Developing bicycle culture in a city prioritizing automobiles

A case study with attitude-based analysis of the city of Gliwice, Poland

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Summary

This thesis is a case study of a Polish city which faces a problem of high automobile share and little popularity of cycling in its residents’ modal split. In times when the world is facing climate change and there is a need of preserving scarce resources, it is essential that urban areas adopt a sustainability approach to the way they develop. Thus, this research focuses on what attitude is held by residents and local authorities of the subject city and how it should be facilitated so that biking for transportation becomes more common. With the approach of Ajzen’s (1991) theory of planned behaviour, the citizens’ perspective is investigated by a questionnaire where the results lead to dividing the population sample into seven groups based on their attitude. Such segmentation into population groups with respect to mobility can help promote sustainable mobility behaviour and is essential in order to address the problem successfully. Local authorities’ attitude is examined by interviews and secondary data analysis. A principal finding here is that in this city bicycle is a secondary or tertiary mode of transportation, while there is a prevailing automobile priority continuously being facilitated by the authorities. The problem lies in that it is not fully understood how bicycling can bring benefits to the city and that managing transportation is an essential part of sustainable urban development. The dissertation concludes with suggestions for both the residents and the authorities so that pro-sustainability behaviour can occur. Additionally, the analysis in this paper could be used in a number of similar cities in Poland.

Key words: bicycle culture, modal split, theory of planned behaviour, attitude, utilitarian cycling, sustainable mobility, segmentation
Table of contents

1. Introduction ........................................................................................................................................ 4
  1.1 Problem statement and research questions ................................................................................. 5
  1.2 Previous research ....................................................................................................................... 7
    1.2.1 Bicycle as a mode of transportation .................................................................................. 7
    1.1.2 Attitude toward cycling for transport .............................................................................. 8
  1.3 Disposition .................................................................................................................................... 9
2. Research design and methods ......................................................................................................... 10
  2.1 Case study .................................................................................................................................... 10
  2.2 Methods ....................................................................................................................................... 10
3. Theory ............................................................................................................................................... 13
  3.1 The concept of attitude ............................................................................................................... 13
  3.2 Theory of planned behaviour ...................................................................................................... 14
  3.3 Attitude-based target groups ....................................................................................................... 15
4. Presentation of the case study .......................................................................................................... 16
  4.1 General information ..................................................................................................................... 16
  4.2 Mobility ....................................................................................................................................... 16
5. Analysis .............................................................................................................................................. 19
  5.1 Residents ..................................................................................................................................... 19
    5.1.1 Geographic and socio-demographic characteristics of the sample ......................... 19
    5.1.2 Perception of bike as a mode of transportation ............................................................. 22
    5.1.3 Attitude-based segmentation ............................................................................................ 23
  5.2 Local authorities .......................................................................................................................... 27
6 Discussion and conclusion ................................................................................................................ 29
7 References ......................................................................................................................................... 32
8 List of figures and tables .................................................................................................................. 36
9 Appendices ...................................................................................................................................... 37
  Appendix 1. The organization of municipality units ....................................................................... 37
  Appendix 2. Internet questionnaire .................................................................................................. 38
  Appendix 3. Interview questions ....................................................................................................... 43
1. Introduction

In the 20th century there has been an enormous increase in road infrastructure and car ownership (Litman, 2006). Cars became more popular and that demanded building new roads. Also, more airport and port infrastructure was provided, as well as rail lines. At the turn of the 20th and 21st centuries, rise of fuel prices made some commuters choose transit over their cars, and so public transportation started to be developed more (Litman, 2006). Nevertheless, cars are still a very common mode of transportation and there are countries where more roads are being built in order to relieve automobile traffic. However, this way of managing the overflow is misleading, because “traffic does not behave like a “liquid” and maintain a constant “volume”, but, rather, behaves more like a “gas” that expands and contracts to fill the space provided for it” (Kenworthy, 2006, p. 81), meaning that the more roads are built to meet the demand, the more traffic is being created, making it a vicious circle. Additionally, when streets are being widened for more comfortable driving and parking, another problems arise, such as scarce urban area is devoted to roads instead of other services, and additional costs of road maintenance occur (Igarta, 2012).

Air in urban areas is mainly polluted by motor vehicles which are responsible for the consumption of the vast majority of travel-related energy (Lee, 2006). Hence, a city that prioritizes automobile dependence is not sustainable. Sustainable cities should rather focus on other modes of transportation such as walking, cycling and public transportation, while limiting the use of cars (Kenworthy, 2006). Concentrating on non-automobile transportation patterns development goes in accordance with the premise of sustainable development which “seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future” (Cassen, 1987, p. 34). Therefore, resources should be used in a wise way, and since different forms of transportation require various depletable resources, cities should manage their mobility patterns so that they are sustainable (Goldman & Gorham, 2006).

The European Union’s Ministers of Transport agreed on a definition of sustainable transport that possesses following characteristics:

- “Allows the basic access and development needs of individuals, companies and societies to be met safely and in a manner consistent with human and ecosystem health, and promises equity within and between successive generations
- Is affordable, operates fairly and efficiently, offers choice of transport mode, and supports a competitive economy, as well as balanced regional development
- Limits emissions and waste within the planet’s ability to absorb them, uses renewable resources at or below their rates of generation, and, uses non-renewable resources at or below the rates of development of renewable substitutes while minimizing the impact on land and the generation of noise.” (as quoted in Rahman & van Grol, 2005, p. I)

This definition stresses the fact that sustainable transport answers the needs of different sorts of users and contributes to local development with respect towards the environment. Thus, when one considers various modes of transportation available in contemporary cities, bicycles turn out to be the most sustainable ones in all three dimensions of sustainability: economic, environmental and social. They are not only environmentally friendly, but also reduce costs of daily commuting and are roughly available to all residents, which makes them an equitable mode of transportation. (Pucher & Buehler, 2008)

Areas that have a dense built environment enhance so called utilitarian cycling because of proximity of various services and impeded driving and parking conditions (Pucher, et al.,
Thus, generally dense, compact cities are more welcoming for cyclists. However, the degree of cycle friendliness in a given city is determined not only by the relative compactness of the city but also by the form and kind of transport infrastructure in place and whether the traffic culture in a city is accepting or at least tolerant of biking. The factor of culture and habit is crucial for popularity of biking in a city, meaning that cycling is not considered a typical behaviour in cities where there are few utilitarian cyclists (Pucher, et al., 1999). Therefore, if the culture of biking is present, it is a driver for people to use their bikes for transportation. However, if we focus on what can be referred to a culture of cycling, an important distinction must be made between recreational cycling and utilitarian cycling. The former is the use of bikes for frequent, recreational trips while the latter refers to frequent use of cycling in all circumstances. Promoting and improving cycle infrastructure per se is not a central part of this thesis. Instead, it is primarily the transport culture and in particular a culture of cycling which is the focus and it is investigated as an attitude toward utilitarian cycling.

1.1 Problem statement and research questions

Gliwice is a city located in the south of Poland, in an agglomeration of two million inhabitants (Górnośląski Związek Metropolitalny, 2014). It is situated at the western edge of the cluster of cities, so it is on one hand included in the vast urban area, and on the other it is exposed to less inhabited, rural areas. The city’s population has been declining for the past years and is currently around 186 thousand living on the area of approximately 134 km² (GUS, 2012; GUS, 2013). These characteristics place Gliwice in the group of twenty biggest cities in the whole country.

The citizens of Gliwice commute every day between different parts of the city, as well as to other cities of the agglomeration. Thus, the residents’ modal split is presented in Table 1 together with the modal split of the area of cities that belong to the Union of Transport which provides public transportation for most of the cities of the agglomeration that Gliwice is in. In the table below one can compare the areas’ population and surface area, hence the population density and the modal splits.

| Table 1 Modal split of Gliwice and the agglomeration in Poland (Dydkowski & Tomanek, 2010; GUS, 2012; GUS, 2013; PP-U "INKOM" S.C. Katowice, 2011; UM Gliwice, 2013; PP-U "INKOM" s.c. Katowice, 2013) |
| ------------ | -------------------------- | --------------------------------- |
| Area (km²)  | 186 210                    | 1 980 466                         |
| Density (inh/km²) | 1 390 | 1 352 |
| Bike lanes (km) | 94 | n.d. |
| Modal split | Walking 24,3% | 33,6% |
| Public Transport (PT) 26,8% | 35,6% |
| Car 46,5% | 29,6% |
| Bike 1,8% | 1,2% |
| Others 0,6% | |

¹ The data on modal split come from a study of mobility in the city of Gliwice that was based on a survey of 859 households located all around the city. The numbers quoted in the thesis have been rounded down and up to reduce decimal places to one.
These data indicate that automobile dependence in Gliwice is high, while cycling is not a common mode of transportation. This structure of mobility does not go in accordance with the notion of sustainable transportation. What is more, the city is continuously expanding its road network, building ring roads and a centrally-located highway. It is also developing a smart system of traffic management, creating favourable conditions for driving a car, which implies that the city prioritizes automobile dependence (ZDM Gliwice, 2014). When compared to the modal split of the agglomeration, it can be noticed that, by and large, the residents of the agglomeration are more likely to walk or commute by public transport, and less likely to go by car, though population density is rather similar in both areas. Moreover, biking is even less common in the whole agglomeration than in Gliwice itself.

Currently, the issue of cycling for transportation is given increasing attention in Poland. The infrastructure is being developed in certain cities, some people have started to recognize bikes as a mode of transport while politicians introduce new laws that enhance cycling and building new bike lanes (Prezydent.pl, 2014). However, there are also negative attitudes that are expressed by people in Poland, especially in the Internet environment. There is a variety of arguments that have been brought up against cycling, such as that cyclists do not pay for roads or that streets and roads are for drivers, not cyclists (WP.PL, 2014). Thus, the topic of cycling is discussed in Poland. What is more, there is as well popular science literature on this topic. An American independent publisher wrote a book where she outlined a long list of proofs and arguments that biking is good for the economy (Blue, 2013).

In the era of strengthening the role of non-motorized ways of travelling, it is essential to transform urban habits of mobility. In Gliwice and the agglomeration it is a part of, bikes comprise only a small percentage in the modal share, while cars seem to be the prevailing mode of transportation. In light of sustainable development it is necessary that cities restructure their mobility pattern so that they put less pressure on the environment and create more liveable spaces. In Poland, especially in the agglomeration where Gliwice is located, the environmental burden is already heavy due to its industrial character. It is vital that the mobility behaviour be turned to the direction toward sustainability so that the area can reduce its air pollution and limit traffic congestion. As bicycling is one of the pieces of sustainable development, promoting utilitarian cycling seems an obvious way to convince people to change their mobility behaviour and give up their cars or public transportation for the sake of bike. Therefore the aim of this paper is to examine the potential of utilitarian cycling in the city regarding people’s attitude towards this mode of transportation. This will be done by finding answers to following research questions:

1) What is the residents’ attitude towards cycling for transport?
2) What is the local authorities’ attitude towards increasing the role of utilitarian cycling?
3) In relation to these attitudes, how to facilitate the development of bicycling for transportation in Gliwice?

