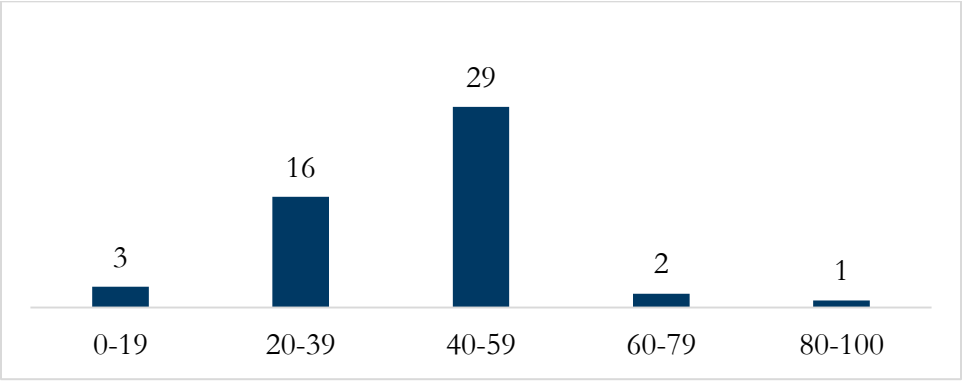
CHAPTER 4. DATA

This section delves into a critical aspect of the barriers to urban cycling adoption. Understanding the barriers that keep people from urban cycling is critical for city planners, policymakers and businesses involved in cycling industry who strive to create a more sustainable and livable urban environment. To shed light on this issue, a comprehensive survey of Kyiv residents was conducted, collecting data on residents' perceptions, attitudes and experiences regarding urban cycling.

The following subsections will detail the survey methodology, participant demographics, and key findings that will shed light on the complex web of challenges and opportunities facing urban cycling in Europe, with a particular focus on the case of Kyiv.

A survey of 53 respondents has revealed a broad spectrum of age groups expressing interest in the subject of bicycles. Nonetheless, two distinct age brackets stand out prominently: those aged 23 and 48 years. The prevalence of bicycle-related topics across various age demographics signifies the potential to engage a diverse audience in the development of urban cycling initiatives.

Figure 3. Respondents distribution by age

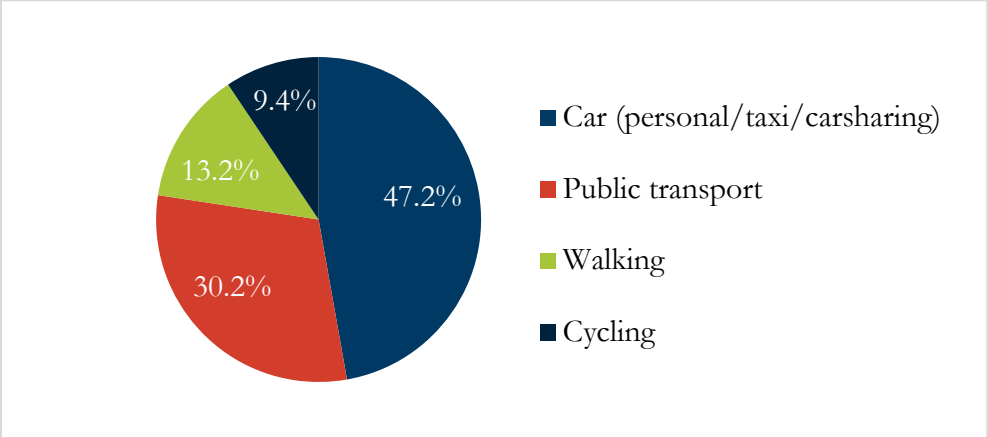


Source: survey conducted by author

In terms of gender distribution among the respondents, an almost even split is observed, with 53.3% being male and 46.7% female. This equitable gender representation lends credibility to the survey's results, rendering them more objective and applicable to both men and women. Diversity is also evident in the occupational backgrounds of the respondents, encompassing a wide spectrum of professions such as managers, lawyers, doctors, pensioners, farmers, analysts, and others. This diversity in occupational profiles suggests that the interest in urban cycling transcends specific social or professional demographics.

Among the surveyed individuals, 47.2% rely on automobiles as their primary mode of transportation, while 30.2% prefer public transport, and 13.2% primarily commute on foot. Approximately 9.4% of respondents already incorporate bicycles into their regular commuting routines. This suggests that for the successful implementation of urban cycling initiatives, it may be essential to consider integrating bicycles with other modes of transportation.