The answers to these questions will allow to understand why currently cycling has such a low priority in Gliwice. Hence, this thesis is a case study of one city, but since it is a part of a big agglomeration, its results can be referred to the whole metropolitan area which is a home for approximately ten times more people than the city is inhabited by itself. Therefore, this study is relevant for the field of sustainable mobility in that it investigates people’s attitude in areas prioritizing automobile dependence, and so the potential of switching such car-based modal split needs to be scrutinized.
1.2 Previous research

This thesis investigates cycling for transportation in Gliwice, Poland. Thus previous research has been reviewed to learn about features of a bike as a mode of transportation – its benefits, drawbacks, favourable conditions for cycling and its implications, as well as attitudes toward cycling for transport. Therefore, this section is divided into two parts to elaborate on both of these issues.

1.2.1 Bicycle as a mode of transportation

A lot of research (Pucher, et al., 1999; Pucher & Buehler, 2008; Forward, 2003; McClintock, 2003; Jacobsen, 2003; Pikora, et al., 2003) has extensively examined the role of cycling for transport. These researchers have listed the advantages and disadvantages of biking, and found how it influences the transportation pattern in cities. They have been also investigating what motivates people to take up cycling, and what hinders it. This section will outline all the mentioned aspects in relation to relevant studies.

Biking for transportation can bring many benefits both to an individual and to the environment one lives in, and these are widely presented in literature. Cycling does not pollute the air but is energy efficient and can relieve traffic congestion when more drivers decide to switch to bikes. Moreover, it is cheaper to bicycle than to use any other way of transportation, except walking, thus it is roughly available even for people with difficult financial situation. People who use a bike also claim that it is comfortable, fun and quick to move in dense areas (Pucher, et al., 1999; Forward, 2003; McClintock, 2003). It is as well important to notice that utilitarian, regular cycling is good for one’s health and fitness (Pucher, et al., 1999; McClintock, 2003; Moudon & Lee, 2003).

Among drawbacks of cycling several have been indicated, such as fear of having the bike stolen or having an accident. Some people also find it inconvenient and stressful, especially on roads that are occupied by heavy traffic. Weather and climate conditions might also put people off biking (Forward, 2003; McClintock, 2003).

Nevertheless, still there are cities where utilitarian cycling is very common but also there are some where it is not (Pucher & Buehler, 2008). It is a result of a wide range of factors but can be also related to transport demand (i.e. “vehicle ownership and use” (Litman, 2006)) which is influenced by several elements: demographics, income, vehicle costs, travel speeds, land use, transportation planning and investment practices, and freight transport (Litman, 2006). The structure of the society has a huge impact on what mode of transportation people use – whether they live in the centre or the suburbs, or are younger or older, determines what way of commuting they choose. Income plays an important role, too, meaning that countries with better financial situation decide to invest in better public transportation infrastructure encouraging citizens to leave their cars. Another factor described by Litman (2006) is vehicle costs consisting of e.g. insurance costs, taxes and fuel prices, and it also affects transport demand. Moreover, new technologies which deal with traffic management can cause a reduction in the overall amount of travel. Land use determines what modes of transportation people choose depending on the provision of alternative modes which enhance switching from cars to public transport or cycling (Litman, 2006). The factor of land use is commonly mentioned among researchers examining bicycling. Moudon and Lee (2003) stressed that physical activity is strongly influenced by “the quality of the built environment and patterns of development” (p. 22), outlining three major determinants of walking and cycling, namely the origin and destination of the trip, its route and the area where it is done (Moudon & Lee, 2003). Thus, the city should be compact, of high density, so that travel is reduced and people are more inclined to walk, cycle or use transit rather than their own car (Kenworthy, 2006).
Many studies have discovered how cycling influences people’s behaviour as well as travel patterns. Pucher et al. (1999) found that the percentage of utilitarian cycling increases with the bike share in the modal split. Jacobsen (2003) focused on the aspect of safety and found that the longer the distance bicycled, the lower the number of fatalities per distance. What is more, generally motor vehicles’ drivers change their behaviour on roads when there are more people walking and cycling, leading to a reduced number of accidents occurring between the walkers and bikers, and the drivers. It has been confirmed by Forward (2003), too. Cyclists’ safety also increases when appropriate cycling facilities are provided (Pucher & Buehler, 2008; Forward, 2003; Pucher, et al., 1999).

Vehicle ownership strongly affects how people move but a high percentage of car ownership does not necessarily mean that few people cycle for transportation (Pucher & Buehler, 2008). However, if someone already uses a bicycle but cycles for recreation, he or she might not be likely to become a utilitarian cyclist (McClintock, 2003). This suggests that bicycle culture contains two components – recreational and utilitarian, which may not overlap in the behaviour and habits of individuals.

People are more inclined to practice utilitarian cycling in liveable areas. What makes an area liveable is whether people feel safe when using different modes of transportation as well as on personal level, and if they find it comfortable to move by bike or on foot (Pikora, et al., 2003). Igarta (2012) stressed that liveable streets should be places where people would spend time and which should be resized to welcome traffic “at a more human-pace” (p. 15). Goldman and Gorham (2006) understand liveability very broadly, comprising it of various transportation innovations. They noted several components of this concept, to name “concern for accessibility, the allocation and design of public space, opportunities for social engagement and recreation, and the overall health and economic welfare of city residents” (p. 270).

There is a wide range of ways to encourage utilitarian cycling in cities. They can be divided into two groups: biking infrastructure and government policies. The former includes various types of bikeways, bike parking, biker-friendly crossroads and traffic signals. The latter, which is no less important than the infrastructure, consists in introducing appropriate traffic laws, organizing courses on traffic to train cyclists-to-be to get around, promotional events and various taxation and land-use policies. Apart from these it is important that different solutions limiting the use of automobile are introduced to discourage people from driving, such as parking policies or traffic calming. It is also vital to coordinate biking infrastructure with public transportation to enhance multimodal travels. (Pucher & Buehler, 2008; Pucher, et al., 1999; McClintock, 2003)

1.1.2 Attitude toward cycling for transport

It is essential to learn about people’s attitude to cycling, so that appropriate steps can be done. Pucher et al. (1999) mentioned that safe bikeways and parking as well as showers at destination point would be incentives for people to take up utilitarian cycling. Forward (2003) analyzed how different factors are perceived by people in terms of transportation. And so, cyclists said biking was quick, while drivers stood for the perspective that a car is a quicker mode of transportation in the city, which implies that the attitude in that case can be changed by changing the experience of the travel between the departure and arrival at one’s destination. Cost was another factor, generally considered as crucial by people travelling by public transportation, however drivers did not reflect much on the costs of running a car. If it comes to safety, people do find it important but as it was mentioned before, it increases with the rise of levels of cycling. However, some people might find cycling inconvenient which may cause a negative attitude. Users of different modes of transportation differently perceive
independence – both cyclists and car drivers feel that they are free to when and where they can go. Walkers also consider themselves independent but the distance they can easily travel is more limited. What makes some people choose to walk or cycle instead of driving is caring for environment and their health, and they combine both transportation and daily exercising, unlike drivers who, despite being aware of lack of contribution of car to health and well-being, do not find it necessary to link exercise and transportation. Further on, Forward (2003) discussed attitude change noting that it has an evaluative nature and it is essential to provide educational programmes for people to raise awareness about environmental issues and their contribution to air pollution. Once this step is done and people’s perception is modified, they are more likely to change their attitude.

People’s attitudes have been widely used when determining mobility behaviour (Bamberg & Schmidt, 2003; Anable, 2005; Hunecke, et al., 2010). Several researchers identified different kinds of mobility types based on various approaches: a priori segmentation divides people into groups basing on already known features, such as geographic or socio-demographic ones, while post hoc segmentation is built on data obtained during the research (Anable, 2005). Anable’s (2005) differentiation includes six mobility styles: “complacent car addicts”, “malcontented motorists”, “aspiring environmentalists”, “die hard drivers”, “car-less crusaders” and “reluctant riders”. Prillwitz and Barr (2011) conducted two types of segmentation: attitudinal and daily travel that allowed to distinguish another mobility types. On the other hand, Hunecke et al. (2010) made segmentations based on psychographic, geographic and socio-demographic factors and found the first one being a better predictor for travel mode choice than the second and third ones. The attitude-based target groups selected by Hunecke et al. (2010) include “public transport rejecters”, “car individualists”, “weather-resistant cyclists”, “eco-sensitized PT-users” and “self-determined mobile people”. Dividing commuters according to their attitude allows politicians and other decision-makers to learn what motivates them to choose certain mode of transportation and then address their needs with matching policy and promotional solutions matching their characteristics (Anable, 2005; Hunecke, et al., 2010; Prillwitz & Barr, 2011).

If it is planned to encourage utilitarian cycling in a city, its authorities should be actively involved in the modal switch (Pucher, et al., 1999). Thus their attitude towards cycling is essential, because if they are reluctant to change or do not prioritize cyclists, automobile dependence will still prevail in the city. Therefore the first step regarding officials’ attitude is to give up the notion of bikers as “second rate road users” (McClintock, 2003, p. 231). Later on, they should facilitate biking by both providing the infrastructure, and changing their policies. To conclude, it is vital that the local authorities recognize their key role in the birth and development of bicycle culture, and help people change their travel patterns by providing matching policy and infrastructure. That allows for enduring switch in their attitude (McClintock, 2003).

1.3 Disposition
This thesis has been structured in the following way: at first the research design is outlined together with methods applied in the paper. An approach of case study has been adopted and mixed methods have been used to investigate the subject. The theoretical part focuses on the aspect of attitude by giving an explanation of this disposition and its role and characteristics. Further, the theory adopted in the research, i.e. the theory of planned behaviour is presented to give the reader the base to understand the upcoming analysis of the problem. However, before the analysis itself is outlined, background information on the city of Gliwice will be presented with particular focus on the issue of transportation and its management. This presentation leads to the main body of analysis where both primary and secondary data are used to
investigate the answers to the research questions. Thus, firstly the residents’ attitude toward utilitarian cycling will be scrutinized allowing to divide the surveyed inhabitants according to their attitude and perceived behavioural control of commuting by bike. The second part of the analysis focuses on the local authorities’ perspective to understand how they treat bicycling and what opinion they hold regarding cycling for transportation. Finally, the findings from the analysis are discussed, conclusions are drawn and the thesis is concluded by suggestion for further research within this field.

2. Research design and methods
The following section describes how the research was planned and conducted. It elaborates on the single case study approach that has been applied and also explains what sort of primary and secondary data have been collected and in what way.

2.1 Case study
This thesis is based on a case study which, as Bryman (2008) put it, “entails the detailed and intensive analysis of a single case” (p. 52). It allows to investigate a certain setting in a profound way with the use of both qualitative and quantitative methods. This approach is useful when one wants to learn about the context of an event in a particular setting, because “[a] case study approach is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003, p. 13). Thus, a single case study approach has been adopted to this thesis in order to learn about the issue of utilitarian cycling in a Polish city. The reason for choosing the city of Gliwice is the fact that it is my hometown which I know well and currently perceive the aspect of mobility as one of the main issues and challenges that the city is facing in terms of sustainable development. Hence, a deep analysis of one of the possible ways toward sustainable mobility seems essential. The analysis has been done with an exploratory approach to answer the “what” and “how” questions, which allowed to scrutinize current attitudes and perceptions of bike as a mode of transportation in the subject city.

The scope of the study is the analysis of utilitarian cycling in the city of Gliwice, Poland. Thus, it does not investigate other aspects of sustainable mobility, nor does it examine other cities. It is primarily focused on and limited to examining residents’ and local authorities’ attitudes toward cycling and next the ways to promote cycling. Hence, the design of bike infrastructure itself is not included in the study.

2.2 Methods
The study has been conducted with the use of mixed methods approach which is a combination of qualitative and quantitative methods and is useful because it offers more detailed facts that can be used for the analysis (Blaikie, 2009). Both primary and secondary data have been collected and the way it has been done is presented below. Additionally, a popular science book on cycling as well as observations of comments on the Internet inspired certain ideas for this dissertation.

Among primary data a questionnaire and interviews have been conducted. The questionnaire was online-based, therefore available for residents with an access to a device with Internet connection. The respondents were primarily reached by social media, internet forums and emails, but also the link to the questionnaire was personally distributed among residents. However, it was mainly based on social media which resulted in receiving majority of the answers from rather young adults. Nevertheless, it has been done on purpose, as the main
target group for the survey were people who are at least eighteen years old which gives them the possibility to obtain a driving licence and drive a car, but also are in the so-called young adulthood. Literature and theory review have provided information that such a sample of population is more susceptible to attitude change than middle-aged adults (Ajzen, 2001), but also it is important to address young people as they are essential “for the development of a sustainable environment” (Nilsson & Küller, 2000, p. 229). Arnett (2000) focused his research on a group of people between 18 and 25 years old, distinguished them from other age groups and called this period emerging adulthood. He claims that people belonging to this age group are most subject to major changes in their life and very likely to introduce new lifestyle. They are at a point in their life when they form the basis for the future. Therefore, such distribution of respondents is a source of potential bias, which may result in the size of attitude-based target groups – particular target groups might include many respondents, but if translated to the whole population of the city it might turn out they comprise only several percentage of all inhabitants. Nevertheless, as young people were the primary target group of the survey, the results can be referred to the overall population of young adults of Gliwice.

The questions were both inspired by literature review and built upon the theoretical approach to be used – the survey contained a wide range of questions that referred to determinants of the intention toward behaviour, according to the theory of planned behaviour (Ajzen, 2005; Ajzen, 2006). The answers to TPB (theory of planned behaviour) questions were constructed according to Likert scale as it is a tool often used for examining attitudes (Bryman, 2008), while questions referring to feelings toward everyday commute were to be rated 1 to 7 to let the respondents to assess their travel directly (Ajzen, 2005). All compulsory questions were closed, which allowed to process and compare the answers more easily, but it was also convenient for the respondents as such surveys are easier to fill out than self-completed questionnaires, and they help clarify what the question refers to if the respondent is uncertain (Bryman, 2008). Some of the multiple-choice questions contained an “others” option where respondents could write the answer they found relevant, however this option has been rather rarely used. Eventually, all respondents were given an opportunity to add comments to the survey if they felt the need to do so, and that could have been done by writing personal remarks under a non-mandatory question. Overall, during fourteen days the survey was answered by 371 inhabitants of Gliwice, but due to evident misunderstanding of one of the multiple-choice questions, 77 answers have been removed, leaving as much as 294 replies to be analyzed. The analysis was done using the Microsoft Office Excel spreadsheet application. The answers to Likert-scale questions have been scaled 1 to 5 in order to process them. Then, using pivot tables, attitude-based target groups have been distinguished according to the combination of the score on attitude and perceived behavioural control questions. Such analysis allowed to find similarities among certain respondents and to divide them into rather homogenous groups. The results of the survey possess validity in that they could be applied to similar milieus, namely those represented mainly by young adults living in similar environment, hence the relation of Gliwice to the agglomeration as mentioned in Chapter 1. Reliability, in turn, refers to the results being repeatable (Bryman, 2008), which is predicted to be present among the sample as the questions touched upon the determinants of the theory of planned behaviour and have been designed according to guides, so that it is assumed that the answers are reliable.

Primary data were also collected from interviews conducted by the author. It was decided to take the semi-structured approach to interviewing, which consists in a rather flexible conversation, where the researcher asks earlier prepared questions but the interviewee is free to reply in a way they choose and both parties use similar wording to communicate (Bryman, 2008). There is not a particular strict order in which questions should be asked, and additional questions may be brought up as a reaction to the flow of the interview. The interviews were
conducted in order to gather information for the analysis of the local authorities’ perspective. Therefore, at first the researcher contacted three main municipal offices that deal with bike infrastructure in the city and the interviewees have been chosen by the officers employed at those units. However, eventually one of these three interviews has been cancelled due to little significance for the subject of the thesis (this office deals only with running maintenance of bike lanes outside the road networks, thus it does not design new infrastructure). Instead, it was suggested that particular information will be passed to the researcher via email. The city councillor was chosen for an interview as it was previously known that he advocated for opening a city bike rental. The fourth interview was conducted with representatives of the company that designed the bike lanes network plan for Gliwice, and the last interviewee was a representative of an NGO – the Gliwice Bike Council. It was also attempted to arrange an interview with the mayor of the city, who due to busy schedule was not available, but he has offered to answer questions by email. Therefore, a list of questions has been sent but the mayor did not reply while this thesis was being finalized. Neither did his first deputy who was also emailed in order to gather information via electronic communication. Thus, finally five interviews were conducted with people who are currently engaged in the issue of biking in Gliwice. These interviewees were not only officers employed by the municipality but also employees at a private company and a representative of an NGO. This allowed to hear about biking from different perspectives in order to avoid a municipal bias. The questions asked to the interviewees were inspired by the literature review, the overall problem of sustainable mobility and also by the theory of planned behaviour. The researcher was flexible and new questions emerged during the meetings as a result of the flow of conversations. Three of the interviews were conducted in offices at the city hall, the fourth was done at the headquarters of the company, while the fifth one, namely the interview with the representative of the NGO was conducted in a calm city park. All interviews have been recorded and the analysis was done by repeated listening to the recordings and picking out essential information. The holistic analysis of the local authorities’ perspective included also documentation and other electronic sources review, which eventually were combined with the data from the interviews and referred to the theory and the research questions.

As mentioned in previous paragraph, some secondary data have also been used for the thesis. These were mainly electronic sources such as reports and plans, city ordinances, city weekly newsletter and a video recording of a meeting on biking, which was held in 2011. The written data have been scanned for any information on biking infrastructure, while the video recording has been watched to listen for obtaining another data referring to authorities’ attitude, as the main speaker during the meeting was the mayor’s first deputy, whose opinions gave a lot of insight for the case.

Last but not least, literate review was an important part of conducting the research. Scientific articles were obtained from online databases such as SAGE Journals, ScienceDirect, Wiley Online Library and Taylor & Francis Online. The peer-reviewed articles were picked by searching for key words but also many were chosen from reference lists of another articles, previously read by the author of the thesis. That ensured reliability and usefulness of particular texts. The analysis of the articles consisted in searching for works on a similar or related topic so that various aspects of bicycling could have been investigated and compared. It was also important to learn how other researchers have previously scrutinized people’s attitude toward cycling and then conducted segmentation. Various books relevant to the field of sustainable mobility and to the issue of attitude have been read and used for the previous research review and the theoretical basis of the thesis. However, since the majority of these sources were published in light of the concept of sustainable development, a possibility of bias occurs as the sustainability approach favours non-automobile modes of transportation.
Nevertheless, all sources for literature review come from scientific databases or are books available at the university library which positively influences their reliability.

3. Theory
This thesis is to investigate the residents’ and local authorities’ attitude towards utilitarian cycling in order to examine the potential of wide implementation of biking for transportation in the city of Gliwice, Poland. Therefore the theoretical chapter investigates the concept of attitude, its change, as well as its role in people’s behaviour, hence the theory of planned behaviour is later described. Ajzen (1991; 2001; 2005) has widely examined the concept of attitude and developed a theory that other researchers have later used to analyze mobility and environmental attitudes and behaviour (see e.g. Hunecke, et al., 2010; Bamberg & Schmidt, 2003; Anable, 2005; Harland, et al., 1999; Oreg & Katz-Gerro, 2006).

However, the theory of planned behaviour is not the only approach that can be used for research within the field of mobility attitudes. Researchers also use the concept of habit as an essential determinant of people’s choice of mode of transportation, and it is crucial in predicting behaviour (Anable, 2005; Forward, 2003). Schwartz’s norm activation model is another approach used in the field – it is based on the premise that behaviour is driven by personal norms and individuals are more likely to perform a given behaviour providing they are aware of negative consequences of not doing it, and they feel responsible for it. Not knowing neither the consequences nor feeling the responsibility will hold one back from performing a behaviour (Bamberg & Schmidt, 2003). Another way of addressing the problem is to apply the theory of affect which assumes that affective appraisals are associated with various items, such as daily commute (Gatersleben & Uzzell, 2007). The theory of planned behaviour has been chosen for this thesis because it assumes that people make decisions on behaviour based on their attitudes and perceived obstacles, and they weigh up the benefits and costs of given behaviours (Bamberg & Schmidt, 2003; Anable, 2005). It therefore stresses the salient role of possessed attitudes and barriers in choosing transport mode, becoming important issues to be examined when investigating the case of utilitarian cycling.

3.1 The concept of attitude
An attitude as such has an evaluative nature as it shows how one assesses an object – whether they have a favourable or unfavourable reaction towards it (Ajzen, 2005; Ajzen, 2001). These reactions, or responses, can be categorized into cognition (what one believes about an object), affect (how one feels like about an object), and conation (how one behaves about an object) (Ajzen, 2005). Thus, what attitude one has depends on their beliefs which determine the overall evaluation. This is the premise of the expectancy-value model which presumes that people’s beliefs towards particular objects are strongly linked with its characteristics which, together with the beliefs, form general attitudes (Ajzen, 2001).

The strength together with the valence of the attitude are factors that differ among people. While the latter refers to how positively or negatively one perceives the attitude object, the former indicates the strength of this evaluation. It is expected that together with the strength of an attitude, its stability increases, as well as the possibility of predicting the behaviour. What is more, strong attitudes are less likely to undergo persuasion. Therefore, it is a challenge to change a strong attitude, and it is also linked with age – young adults are more likely to switch their attitude, and this likelihood decreases until the middle adulthood. Later, in turn, the chance of changing the attitude rises again, until the age of late adulthood (Ajzen, 2001). This finding means that switching one’s attitude is the least challenging at the relatively young and old age, unlike the middle one.
People’s attitudes can be used to predict future behaviour because they can be measured in advance. What is more, people are apt to act in a certain way if the expected outcome is desired, and on the other hand they would avoid an action knowing that it might end up unfavourably (Ajzen, 2005).

3.2 Theory of planned behaviour

The concept of attitude is included in the theory of planned behaviour which is described in more detail here. This theory is “designed to predict and explain human behavior in specific contexts” (Ajzen, 1991, p. 181). It puts one’s intention at the top, as the main reason for behaving in a certain way, and this intention is under influence of three factors, namely attitude towards behaviour, subjective norms and behavioural control (Ajzen, 2005; Ajzen, 2001).