Figure 4. Respondents distribution by main mode of transportation

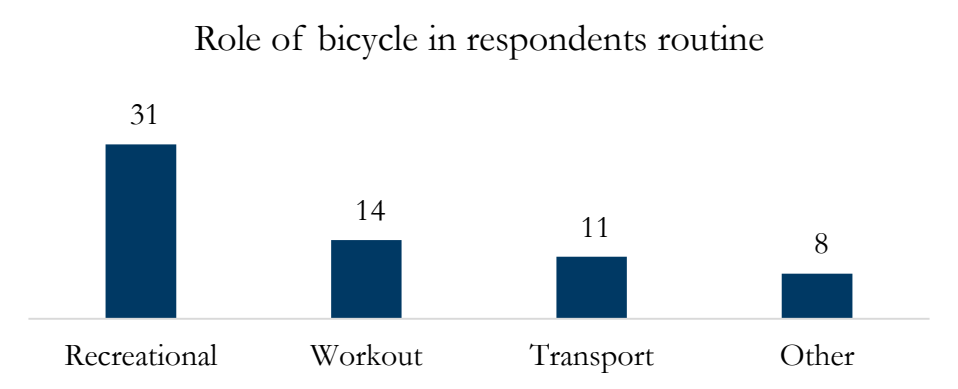


Source: survey conducted by author

Simultaneously, the overwhelming majority of respondents habitually undertake long-distance journeys. The survey data reveals that the majority of participants consider a typical regular route to be below 30 kilometers in length, which is the most commonly cited distance. Other responses indicate routes of varying lengths, including 35, 50, and 100 kilometers. This pattern is mirrored in the time taken for these journeys, with the majority reporting that a typical route consumes approximately 30, 40, or 60 minutes of their time.

The vast majority of respondents, namely, 31 individuals, identified the role of a bicycle in their lives as primarily recreational. Concurrently, an identical percentage of survey participants (60.4%) indicated that they assign the highest possible rating to the potential use of a bicycle for daily transportation. This observation underscores the willingness of individuals to consider extended bicycle commutes, thereby highlighting the adaptability of bicycles for diverse purposes. Furthermore, a significant majority of respondents, amounting to 84.9%, expressed strong agreement with the notion that broader integration of bicycles as a mode of transportation could yield economic, environmental, and social benefits.

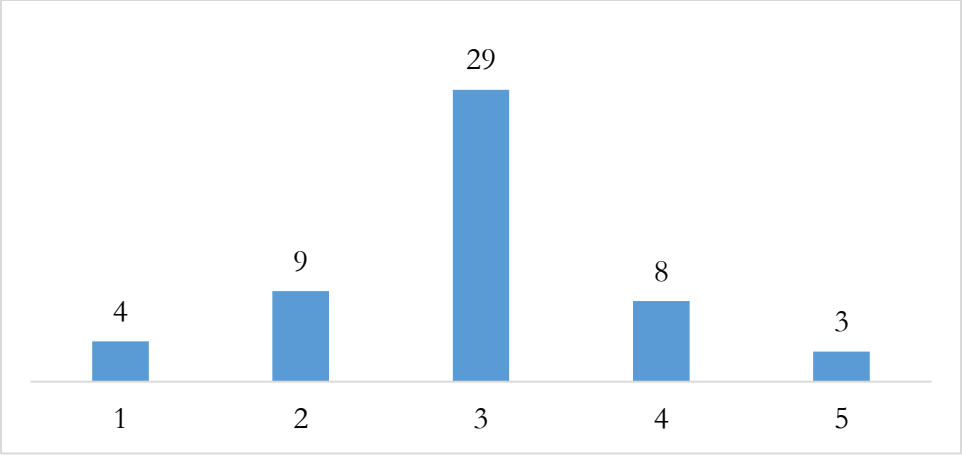
Figure 5. Role of bicycle in respondents' routine



Source: survey conducted by author

Regarding the social perception of the respondents, the introduction of cycling into their daily routines faces minimal impediments, with 56.6% affirming that bicycle usage within their social circles is perceived as exceedingly positive. This favorable perception is likely to contribute to the increased popularity of urban cycling. Simultaneously, a substantial majority of survey participants rated their physical fitness, specifically their ability to consistently cover distances on a bicycle, as satisfactory, with an average score of 3 out of 5. This favorable assessment bodes well for the promotion of urban cycling as a viable means of transportation.