As noted earlier, the intention to perform a behaviour is the central element of the theory. It is essential and elementary that a person wants to perform certain behaviour, and intention shows how strong this desire is. Therefore, it is generally assumed that the stronger the desire, the higher the probability of behaviour occurrence. However, apart from one’s motivation, their ability (also called behavioural control) to perform is also essential (Ajzen, 1991).

![Figure 1: Theory of Planned Behaviour (Ajzen, 1991)]

Figure 1 presents three determinants of the intention towards behaviour: (i) *attitude toward the behaviour* which is one’s personal evaluation of the behaviour, (ii) *subjective norm* which refers to how society influences the decision, and (iii) *perceived behavioural control*, meaning how easy or difficult one believes the performance of the behaviour is, thus it is comparable to the concept of perceived self-efficacy. Taking these aspects into consideration, if they are favourable, meaning that the personal evaluation is positive, and social pressure and the opportunities to perform are present, then the intention is more likely to occur (Ajzen, 2005). The three factors might have different weights if it comes to certain attitudes – for some the attitude might turn out the most important, while for others it could be social norms or perceived behavioural control. Moreover, in some cases only one or two of the determinants could influence the intention. The combination of all three factors may vary depending on the context and situation (Ajzen, 2005). However, it is claimed that the likelihood of developing an intention is very low when one believes they do not possess the needed means to perform,
regardless of their positive attitude and support from the society – that shows the important role of perceived behavioural control. Moreover, the dotted arrow in Figure 1 means that, provided that the control one perceives and the control one actually has correspond, perceived behavioural control can directly influence the behaviour – but this situation also depends on the context, and then perceived behavioural control becomes “a measure of actual control” (Ajzen, 2005, p. 119).

The theory of planned behaviour allows a way to explain people’s actions. It is based on the premise that human behaviour depends on antecedents of the three determinants analysed above, which in turn influence the behavioural intention. These antecedents are called salient beliefs and they can be categorized into three types, matching the determinants. Attitude toward behaviour is driven by behavioural beliefs held by people at a given moment, subjective norms are shaped by normative beliefs, and perceived behavioural control is regulated by control beliefs. The first group of beliefs, namely the behavioural beliefs reflect feelings that people have towards the attitude object, and the attributes that are associated with it (Ajzen, 1991). This is connected to the earlier mentioned expectancy-value model which joins the object’s features and the beliefs. The second sort of beliefs is the foundation of subjective norms. Normative beliefs are linked with the perception of whether important others in one’s life would judge the behaviour positively or negatively. In other words, whether they would support the performance of the behaviour or not. The last type of beliefs, control beliefs, have to do with available means, tools or opportunities that facilitate behavioural intention. The source of these beliefs can be either past experience or information gathered about the behaviour that had been previously performed by other people. Consequently, perceived behavioural control which is determined by control beliefs, will be bigger once there are more favourable conditions and resources, and fewer hindrances (Ajzen, 1991). Summing up, the three salient beliefs are antecedents of attitude toward behaviour, subjective norms and perceived behavioural control which, in turn, determine the intention toward behaviour. Apart from that, it is also assumed that the intention can be implemented once a person has publicly announced the willingness to take up the behaviour (Ajzen, 2005). However, it is important to notice that the behaviour can be changed by changing people’s beliefs toward it (Ajzen, 2005).

### 3.3 Attitude-based target groups

The third research question of this thesis raises the problem of encouraging people of Gliwice to accept and use bike for transportation purposes, depending on the attitude they hold. This problem can be faced by coming up with attitude-based target groups which result from the process of segmentation. The goal of such process is to select groups of people of similar needs and attitudes so that the expected reaction to given marketing actions is rather homogenous (Dibb, 1999). Thus, segmentation can be done by using six criteria, such as (i) predictive power to assess how well the segment’s behaviour can be anticipated, (ii) actionability that aims at finding drivers for taking up particular behaviour, (iii) measurability which refers to the information for segmentation that is attained, (iv) stability of the chosen segments with the time flow, (v) accessibility meaning the ability to introduce marketing actions in order to address target groups, and (vi) efficiency in the usage of target groups in future actions (Hunecke, et al., 2010).

Identifying attitude-based target groups facilitates the promotion of a sustainable approach towards mobility (Hunecke, et al., 2010). Moreover, it allows to address particular groups and target efforts to change their behaviour which is essential in order to create a sustainable living environment, because participation is crucial in this matter (McKenzie-Mohr, 2000).
Thus, sustainable behaviours can be promoted by community-based social marketing. This tool is comprised of four stages. Firstly, an elementary factor is the identification of barriers to particular behaviour to learn what hinders performing it, what the obstacles are and why people are reluctant to engage. It allows to list behaviours that are to be promoted. Secondly, having successfully recognized the obstacles and selected behaviours, strategies to mitigate the barriers and facilitate the behaviours are to be designed. This step is followed by piloting before wide introduction of the strategies. Eventually, community-based social marketing should be subject to evaluation which is the last step of the programme. (McKenzie-Mohr, 2000)

Identifying target groups allows for better implementation of sustainable behaviour, since different individuals or groups of individuals have different beliefs, thus intend to perform different behaviour. Segmentation enables addressing the groups’ beliefs and changing them in order to facilitate the desired behaviour.

4. Presentation of the case study
A brief introduction to the city of Gliwice appeared in Chapter 1. A more in-depth presentation follows below.

4.1 General information
The city is among twenty biggest and most populated cities in Poland. Its population density is nearly 1400 inhabitants per square kilometre. Gliwice lies on uplands which significantly affects its climate. The mean annual temperature is 7-8°C, with the mean monthly January temperature of -2 to -3°C, and the mean monthly July temperature reaching 14-16°C. Annual precipitation varies between 600 and 800 millilitres and the city is not subject to strong winds, but rather to weak and very weak, mostly west winds. It is an industrial city, which in the past hosted several coals mines and steelworks, most of which do not operate anymore. Yet, the concentration of remaining industry affects the air quality which is significantly worse and more polluted than in other parts of the country. Almost 46% of the city area is urbanized, 43% counts as farmland, and the remaining 11% is forests. (EKO–PROJEKT, 2012)

Gliwice is divided into twenty-one districts that differ between each other – some are typical central city districts with high density and mixed-use, while others are former villages that the city acquired in the previous century, but their character still remained more rural than urban, with prevailing detached and semi-detached housing, farmlands and low density areas. Hence, having over twenty districts and a long history, the city’s urban environment is widely differentiated – several remains from the medieval times located in the downtown next to tenement houses built in the nineteenth and twentieth centuries, as well as blocks of flats put up in the second half of 20th century. Moreover, as mentioned before, there are low-density buildings from 20th and 21st centuries and modern several-storey apartment buildings located all around the city. There are also several parts of the city devoted primarily to one urban function, be it industrial (such as Katowice Special Economic Zone), logistic (e.g. Silesian Logistics Centre), educational (the campus of Silesian University of Technology) or residential, as explained before. The oval-shaped old town is a remain from the Middle Ages which is visible in its urban planning – there is a market square surrounded by a net of relatively narrow streets.

4.2 Mobility
The city is developing its logistics and transportation function by expanding the road network. There are two highways – one on the east, and one on the south of the city, and another one, a
central highway is currently under construction in the centre of the city. This highway is to connect the cities of the agglomeration, and it is positioned to be a core of the area – it runs across it, from east to west. In the centre of Gliwice it will be hidden in a tunnel of approximately half a kilometre (UM Gliwice, 2014). Figure 2 presents the network of main roads in the city, where the green ones are the eastern and southern highways, and the remaining yellow, orange and red ones are other main roads, however the central highway is not on the map as it is not finished yet.

![Figure 2 Main roads and highways in Gliwice. Map derived from the city’s GIS (UM Gliwice, 2014).](image)

During the years 2011-2013 the city implemented a modern, intelligent transportation system in order to improve traffic on streets that have traffic lights (ZDM Gliwice, 2014). The system managed to relieve traffic in the city and mitigate the situation during rush hours.

In Gliwice there is no official paid parking zone, so that people can freely leave their cars on marked car parks around the city (with the exception of some car parks near certain institutions or private car parks). However, there is a limitation for truck traffic within the city centre that has been scheduled to certain hours. This law refers to truck weighing over 12 tons, but one can apply for permission to enter the centre under certain conditions (ZDM Gliwice, 2013).

As it was described in the city’s modal split (see Chapter 1, Table 1), about a fourth of daily journeys is made by public transport. There are over forty bus routes around the city, some of which operate only within the city boundaries, while others connect Gliwice with other municipalities (UM Gliwice, 2014). There are also two active train stations in the city. In 2009, after 115 years of having trams in the city, local authorities decided to remove them and replaced them with buses (Tramwaje Gliwickie, 2014).

Biking infrastructure in the city is not widely developed – currently there are about 94 kilometres of bike lanes, including both recreational and utilitarian routes. It is an incoherent network of bike lanes which consists of around 57 kilometres of paved tracks and 37 kilometres of dirt tracks, and majority of the bike lanes does not meet the legal requirements of bike paths (PP-U "INKOM" s.c. Katowice, 2013). However, in 2013 the municipality ordered an extensive plan for new bike lanes. After having conducted a survey among approximately a thousand residents, as well as numerous consultations with organizations and
Residents’ associations, a plan for over 300 kilometres of bike lanes has been designed. The project cost around 88 thousand Euros and the estimate cost of building the infrastructure is around 60 million Euros\(^2\) (UM Gliwice, 2014). However, local authorities have not announced any time plan for implementation of the project.

The management of transportation or mobility in Gliwice is not a responsibility of one unit. There are several entities that manage particular aspects of transportation. Providing bus transportation is the duty of the Union of Transport that includes most of the municipalities in the agglomeration. Trains are in hands of several companies that operate on regional or national level. According to its charter, the Office of City Streets\(^3\) takes care of public roads and bike lanes within the area of public roads. It is also responsible for implementation of city bike rental and paid parking zone (however it is not specified when to do both), and for deciding on permission for heavy trucks to enter the downtown (Rada Miejska w Gliwicach, 2014). Another city unit, the Department of Investments and Renovations is accountable for the new plan of bike lanes, and the Department of Economic Ventures and Municipal Services\(^4\) deals with current maintenance of bike routes that lie outside of road network (UM Gliwice, 2014). The City Office of Municipal Services\(^5\) takes care of bike lanes that are located in parks that this unit is responsible for. Summing up, the aspect of bike infrastructure is managed by four different entities in the municipality (for a more detailed organizational structure see Appendix 1.). Apart from them, local non-governmental organizations (NGOs) play an important role – in 2012 several bike NGOs got together and created a mutual organization called The Bike Council of Gliwice\(^6\) which currently is the main voice of cyclists and advocates for the development of bike infrastructure (Wojtynek, 2014). This description of responsibilities indicates that the management of mobility in Gliwice is widely dispersed among several entities, and there is no superior unit that deals with the overall aspect of transportation in the city.

Figure 3 presents road occurrences involving cyclists in Gliwice that were reported to the police during the years 2006 and 2013. The number of road occurrences is the sum of accidents and collisions. There is no general trend in the number of road occurrences within the past years, however the number of accidents has been declining, and so has the number of injured. There have not been many fatalities within last years, either. Apart from road safety, bicycle theft is also an issue. In 2013 112 bikes have been reported stolen, and during the first quarter of 2014 the number of reported bike thefts was 8 (Gliwice City Police Headquarters, 2014).