Figure 6. Respondents assessment of their fitness level and ability to ride a bike regularly



On the scale from 1 to 5, where 1 is "no exercises at all" and 5 is "professional athlete"

Source: survey conducted by author

Based on the conducted survey and subsequent data analysis, it can be deduced that there exists substantial potential for the advancement of cycling mobility within urban environments. The economic, environmental, and social advantages present a compelling rationale for the promotion of cycling. A noteworthy portion of the respondents currently covers substantial distances on a recurring basis and may conceivably contemplate cycling

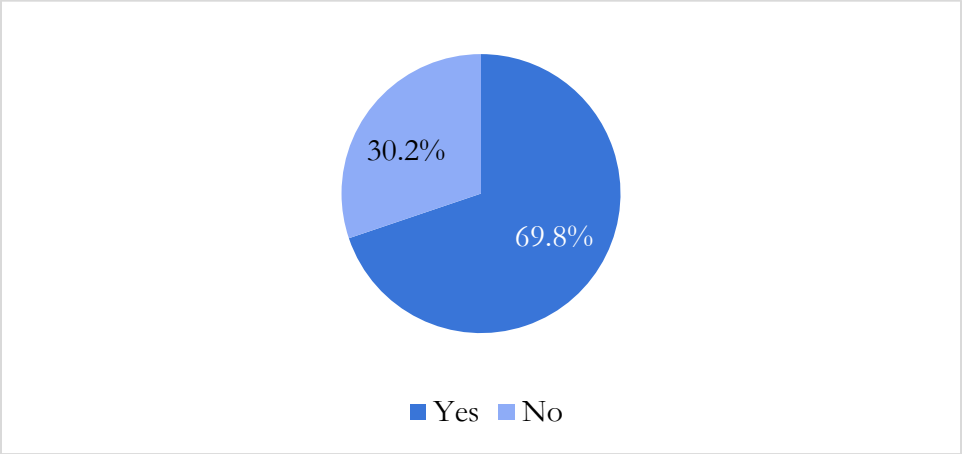
as an efficient mode of transportation in the future. The majority of respondents acknowledge the economic, environmental, and social merits associated with the increased utilization of bicycles as a means of transportation.

Distinct variations in responses based on gender, age, and professional fields have underscored the broad appeal of cycling infrastructure. Simultaneously, it is evident that the current utilization of bicycles as a regular mode of transport remains alarmingly low. This implies that despite the favorable sentiments associated with cycling and the potential for its integration into their daily routines, most residents of Kyiv currently refrain from consistent bicycle usage. Subsequent sections will delve into a comprehensive examination of the primary barriers identified through the survey of respondents.

CHAPTER 5. RESULTS

The preceding section has demonstrated that the outcomes of a survey encompassing various demographic groups reveal a prevailing inclination among Kyiv residents towards the integration of urban cycling into their daily routines. However, a mere 9.4% of individuals actually engage in regular cycling, indicating the existence of substantial barriers to urban cycling. Approximately 66.7% of respondents have contemplated utilizing bicycles as a means of city transportation but encountered certain reservations that deterred them from implementing this idea. The primary impediments hindering the adoption of cycling for daily commuting include the absence of a secure cycling infrastructure: more than 62% of respondents assessed the current state of cycling in Kyiv as poor or very poor, as well as concerns regarding personal safety, and inadequate parking facilities.

Figure 7. Share of respondents who has ever considered using bicycle on a daily basis