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\(^2\) The currency in Poland is Polish złoty (PLN), thus the prices quoted are originally 369 thousand and 250 million PLN respectively

\(^3\) The Office of City Streets (pol. Zarząd Dróg Miejskich) is a city organizational unit that is supervised by the mayor of Gliwice

\(^4\) The Department of Investments and Renovations (pol. Wydział Inwestycji i Remontów) and The Department of Economic Ventures and Municipal Services (pol Wydział Przedsięwzięć Gospodarczych i Uслug Komunalnych) are departments at the Municipal Office of Gliwice

\(^5\) The City Office of Municipal Services (pol Miejski Zarząd Usług Komunalnych) is a city organizational unit that is supervised by the mayor of Gliwice

\(^6\) The Gliwice Biking Board – Pol. Gliwicka Rada Rowerowa
5. Analysis
The analysis consists of two main parts: the first one regarding the residents, and the second one referring to local authorities. Both groups are thoroughly examined, with the stress on the factors from the theory of planned behaviour (for the full questionnaire see Appendix 2. while the interviews questions are in Appendix 3.).

5.1 Residents
This part is an analysis of the online survey that has been distributed among residents of Gliwice. Firstly, all results are collectively outlined, starting from the geographic and socio-demographic characteristics of the respondents, followed by the results on people’s attitude toward cycling for transportation. Finally, seven attitude-based target groups are distinguished that divide people of similar beliefs and perspectives.

5.1.1 Geographic and socio-demographic characteristics of the sample
The questionnaire has been filled in by residents from all twenty-one districts of Gliwice. The response rate from each district was not the same – in most cases the more populated the area, the greater number of replies have been submitted. The distribution according to respondents’ sex is equal (50 per cent for each sex), however over half of the respondents are between 18 and 25 years old, nearly a quarter is 26 to 30 years old, while the remaining percentage is older (with majority of the rest being between 36 and 50). Figures 4 and 5 present the comparison of sex and age of the residents who filled out the survey to the population of Gliwice.

Approximately two thirds of the surveyed have obtained higher education, a third finished secondary schools while one per cent has an elementary level of education. The majority of respondents is employed (52%), 43 percent is studying and the remaining few percent contain the following three groups: unemployed, retirees and pensioners, and housewives, which means that most of the answers are given by people who commute daily. One’s perceived financial situation has been evaluated as good in 45% of the cases, as average in 43% of the
cases, as very good in 9%, as bad in 4% and only one person admitted to be in a very bad situation, which in the sample of 294 replies is insignificant and calculated as zero percent.

The survey was targeted at adults, meaning that according to their age, all respondents are eligible to drive a car. Hence, vast majority (85%) of the surveyed has a driving license, and 86% has an access to a car. Even more, ninety percent of the people possess a bicycle. Ten percent of the respondents exercise every day, thirty percent does it around 3 or 4 times a week, while 28 percent does it weekly, about quarter-less often, and 3% never engages in a physical activity.

Thirty-two percent of the surveyed live within two kilometres from the centre of Gliwice, slightly more, namely 37% live in an area located two to five kilometres from the downtown, while nearly a fourth lives between five and eight kilometres away from it. Eight percent of the residents assessed that their dwelling is farther than eight kilometres away from the city centre. Next, respondents were asked about the distance from their dwelling to the nearest bus stop, which in most cases (89%) is below 500 metres, while the distance to the nearest bike lane is shorter than 1 kilometre for 55% of the respondents, 1 to 3 kilometres for a fifth of them, while 17% do not know where the nearest bike lane is. If it comes to the daily commuted distance, it is as follows: 18% of travels are below 2 kilometres, 27% are 2 to 5-kilometre-long, 21% are between 5 and 8 kilometres, and the remaining 35 percent of travels are longer than 8 kilometres. That means that approximately two thirds of daily commute is
within a distance that could be bicycled. With such distribution of distance travelled daily, the modal split of respondents is as presented in Table 2.

Table 2 Modal split among survey respondents

<table>
<thead>
<tr>
<th>Mode of transport</th>
<th>Share of travels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>19%</td>
</tr>
<tr>
<td>Public transportation</td>
<td>28%</td>
</tr>
<tr>
<td>Car</td>
<td>44%</td>
</tr>
<tr>
<td>Bike</td>
<td>9%</td>
</tr>
</tbody>
</table>

Excluding the bike, all other modes of transport have a very similar or the same share as in the general modal split of the city of Gliwice (see Table 1. for the holistic modal split). These travels have been evaluated in terms of eight characteristics: comfortable (as proximity of modes of transport and the number of changes of modes), comfortable (as comfort of the travel), stressful, time-consuming, interesting, costly, environmentally friendly and good or bad for the respondent’s health. Each feature was assessed in a seven-point scale where 1 referred to positive impact or feature (such as comfortable, interesting, cheap, environmentally friendly etc.) and 7 indicated a negative impact (uncomfortable, stressful, time-consuming, expensive etc.).

Table 3 Evaluation of daily commute. A – Comfort as proximity of modes of transport and the number of changes of modes; B – Comfort of the travel; C – Stressfulness; D – Time-consuming; E – Interesting; F – Cost; G – Environmental friendliness; H – Impact on the respondent’s health

<table>
<thead>
<tr>
<th>Mode of transport used for daily commute</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>1.86</td>
<td>2.09</td>
<td>1.82</td>
<td>1.98</td>
<td>4.12</td>
<td>1.58</td>
<td>1.81</td>
<td>2.02</td>
</tr>
<tr>
<td>Bicycle</td>
<td>2.00</td>
<td>2.75</td>
<td>2.25</td>
<td>1.50</td>
<td>3.13</td>
<td>1.38</td>
<td>1.75</td>
<td>1.63</td>
</tr>
<tr>
<td>Bus</td>
<td>3.02</td>
<td>3.74</td>
<td>3.04</td>
<td>4.28</td>
<td>5.43</td>
<td>3.94</td>
<td>4.30</td>
<td>4.36</td>
</tr>
<tr>
<td>Train</td>
<td>4.40</td>
<td>3.40</td>
<td>2.90</td>
<td>6.10</td>
<td>5.80</td>
<td>3.50</td>
<td>3.10</td>
<td>3.90</td>
</tr>
<tr>
<td>Walking + Bus or Train / Bicycle + Train</td>
<td>3.54</td>
<td>3.46</td>
<td>3.31</td>
<td>4.38</td>
<td>5.15</td>
<td>3.46</td>
<td>2.62</td>
<td>2.85</td>
</tr>
<tr>
<td>Multimodal</td>
<td>4.33</td>
<td>4.00</td>
<td>3.42</td>
<td>5.50</td>
<td>4.83</td>
<td>3.33</td>
<td>4.08</td>
<td>4.17</td>
</tr>
<tr>
<td>Car</td>
<td>2.78</td>
<td>2.22</td>
<td>2.95</td>
<td>3.00</td>
<td>4.77</td>
<td>4.45</td>
<td>4.98</td>
<td>4.69</td>
</tr>
<tr>
<td>Total Mean</td>
<td>2.76</td>
<td>2.68</td>
<td>2.79</td>
<td>3.21</td>
<td>4.69</td>
<td>3.48</td>
<td>3.79</td>
<td>3.76</td>
</tr>
</tbody>
</table>

Table 3 presents the appraisals of daily travels. The cells highlighted in green represent the lowest (i.e. most positive) score, while the ones in red show the highest (most negative) score in particular feature. Train commuters are the ones who are the least satisfied with comfort as proximity of modes of transport (A), they also find their travel the most time-consuming (D) and monotonous (E). Multimodal transportation was assessed as the most stressful (C) and the least comfortable in terms of comfort of travel (B). Those who commute by car consider their travel the most expensive (F), environmentally unfriendly (G) and bad for their health (H). The lowest grades, which represent the most pleasant appraisals were given by walkers and cyclists. Commute by walking is the most comfortable according to both factors of comfort (A and B) and also the least stressful. However, commute by bike scored most positive on the other five factors, therefore it is the least time-consuming (D) or cost-intensive (F), and the most interesting (E), environmentally friendly (G) and good for the commuter’s health (H).
Table 4 Correlations between cost and impact on health \((F,G)\) and between environmental friendliness and impact on health \((G,H)\)

<table>
<thead>
<tr>
<th>Mode of transport used for daily commute</th>
<th>(r(F,G))</th>
<th>(r(G,H))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>0.77</td>
<td>0.74</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0.78</td>
<td>0.80</td>
</tr>
<tr>
<td>Bus</td>
<td>0.42</td>
<td>0.36</td>
</tr>
<tr>
<td>Train</td>
<td>0.51</td>
<td>0.78</td>
</tr>
<tr>
<td>Walking + Bus or Train / Bicycle + Train</td>
<td>0.48</td>
<td>0.73</td>
</tr>
<tr>
<td>Multimodal</td>
<td>0.14</td>
<td>0.40</td>
</tr>
<tr>
<td>Car</td>
<td>0.51</td>
<td>0.61</td>
</tr>
<tr>
<td><strong>Total Correlation</strong></td>
<td><strong>0.70</strong></td>
<td><strong>0.76</strong></td>
</tr>
</tbody>
</table>

Next, correlation (Pearson’s \(r\)) was calculated for combinations of pairs of factors according to all seven ways of commute. It revealed that environmental friendliness is highly or relatively highly correlated with both the cost of travel and/or with impact on health in most of the cases. It means that the ones who scored low or high on environmental friendliness, rated impact on health in a similar way (see Table 4). Additionally, for walked commutes comfort of travel is rather highly correlated with time-consumption \((r(B,D) = 0.76)\), while for train travels there is a significant correlation between comfort of travel and stressfulness \((r(B,C) = 0.87)\).

The surveyed commuters were to pick the most pleasant and unpleasant experiences during their daily travel. In the former group the most common were a comfortable mode of transport, the possibility of listening to music, reading or playing, and observing the environment. The latter, on the other hand, included most often the danger or threat of an accident, a crowded or delayed bus or train, and a lack of appropriate infrastructure.

### 5.1.2 Perception of bike as a mode of transportation

When taken all opinions collectively, the respondents appreciate a bike mostly for its good impact on one’s health and being a money-saving mode of transport. However, the biggest drawbacks of utilitarian biking are a feeling of danger caused by cars, the risk of bike theft and not being weatherproof. Thus, what would convince these residents to cycle would be a developed network of bike lanes and bicycle racks and parkings and the possibility of biking the opposite direction on one-way roads or on roads closed for automobile traffic. Consequently, what discourages people from biking on everyday basis is mostly poor bike lanes network, heavy car traffic and the risk of bike theft.

The majority of the surveyed do not associate bike commute with poor financial situation, but they believe it is a sign of being fit. Consequently, commuting by car is not perceived as a sign of wealth, neither is public transport travel an indicator of financial difficulties. However, there is no prevailing agreement whether one would use a rented bike to cycle in the city centre, or that one would cycle to get to the bus stop or railway station – the responses are rather equally distributed from strong agreement to strong disagreement. Similarly, the opinion of important others does not have a predominant influence on ones cycling behaviour.

The replies indicate that automobile commute is not seen as influencing one’s image in other people’s eyes. A little over half of the surveyed does not agree that bike commute does not befit people of certain occupations.

54 percent of respondents is inclined to admit that they would bicycle for transport already now if they wanted. Over three quarters would be encouraged to cycle by a developed bike
infrastructure which would also convince 55% of the respondents to switch from cars or public transport to bikes. About a half of the surveyed admitted that the rise of fuel price, car park charges or public transport fares would be an incentive to take up cycling. Again, three quarters claim that the weather plays a significant role in their choice of transport mode. It is also commonly believed that a developed bike infrastructure limits the number of accidents and that city authorities have an influence on what mode of transport the citizens choose most often.

5.1.3 Attitude-based segmentation

All responses have been evaluated according to the answers to attitude questions and perceived behavioural control (PBC) questions. The former referred to association of mode of transportation with financial situation and to willingness to bike to a bus stop or railway station and later continue the travel by public transport, and to use rented bike to cycle in the city centre. The latter, namely the PBC questions touched upon matters such as likeability of taking up cycling if proper infrastructure was provided or transportation fares were risen, or whether developed infrastructure increases safety on roads. By and large, statements referring to subjective norms have been assessed as moderately significant, which is the reason for this determinant has not been used as a major one in identifying target groups. All the statements were evaluated in 5-point Likert scale from strongly disagree to strongly agree (with the middle one of “undecided”). Next, the appraisals were scaled from 1 to 5, where the pro-cycling answer was numbered 5, and the anti-cycling was numbered 1. On that basis residents’ attitudes and PBC were evaluated and then put together in a pivot table (see Table 5).

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Perceived Behavioural Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Total</td>
<td>11</td>
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The combination of attitudes and PBC held by surveyed residents allowed to distinguish seven target groups of various grades on the scale of attitude and on the scale of perceived behavioural control. These target groups have been marked by colours in Table 5. The sample of residents that have been surveyed is unevenly distributed among the seven groups – the tendency is that the more positive the attitude and the higher the perceived behavioural control, the more people can be identified in such a group. Thus, following groups have been distinguished: “urban cycling enthusiasts”, “hesitant cycling supporters”, “susceptible uncertain commuters”, “tolerant non-cyclists”, “strict underappreciators”, “susceptible conservatives” and “determined rejecters” (see Table 6 for each group’s score on attitude and PBC and the percent of the sample as well as gender distribution in each group). Hence, the main criterion for the segmentation is the predictive power that allows to foresee particular group’s behaviour.
<table>
<thead>
<tr>
<th>Name of the group</th>
<th>Score on Attitude</th>
<th>Score on PBC</th>
<th>Percent of the sample</th>
<th>Gender distribution (%)</th>
<th>Female/ Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Urban cycling enthusiasts</td>
<td>4 and 5</td>
<td>4 and 5</td>
<td>34</td>
<td>54/46</td>
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<td>2) Hesitant cycling supporters</td>
<td>4 and 5</td>
<td>3</td>
<td>27</td>
<td>55/45</td>
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<tr>
<td>3) Susceptible uncertain commuters</td>
<td>3</td>
<td>3, 4 and 5</td>
<td>21</td>
<td>49/51</td>
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</tr>
<tr>
<td>4) Tolerant non-cyclists</td>
<td>4 and 5</td>
<td>1 and 2</td>
<td>4</td>
<td>33/63</td>
<td></td>
</tr>
<tr>
<td>5) Strict underappreciators</td>
<td>3</td>
<td>1 and 2</td>
<td>6</td>
<td>33/63</td>
<td></td>
</tr>
<tr>
<td>6) Susceptible conservatives</td>
<td>1 and 2</td>
<td>3, 4 and 5</td>
<td>5</td>
<td>36/64</td>
<td></td>
</tr>
<tr>
<td>7) Determined rejecters</td>
<td>1 and 2</td>
<td>1 and 2</td>
<td>3</td>
<td>40/60</td>
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</tr>
</tbody>
</table>

Below, the description of each group is given. After having classified the sample of respondents according to their attitude and perceived behavioural control, each group has been examined to investigate whether it possesses any distinctive socio-demographic features. This analysis showed that there is a little bit more women included in the first two target groups, while the gender distribution among susceptible uncertain commuters is almost equal. However, men dominate the next three groups, namely tolerant non-cyclists, strict underappreciators and susceptible conservatives, as they make up two thirds of them. Determined rejecters consist of forty percent of women and sixty percent of men. Any other socio-demographic features that have been found characteristic for particular target groups can be found in each group’s description below.

**Urban cycling enthusiasts**

About a third of the surveyed belong to this group. They do not consider which mode of transportation an individual takes as an indicator of financial situation, and they are willing to use a rented bike to move around the centre of Gliwice. A majority of them would introduce multimodal commute in that they would cycle to a bus stop or railway station to switch to public transport to reach their final destination. Urban cycling enthusiasts would willingly take up cycling for transport provided that the infrastructure was developed. In that case they would as well change their commute habits from car or public transportation to bike. It would also happen if the ticket fares or fuel and parking prices increased. What is more, a coordinated bike and public transport infrastructure would encourage them to bike on an everyday basis. They strongly believe that the local authorities have an impact on residents’ mobility choice and that a developed bike infrastructure lowers the number of accidents. According to urban cycling enthusiasts commuting by car does not influence one’s image. Neither do they consider it to be inappropriate for certain occupations to commute by bike.

Urban cycling enthusiasts are much more inclined than other groups to engage in physical activity frequently – over half of them exercises at least a few times a week. Their modal split is less car-dependent, as a car is used by about a third of them, while 28% of urban cycling enthusiasts walk, and 14% cycle.

**Hesitant cycling supporters**

This is the second largest group from the sample. Just like urban cycling enthusiasts, its members do not see any connection between income and used mode of transport, however they are not so keen on using a rented bike in the downtown, and hold a rather negative attitude toward cycling to a bus stop or railway station for further transport to a final
destination. Proper bike infrastructure is claimed to encourage hesitant cycling supporters who also claim that it can contribute to the decrease of the number of accidents. However, although bike lanes network would help them cycle, they are less inclined to give up their cars or commuting by public transport for the sake of bikes, even if costs of those modes rose. They may, however, switch to bikes provided that the infrastructure was coordinated with that of public transportation. Hesitant cycling supporters are very weather-sensitive if it comes to choosing a mode of transport.

Among residents included in this group exercising is less frequent than in the whole sample of all respondents – two thirds of hesitant cycling supporters engage in physical activity once a week or less often, while almost no one does it daily. What is more, they tend to commute longer distances than the whole sample does – 42% of the group travel over eight kilometres one way. Almost sixty percent of the group members commute by car, bus is used by 15%, 8% of hesitant cycling supporters walk, and as little as 1% of them commute by bicycle. 

Susceptible uncertain commuters

This group comprises about a fifth of all respondents. Since it includes those who repetitively chose the “undecided” option, members of this group possess a rather vague attitude toward utilitarian cycling. Firstly, according to them, biking does not indicate financial difficulties, but driving, on the other hand, can be associated with wealth, and in the opinion of this group for some occupations it is rather inappropriate to commute by bike. Susceptible uncertain commuters admit they would be encouraged to cycle if offered a developed biking infrastructure, which, they also believe, limits the number of accidents. However, they are price-sensitive, as they might switch to cycling if the costs of their commute rose, but the weather conditions play an important role in choice of transport, too. Susceptible uncertain commuters were rather undecided when evaluating other factors, which indicates that it might be possible to convince them to cycle.

The vast majority of people holding this attitude are between eighteen and twenty-five years old. The most common modes of transportation among susceptible uncertain commuters are car (35%), bus and walking (both have the share of 22%), while bike is used by 10 percent of the surveyed.

Tolerant non-cyclists

This and the remaining target groups are rather small and include only few percent of the whole sample. Tolerant non-cyclists do not associate the mode of transport with financial situation, nor do they think driving influences one’s image. However, they have a strong opinion if it comes to them personally taking up cycling for transport. They refuse to cycle even if proper infrastructure and educational courses were offered. Rising costs of tickets and fuel, as well as coordination of bikes with public transportation would not encourage them, either. Neither do they think that an increased number of cyclists makes drivers more cautious.

Tolerant non-cyclists are very likely to exercise at least a few times a week. Over eighty percent of them are employed and for two thirds of the group the daily commute exceeds eight kilometres. The car is most commonly used for transportation – two thirds of tolerant non-cyclists use it, while 17% of them walk and no one cycles.

Strict underappreciators
Strict underappreciators claim there is no connection between commuting by bike or by car and one’s financial status. However, they are not that certain about the connection between using public transport and one’s financial situation. Nevertheless, even though they are less weather-sensitive, they are determined in that they will not cycle for transport at any case – bike network or rising costs would not convince them to take up biking. According to them, local authorities do not have an influence on people’s mobility choice.

Apart from men’s majority in this group, the only other feature that has been found distinctive for strict underappreciators is that over half of them uses a car to commute, while a bus is used by slightly more than a fifth of the people.

Susceptible conservatives

These 5 percent of the sample do not think biking indicates poor financial situation, but neither it is connected with being fit. However, commuting by bus or train is a sign of lower income, unlike driving which points to wealth and influences one’s image among others. What is more, they support a claim that it does not befit for people of certain occupations to commute by bike. Despite this attitude and sensitivity to weather, susceptible conservatives believe that a developed bike infrastructure would help lower the number of accidents. They are also rather inclined or hesitant if it comes to taking up cycling if provided the infrastructure or if the costs of car or public transport commute rose.

Susceptible conservatives are very likely to have an average financial status. Less than a third commutes by car, which is significantly lower than in the other groups. One fifth of travels is done by bus, and another fifth is cycled, which goes in line with the premise that they are susceptible to bike for transportation.

Determined rejecters

This group is represented by the smallest number of respondents who hesitate whether commute by bike is associated with financial difficulties, but they are more inclined to disagree rather than support this claim. However, they share the susceptible conservatives’ opinion associated with commuting by public transportation and car, although they think that driving is not much connected with creating image of oneself, yet for certain occupations it is inappropriate to cycle to work. This group of residents is determined in that they neither think biking is connected with being fit, nor they can ever be encouraged to bike themselves. No circumstances such as a proper bike lanes network or increased prices of car and public transport commute would convince them to cycle for transport.

This group consists of mainly younger adults up to 35 years old – 90%. Half of the group evaluates its financial situation as good, while a third as very good. All of them possess a driving licence and have an access to car, while 70% exercise once a week or less often. Forty percent of determined rejecters commute a distance shorter than two kilometres, while only ten percent of the travels exceed eight kilometres. Half of the group uses a car, forty percent walk, and the remaining ten percent travel by bus.

Such segmentation allows one to address various strategies in order to promote utilitarian cycling in Gliwice. Each target-group has its characteristics and revealed barriers toward taking up biking for transportation. The analysis showed that the strongest determinants of the intention toward behaviour are the attitude and perceived behavioural control, while the role of subjective norms is moderate. What is more, the segmentation revealed that people belonging to a certain group are not necessarily homogenous if terms of geographic and
socio-demographic features. Thus, possessing such analysis is useful for designing strategies for changing particular groups’ attitudes and behaviour. With a limited availability of funds decisions can be taken on which groups to target and with what methods to be able to realize the greatest change in modal shift toward biking.