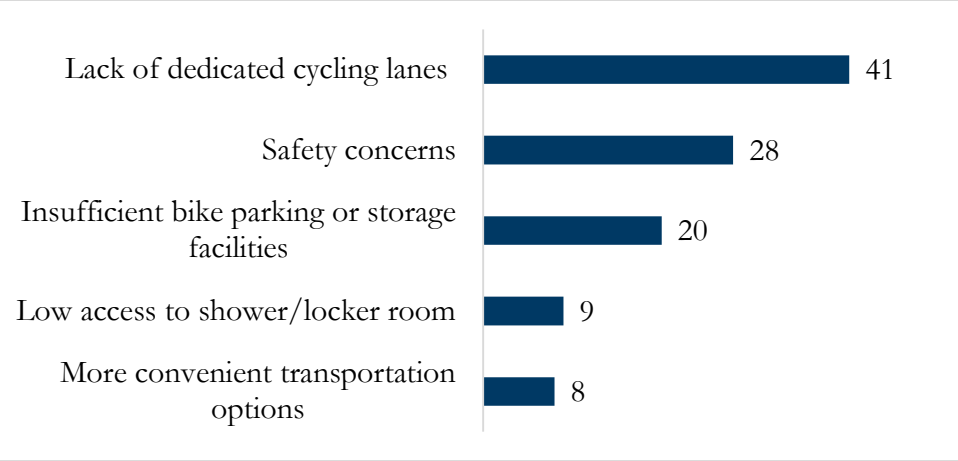


Source: survey conducted by author

The survey results unequivocally corroborate that the absence of a secure cycling infrastructure constitutes a formidable obstacle to the development of urban cycling in Kyiv. This trend is grounded in the survey participants' responses, with 41 out of 53

respondents identifying this factor as one of the principal obstacles to bicycle usage in their everyday travels.

Figure 8. Top-5 barriers for bike commuting indicated by respondents



Source: survey conducted by author

Enhancing the safety and comfort of cyclists, encompassing the expansion of the cycle lane network, regular maintenance, and the implementation of improved signaling systems, has the potential to materially increase the number of individuals who opt for bicycles as their mode of daily transportation. Such measures also hold the promise of mitigating vehicular traffic, ameliorating environmental conditions, and enhancing the overall quality of life within the region.

Additionally, it was revealed that personal safety concerns exert a second most important barrier influence on individuals' decisions to refrain from using bicycles in their daily lives. This particular factor garnered the attention of 28 out of 53 respondents. It is noteworthy that the issue of safety stands as a pressing concern with significant implications for the level of urban participation in cycling.

The safety-related apprehensions expressed by respondents regarding cyclists' well-being on the roads encompass several distinct reasons. A notable concern revolves around

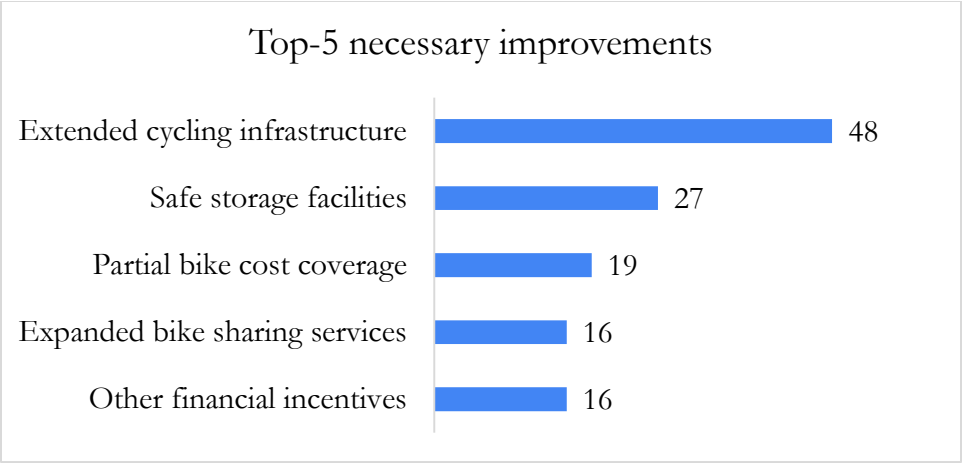
the potential risk of collisions with motor vehicles. This concern is well-founded, considering the existing infrastructural limitations and the intricacies involved in the interaction between bicycles and vehicular traffic within urban settings.

The survey results indicate that the third most significant impediment to the widespread use of bicycles in daily life is the shortage of bicycle parking facilities. This deficiency has a pronounced impact on urban residents and their capacity to integrate cycling into their daily routines. According to the survey data, 20 out of 53 respondents unequivocally identified the lack of bicycle parking spaces as one of the primary factors restricting their bicycle use within the city. This finding underscores the gravity of the issue, emphasizing the need for municipal and other concerned entities to address it.

The absence of convenient and secure bicycle parking locations within the city introduces inconveniences and risks for cyclists who rely on bicycles as a mode of transportation. The unavailability of secure bicycle parking facilities renders bicycles susceptible to theft and vandalism, engendering apprehension and uncertainty regarding their safety.

On the one hand, the challenges mentioned in the previous section exert a substantial influence on the motivation of urban dwellers to utilize bicycles for daily commuting. However, as indicated by survey participants, certain infrastructural improvements and public policies would serve as a potent incentive to augment the number of cyclists within the city. This, in turn, would contribute to the mitigation of urban traffic issues, such as congestion and pollution.

Figure 9. Top-5 necessary improvements indicated by respondents



Source: survey conducted by author

According to the survey results, when asked to select top-3 improvements that may incentivize the usage of bicycle as a main mode of transportation, 48 out of 53 respondents selected extended cycling infrastructure as the most formidable factor.

Another important factor which can contribute to the development of bike commuting is construction of safe storage facilities in key destinations and transport hubs. This will increase the connectivity between the different types of transport and prevent bike theft and vandalism.

Additionally, 19 out of 53 respondents indicated that introduction of the bike cost coverage programs may be positive factor that can potentially affect their decision to opt for bike commuting.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

Kyiv, as a 3-million megapolis, has a transportation system that is heavily reliant on vehicular travel. The rapid urban expansion and population growth have led to increased traffic congestion and environmental concerns. As was revealed in the survey of Kyiv residents, the current cycling infrastructure is not sufficient to accommodate or encourage a significant number of cyclists. This presents a pressing need to rethink and improve the cycling infrastructure to promote sustainable transportation and reduce carbon footprints.

The research findings emphasize that the primary impediments to cycling in Kyiv are related to infrastructure. Lack of designated bike lanes, safety concerns and lack of parking and storage facilities are among the most common challenges. Remarkably, natural factors such as hilly terrains or unfavourable weather conditions are less of a concern for the respondents. Thus, addressing these infrastructural challenges requires a comprehensive strategy. Government initiatives, infrastructure improvement projects, and financial incentives can help create a robust cycling environment.

Local businesses have the potential to play a significant role in bolstering cycling infrastructure. By sponsoring bike lanes or establishing bike parking facilities at strategic points, like near commercial centers or public transit hubs, businesses can help in making cycling a more convenient and attractive option. This not only promotes eco-friendly transportation but also potentially draws customers to businesses.

Regarding the businesses involved in the cycling industry, bike shops and rental companies can play a pivotal role in shaping public opinion about cycling. By organizing community events, workshops, and awareness programs, they can educate the citizens about the environmental, health, and economic benefits of cycling. Furthermore, they can provide training on cycling etiquette and safety, thereby reducing accidents and making roads safer for everyone.

Collaboration between bike rental companies, bike shops, and corporate entities can result in innovative employee incentive programs. For instance, employees could be provided with discounts on bike rentals or purchases, or even rewarded for cycling to work. Such initiatives can motivate employees to opt for bicycles over cars, reducing traffic congestion and contributing to environmental sustainability.

Data is a powerful tool in urban planning. Businesses that have insights into bike usage patterns – like popular routes, peak cycling hours, and seasonal variations – can share this data with city authorities. This information can be invaluable in designing cycling paths, deciding where to establish new bike lanes, or determining which areas need more bike parking facilities. A data-driven approach ensures that infrastructure development is in sync with actual user needs and patterns.

In conclusion, Kyiv has a large potential as a cycling city. However, promoting cycling in Kyiv requires a holistic approach that combines government initiatives, private sector involvement, and community engagement. By addressing the infrastructural challenges and harnessing the potential of collaborative efforts, Kyiv can pave the way for a greener, healthier, and more sustainable future.

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APPENDIX

Appendix 1. Survey of Kyiv residents.

Section 1 of 3

Допоможіть формувати майбутнє міського транспорту в Києві - візьміть участь у нашому опитуванні!

Чи замислювалися ви коли-небудь над тим, як можна покращити транспорт у нашому місті? Тут ваша можливість зробити свій внесок!

Я - студент магістратури Київської школи економіки, який проводить дослідження, спрямоване на краще розуміння транспортних звичок мешканців Києва та вивчення потенціалу збільшення використання велосипедів у нашому місті. Метою цього опитування є визначення бар'єрів, які можуть перешкоджати людям використовувати велосипед як основний вид транспорту.

Навіть якщо ви не є завзятим велосипедистом, ваш внесок надзвичайно важливий. Ми хочемо почути думку кожного, незалежно від того, чи є ви досвідченим велокоммьютером, чи ви катаєтесь на велосипеді зрідка, чи навіть якщо ви ніколи не катался на велосипеді. Ваша участь допоможе нам отримати більш повне розуміння викликів та можливостей для велосипедного руху в Києві.