5.2 Local authorities

The theory of planned behaviour is based on the premise that an intention toward behaviour is determined by an attitude toward this behaviour, subjective norms and perceived behavioural control. Consistently with the research questions and the aim of this thesis, the intention toward behaviour, and then the behaviour refer to treating bike as a mode of transportation in Gliwice. Thus, local authorities’ perspective has been examined by a series of interviews with different officers and officials and by analysis of documents, press and a video recording. An essential and primary point of information gathering was inquiring whether the city has an overall plan for sustainable mobility, and if so, how the newly designed plan for bike lanes suits it. Having that as a point of departure, questions to investigate the attitude have been asked.

It was then recognized that among city authorities there are no groups of councillors or officers advocating or responsible for sustainable transportation in the city (Dragon, 20147; Grabowski & Działach, 20148). What is more, it has been noticed that among several officers sustainable transport is mainly associated with public transport, while the interviewed councillor understood sustainable transport as a transportation system which has a balanced share of all modes (Dragon, 2014). This implies that taken together the interviewed people have little knowledge of the concept of sustainable transport.

Consistent with the lack of an officer responsible for sustainable mobility, neither is there a plan towards it. When presenting the city in previous chapter, it was explained that various dimensions of transportation in the city are spread among several entities and that system may impede transportation management, and as claimed by the councillor, is not a successfully working solution (Dragon, 2014). Biking infrastructure itself is managed by four entities however the Office of City Streets claims it is not problematic (Grabowski & Działach, 2014). Nevertheless, this challenge has also been listed in the new bike infrastructure project (PP-U "INKOM" s.c. Katowice, 2013). Various interviewees admit that the city has not set goals such as reduced percentage of car use and raised share of other modes of transport in the city’s modal split (Grabowski & Działach, 2014; Komidzierski & Cygan, 20149) however the development of the bike infrastructure is to give an opportunity for people to change their travel behaviour. Moreover, the mayor and the councillors are currently putting the biggest pressure on developing the city’s road infrastructure to make it easier and smoother to travel by car. Gliwice is now becoming a driver-friendly city where most transport investments are directed toward this mode of transport (Dragon, 2014). The officers at the Office of City Streets also confirmed that, adding that at the moment there is no major alternative to automobile travels, nor is there an overall document regarding sustainable mobility in Gliwice. They claim the new project for bike infrastructure is an independent idea, not related to any other plan (Grabowski & Działach, 2014), while the officers at the Department of Investments and Renovations put the project as an ingredient of “Gliwice’s

7 Dominik Dragon, City Councillor at the Gliwice City Council, the Head of City Development and Investments Commission, member of the political party “Civic Platform”
8 Artur Grabowski and Michał Działach, employees at The Office of City Streets, the Section of Traffic Engineering
9 Mariusz Komidzierski, the deputy of the head of The Department of Investments and Renovations, Tadeusz Cygan, specialist at The Department of Investments and Renovations

27
Strategy of Integrated and Sustainable Development Until 2022” where it, indeed, is located, however it is one of the means of “strengthening regional offer in the spaces of the city connected with its image” (author’s translation, UM Gliwice, 2014, p. 42). What is more, the project of expanding bike infrastructure does not have an objective of relieving traffic in the city or solving its transportation problems, and it is strongly perceived that bicycles will never become a primary or main mode of transportation, as it is anticipated not to exceed ten percent of modal split (Komidzierski & Cygan, 2014; Gregorowicz & Trybuś, 2014). Therefore, the aim of the bike infrastructure project is to adjust current road infrastructure to allow people to cycle more easily (Komidzierski & Cygan, 2014).

Having inquired about the overall aspect of mobility in Gliwice, it was later investigated what role bikes currently have in the city, where nearly 2 percent of daily journeys are bicycled. The officers see bicycles as an additional mode of transportation, a supplement for the existing transportation (Grabowski & Dzialach, 2014). However, the city hall’s website clearly states recreational character of bicycling by placing the map of bike lanes and their description under the bookmark “sport and recreation”, and not “transportation” (UM Gliwice, 2014). More recreational than utilitarian usage of biking is also noticed by the first deputy of the mayor during a meeting at which he also explained that there is little interest in cycling for transport and so there is not much need to expand the infrastructure (Kwasek, 2011). Nevertheless, the city has not remained indifferent toward biking and for the last few years the authorities have been including bike infrastructure in its investment plans, planning to spend around 240 thousand Euros each year on its improvement (Rada Miejska w Gliwicach, 2011; 2012; 2013) while the city’s anticipated income in 2014 is approximately 360 million Euros (UM Gliwice, 2013).

In December 2012 city councillors voted and passed an ordinance to have a bike rental opened by August 2013. However, the voters were not unanimous and the majority of votes was barely achieved (12 for and 11 against the act) (Rada Miejska w Gliwicach, 2012). Enacting the ordinance was not sufficient to open up the bike rental – the city mayor claims that there is plenty of ongoing renovation and rebuilding which creates unfavourable conditions for cycling (Dragon, 2014). Low support for the bike rental was supposedly caused by political reasons, because after all there is an impression that the city councillors are for the idea of the development of biking infrastructure (Dragon, 2014).

Non-governmental organizations advocating for biking in the city have been given increasing attention from the city hall. These organizations have united into the Gliwice Biking Board (GBB) which is currently recognized by city authorities as a legible representative of cyclists. The officers and councillors find it important to consult enterprises with this NGO as well as with individuals who wish to have a voice (that was the case when preparing the bike lane project). A member of the GBB, when interviewed, indicated that the city authorities become more aware of the increasing role of bikes in other cities and are more inclined to develop it, but they are searching for ideas how to do it (Wojtynek, 2014). According to the officers at the Department of Investments and Renovations, local NGOs have also another role, namely promoting bicycling by organizing events and educating, while the city hall perceives its role as a provider of raw infrastructure only (Komidzierski & Cygan, 2014).

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10 Jan Gregorowicz and Piotr Trybuś, partners in the company PP-U „INKOM” s.c. Katowice which designed the bike lanes project for Gliwice
11 The original amounts in Polish złoty (PLN) are 1 million and 1,5 billion PLN respectively
12 Bartosz Wojtynek, member of the Gliwice Biking Board
Thus, the attitude of the different authorities interviewed is rather consistent and indicates that
the bike is becoming recognized as a mode of transportation though its influence and role are
not fully understood and anticipated, but rather underestimated and undervalued. This attitude
toward utilitarian cycling is mainly expressed in treating the bike as a secondary mode of transport.

The second determinant of intention toward behaviour, namely the subjective norm refers to
social approval and opinion of performing a given behaviour. Local authorities generally treat
the project of bike lanes as an enterprise for the residents, not as a solution to the city’s
problems. Various stakeholders outside of the city hall have taken part in the design process
thus making it to some extend participatory. Nevertheless, it is assumed that the city ordered
the project not because it is important to promote utilitarian cycling, but rather because other
Polish cities have been facilitating cycling for transport, which put pressure on local
authorities in Gliwice in order not to lag behind them (Wojtynek, 2014). The authorities, on
the other hand, perceive the project as a marketing tool to promote the city around the country
(Komidzierski & Cygan, 2014). Additionally, the interviewed councillor is concerned that the
project is “an element of propaganda” to promote the city and its actions (Dragon, 2014).

Thus, the determinant of subjective norms is less important than the attitude toward
behaviour. During the interviews the aspect of city’s position among others and social
approval was not widely mentioned, implying that this determinant is of minor relevance to
the general behaviour of treating bikes as mode of transport.

The determinant of perceived behavioural control deals with perceived ability to perform a
given behaviour. Local authorities of Gliwice most commonly mention the financial obstacle
toward expanding the bike infrastructure. The project is seen as a cost, not an investment,
therefore the financial aspect is the most important (Dragon, 2014; Komidzierski & Cygan,
2014) The authorities are seeking for opportunities to receive a grant from the European
Union that would allow the implementation (UM Gliwice, 2014). Another challenge in
implementing the project is that building bike lanes in certain places will require complete
reorganization and reconstruction of roads and other objects, hence it is a problematic
enterprise (Dragon, 2014). No more relevant obstacles have been mentioned by the
interviewees, nevertheless these two, and especially the former, regarding financing, is of a
huge importance, thus it may affect a lot the intention toward behaviour.

Therefore, the last antecedent of intention and, hence, the behaviour, namely the perceived
behavioural control is a salient ingredient, which can either help successfully reach the
behaviour and recognize bikes’ role in the city’s transportation or will hinder it and limit the
implementation of this behaviour.

6 Discussion and conclusion
The above analysis in light of the theory of planned behaviour allowed for identifying
attitudes toward utilitarian cycling held by the residents and authorities of the city of Gliwice.
It also investigated two other components of the model – subjective norms and perceived
behavioural control.

The residents have been divided into seven distinctive attitude-based target groups. Each
group holds a different combination of attitude toward cycling and perceived behavioural
control. However, not all of the groups of people are willing to use their bikes for
transportation purposes. Four groups, including urban cycling enthusiasts, hesitant cycling
supporters, susceptible uncertain commuters and susceptible conservatives would cycle under
various conditions. Thus, these four groups should be the focus of local authorities’ efforts to promote utilitarian cycling. Nevertheless, each group should be addressed separately since its members perceive different barriers that discourage them from cycling. These four groups comprise eighty-seven percent of all respondents which is a very high share, yet it needs to be kept in mind that this sample is not representative as it includes vast majority of young adults, leaving out people below eighteen years old and many of those in middle and late adulthood. In reality, these groups, although prevailing in this sample, might refer only to a small percentage of the whole population of the city. However, their attitude is still a sign for the authorities that people would willingly take up cycling if provided favourable conditions. What is more, according to data from Table 3, Chapter 5, biking is the most enjoyable way of commuting. Thus, there is a potential to make cycling more popular among the residents of Gliwice. However, the conditions that would facilitate it most commonly include a well-developed bike lanes network that allows people to cycle safely to places spread all around the city. Additional infrastructure including bike racks would be also very much appreciated, together with being given more opportunities to cycle on roads closed for cars or in the opposite direction on one-way roads. Lack of these amenities discourages people from taking up cycling, thus these barriers, including as well more safety regarding bike thefts or heavy car traffic, ought to be overcome. Therefore, following McKenzie-Mohr’s (2000) community-based social marketing approach, having such a segmentation of residents allows the politicians and other decision-makers to specify barriers for each of the target groups, and then design a strategy that contributes to promotion and wide introduction of bikes in everyday commuting. Such actions may gradually develop a culture of biking in the city which will then influence people’s mobility behaviour and enhance utilitarian cycling. The analysis of each attitude-based target group revealed that they are far from geographic or socio-demographic homogeneity, which implies that the most successful promotion of biking will be done based on psychographic segmentation, because such groups are more alike than if they were created upon other features.

From the authorities perspective, the problem lies in that they seem to have little understanding of the aspect of sustainable mobility on the whole. Therefore, the role of bikes, especially the utilitarian aspect, is underestimated. Under current conditions, the city’s scheme for transportation is ill-planned as it prioritizes automobile mobility, treating bikes as secondary, if not tertiary mode of transportation. The division of responsibilities among four offices is an additional impediment, even though each of the entities clearly understands its scope of actions. Under these circumstances, a well-planned and thoroughly designed cooperation should be implemented so that various offices hear from each other and mutually work toward better development of bicycle infrastructure.