Заповнення опитування займе близько 5-10 хвилин, а ваші відповіді будуть повністю анонімні та використані лише для наукових цілей.

З вашою допомогою ми зможемо вплинути на міське планування, формування транспортної політики, а також на стратегії місцевих компаній у велосипедній галузі. Беручи участь в цьому опитуванні, ви допомагаєте створити сталий, здоровий та ефективний транспортне майбутнє для всіх нас у Києві!

Скільки вам років?

Short-answer text

З якою статтю ви найбільше себе асоціюєте?

- ◯ Чоловіча
- ◯ Жіноча
- ◯ Не хочу відповідати
- ◯ Other...

Яка ваша професія?

Short-answer text

Яка основна роль велосипеда у вашому житті?

- [ ] Рекреаційна
- [ ] Транспортна
- [ ] Тренувальна
- [ ] Other...

Скільки кілометрів ви в середньому проїжджаєте на тиждень?

Short-answer text

Наскільки позитивно ви оцінюєте використання велосипеду для щоденного пересування?

	1	2	3	4	5	
Негативно	○	○	○	○	○	Позитивно

Чи погоджуєтесь ви з тим, що більш широке використання велосипеду як виду транспорту потенційно може мати економічні, екологічні та соціальні переваги?

	1	2	3	4	5	
Не погоджуюсь	○	○	○	○	○	Погоджуюсь

Наскільки позитивно використання велосипеду сприймається у вашому колі спілкування?

	1	2	3	4	5	
Негативно	○	○	○	○	○	Позитивно

Як би ви описали свій рівень фізичної форми, а саме здатність регулярно долати певну відстань на велосипеді?

	1	2	3	4	5	
Фізичні навантаження відсутні	○	○	○	○	○	Професійний спортсмен

Section 2 of 3

Барьєри для використання велосипеду як основного транспорту

Description (optional)

Яким чином ви зазвичай добираєтесь до роботи/школи/інших місць?

- ○ Пішки
- ○ Громадським транспортом
- ○ Велосипедом
- ○ Автомобілем (власний/таксі/каршерінг)
- ○ Other...

Яка довжина вашого типового маршруту у км (в обидві сторони)?

Short-answer text

В середньому, скільки часу займає ваша поїздка?

Short-answer text

Чи розглядали ви коли-небудь велосипед як засіб для пересування до роботи/школи/інших місць?

- ○ Так
- ○ Ні

Якщо так, то які основні причини, що заважають вам використовувати велосипед для щоденного пересування? (Виберіть 3 найбільш релевантні варіанти)

- [ ] Відсутність безпечної велосипедної інфраструктури
- [ ] Занепокоєність щодо власної безпеки
- [ ] Недостатньо місць для паркування велосипедів
- [ ] Обмежений доступ до душових кабін/приміщень для переодягання в пункті призначення
- [ ] Незнання велосипедних маршрутів
- [ ] Несприятливі кліматичні умови
- [ ] Дистанція є занадто великою для велоподорожей
- [ ] Заскладний рельєф для пересування велосипедом
- [ ] Наявна більш зручна/доступна альтернатива (громадський транспорт, електросамокат тощо)
- [ ] Other...

Section 3 of 3

Перспективи використання велосипеду як основного засобу пересування

Description (optional)

Чи знаєте ви про наявну велосипедну інфраструктуру (велосипедні доріжки, стежки тощо) у вашому місті?

- Так
- Ні

Якщо так, то як би ви оцінили якість та доступність наявної велосипедної інфраструктури у вашому місті?

- Дуже погано
- Погано
- Задовільно
- Добре
- Відмінно

Які ініціативи або поліпшення спонукали б вас почати використовувати велосипед більш регулярно? (Виберіть три найбільш релевантні варіанти)

- [ ] Розширена та безпечніша велосипедна інфраструктура
- [ ] Розширення послуг з аренди велисипедів (більша кількість велосипедів, більша зона покриття, на...
- [ ] Більш безпечні місця для паркування велосипедів
- [ ] Стимули на робочому місці (наприклад, покриття частини витрат на придбання велосипеда, обла...
- [ ] Фінансові стимули від міської влади (наприклад, податкові пільги, субсидії)
- [ ] Other...