To link the two sides of the attitudes – the one of the residents and the one of local authorities, it is essential to notice the relation between them. Many of the surveyed residents expressed the willingness to take up cycling provided that certain obstacles are overcome. These obstacles turn out to be aspects to be solved within the responsibilities of the municipality which is the factor that links residents to the authorities. The authorities, on the other hand, are to provide the infrastructure in order to stimulate people’s behaviour toward utilitarian cycling. In that, the reciprocity can be noticed between the two groups of stakeholders. By addressing particular attitude-based target groups local authorities can best influence people’s behaviour. An important fact to stress is that local authorities’ attitude is elementary in facilitating biking in the city, because if the authorities continue acting in a way that prioritizes cars and marginalizes bikes, cycling is unlikely to become common in Gliwice. Further, since the role of NGOs is becoming more influential and more important in the city, citizens have the possibility to influence the authorities’ attitude and behaviour by sharing
ideas, being a party in consultations and demanding and controlling the actions taken by the municipality. Thus, both the residents and the authorities need to fully understand the role of bikes in contemporary cities and how it can influence the development of the city in that it makes the city more liveable and friendly. Therefore, the authorities should realize the importance of restructuring the modal split and limiting automobile traffic and next, strategies for facilitating cycling have to be designed. Broad cooperation with residents is needed at this point, because recognizing the citizens’ needs and barriers is essential for successful implementation of sustainable mobility strategies. These strategies should include discouraging people from driving their cars, developing traffic calming infrastructure and introducing government policies prioritizing and simplifying cycling in the city.

Additionally, by working with young adults who in the understanding provided by Arnett (2000) are still in a formative stage in their life, any changes in behaviour at this age will have a certain tendency to be retrieved later during adulthood. This would mean that targeting projects on the four susceptible target groups who are under 25 years of age would be more likely to lead to long-term change and shift in the modal split towards bicycles.

To conclude, in Gliwice there is a potential to introduce utilitarian cycling on a larger scale, because the residents are willing to start biking for transport. However, an elementary action that would help place cycling in the city’s transportation scheme is designing strategy for sustainable transport that would encompass the whole aspect of transportation in Gliwice, and this is to be done by the local authorities.

Now, knowing what attitude is held by the inhabitants and authorities of Gliwice, and how to work it in order to promote utilitarian cycling, further research can be conducted in this field. The scope of research should be widened, and the holistic aspect of mobility in the city should be examined in order to investigate the idea of sustainable mobility and the potential for such approach in the city of Gliwice and others of similar features. One of the areas to be researched is limiting automobile dependence so that it can be checked what attitude regular citizens and local authorities hold toward decreasing car use. What is more, a research on people’s environmental concern would be complementary. As Poland is now at a point at which certain cities realize the importance of changing people’s mobility behaviour in light of sustainability, such research adds significantly to the field. Since Gliwice is located in an agglomeration which certain geographic and socio-demographic features and the modal split are similar, the results could be applied to a wider number of cities.
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8 List of figures and tables

Table 1 Modal split of Gliwice and the agglomeration in Poland ...................................................... 5
Table 2 Modal split among survey respondents ....................................................................................... 21
Table 3 Evaluation of daily commute ........................................................................................................ 21
Table 4 Correlations between cost and impact on health (F,G) and between environmental friendliness and impact on health (G,H) .................................................................................................. 22
Table 5 Combination of attitudes and PBC held by surveyed residents ...................................................... 23
Table 6 Target groups and their origins in the theory of planned behaviour .......................................... 24

Figure 1 Theory of Planned Behaviour .................................................................................................. 14
Figure 2 Main roads and highways in Gliwice. ....................................................................................... 17
9 Appendices

Appendix 1. The organization of municipality units

Figure 4 presents how the City Hall is structured, so that the reader can understand where in the hierarchy particular units dealing with bikes and transportation are located. A box with letter “D” stands for a particular department, DEV&MS is the abbreviation of The Department of Economic Ventures and Municipal Services while DI&R is short for The Department of Investments and Renovations. These two are the only departments at the City Hall that deal with bike infrastructure. Both of them are together with another two departments under responsibility of the first deputy of the mayor.

Each of the three deputies of the mayor is responsible for the management of the city’s affairs taken care of by the departments below the deputies in Figure 6, hence the different colours. Thus, the Department of Economic Ventures and Municipal Services and The Department of Investments and Renovations report to the first deputy who has been referred to in this thesis.

Apart from the City Hall, there are also so called city organizational units which are entities that do not belong to the City Hall but to the municipality. These units have their own
organizational structure at top of each one there is a director. City organizational units include the following:

- educational institutions, e.g. nurseries, kindergartens, primary, secondary and high schools,
- a hospital,
- social welfare units,

Out of the four entities that in some part deal with bike infrastructure two are directly parts of the City Hall, while the other two are separate organizational units, however according to their charters The Office of City Streets is supervised directly by the Mayor of Gliwice, while The City Office of Municipal Services is supervised by the mayor of Gliwice.

Appendix 2. Internet questionnaire

Questionnaire for the residents of Gliwice (translated from Polish):

The district you live in:

- Bojków
- Brzezinka
- Czechowice
- Kopernika
- Ligota Zabrska
- Łabędy
- Obróńców Pokoju
- Ostropa
- Politechnika
- Sikornik
- Sośnica
- Stare Gliwice
- Szobiszowice
- Śródmieście
- Trynek
- Wilcze Gardło
- Wojska Polskiego
- Wójtowa Wieś
- Zatorze
- Żerniki
- Żwirki i Wigury

Sex:

- Female
- Male

Age:

- 18–25
- 26-35
- 36-50
- 51-65
- Over 65

**Education:**
- Elementary
- Secondary
- Higher

**Occupation:**
- Student
- Employed
- Unemployed
- Housewife
- Pensioner

**How do you assess your financial situation?**
- Very good
- Good
- Average
- Bad
- Very bad

**Do you have a driver’s licence?**
- Yes
- No

**Do you have an access to a car?**
- Yes
- No

**Do you have a bike?**
- Yes
- No

**How often do you practise sport?** Choose an answer closest to reality.
- Every day
- 3-4 times a week
- Once a week
- Less than once a week
- Never

**How long is the distance from your home to the centre of Gliwice?** As the centre of the city take the area from the railway station and Piastów Square to the old town.
- Less than 2km
- 2-5 km
- 5-8 km
- More than 8 km

**How long is the distance from your home to the nearest stop of public transport?**
- Less than 200 m
- 200-500 m
How long is the distance from your home to the nearest bike lane?

- Less than 1 km
- 1-3 km
- 3-5 km
- More than 5 km
- I don’t know where the nearest bike lane is.

DAILY COMMUTE

This part of the survey refers to your daily commute – to work, school, university or another place to which to travel daily. Refer your answers to your commute habits, i.e. your most frequent activities.

How long is the distance from your home to the place you commute daily (work, school)?

- Less than 2km
- 2-5 km
- 5-8 km
- More than 8 km

How do you usually commute? If, during one travel you use more than one mode of transport, mark all modes that you use.

- On foot
- By bus
- By car
- By train
- By bike
- Others: how?

Rate your daily commute according to following features (1-7)

<table>
<thead>
<tr>
<th>Feature</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfortable (as of proximity of modes of transport, the number of changes of modes)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Uncomfortable</td>
</tr>
<tr>
<td>Comfortable (in terms of the comfort of the travel)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Uncomfortable</td>
</tr>
<tr>
<td>Not stressful</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Stressful</td>
</tr>
<tr>
<td>Taking little time</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Time consuming</td>
</tr>
<tr>
<td>Interesting</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Monotonous</td>
</tr>
<tr>
<td>Cheap</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Expensive</td>
</tr>
<tr>
<td>Environmentally friendly</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Environmentally unfriendly</td>
</tr>
<tr>
<td>Good for your health</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Bad for your health</td>
</tr>
</tbody>
</table>

The most pleasant experiences during daily commute: (choose max. 2 answers)

- Smooth travel
- Contact with people
- Good well-being
- Observing the environment
- Comfortable mode of transport
- Possibility of listening to music, reading, playing
- Others: which ones?

**The most unpleasant experiences during daily commute:** (choose max. 2 answers)

- Traffic jams
- Long time to wait for the next change
- Lack of appropriate infrastructure
- Crowded bus/ train
- Delayed bus/ train
- The danger of an accident
- Others: which ones?

**ATTITUDE TOWARD BIKING FOR TRANSPORTATION**

What do you think are the biggest advantages of bike as a mode of transportation? (choose max. 3 answers)

- Direct commute
- Independence
- Time-saving
- Money-saving
- Comfort
- Environmentally friendly
- Good for one’s health
- Others: which ones?

What do you think are the biggest disadvantages of bike as a mode of transportation? (choose max. 3 answers)

- Stressful commute conditions
- Uncomfortable
- Does not secure from rain/ snow/ wind etc.
- Tiring commute
- Risk of bike theft
- Feeling of danger because of the cars
- Others: which ones?

Mark how far you agree/ disagree with following statements:

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Rather disagree</th>
<th>Undecided</th>
<th>Rather agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuting by bike indicates worse financial situation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuting by bike indicates good fitness.</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I would use a bike from bike rental to move around the centre of Gliwice.</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I would use a bike to get to the bus stop/ train station and continue the commute by public transport.</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>People important to me would approve of me biking for transportation.</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>People whose opinion I value bike for transportation.</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
If I wanted, I would bike for transportation already under current conditions. 0 0 0 0 0 0
Expanded bike infrastructure would encourage me to bike for transport. 0 0 0 0 0 0
Expanded bike infrastructure would make me give up my car/ public transport for bike. 0 0 0 0 0 0
The rise ticket/ fuel/ parking prices would encourage me to bike for transport. 0 0 0 0 0 0
Extra courses on biking would help me bike in the city. 0 0 0 0 0 0
The coordination of bike infrastructure with public transport would encourage me to bike for transport. 0 0 0 0 0 0
The weather plays a huge role in my choice of mode of transport. 0 0 0 0 0 0
Commuting by car influences one’s image in other people’s eyes. 0 0 0 0 0 0
Commuting by car indicates good financial situation. 0 0 0 0 0 0
Commuting by public transport indicates worse financial situation. 0 0 0 0 0 0
The number of cyclists on roads make drivers more cautious. 0 0 0 0 0 0
Expanded bike infrastructure lowers the number of accidents. 0 0 0 0 0 0
City authorities have an influence on what mode of transportation are most willingly used by the residents. 0 0 0 0 0 0
It does not befit for people of certain occupation to commute by bike. 0 0 0 0 0 0

What would convince you to bike for transport? Choose max. 3 answers.

- Expanded bike lanes network
- Bike racks/ bike parking at the destination
- Additional appliances of bike infrastructures, e.g. pumps at bike lanes
- Priority on roads
- The presence of a bigger number of cyclists
- Limited car traffic on roads
- The possibility of cycling on roads closed for cars, or the opposite direction on one-way roads
- Shower at destination point (work, school etc)
- Others: what?

What discourages you from cycling for transport? Choose max. 3 answers.

- Weak bike lanes network
- Lack of bike racks/ bike parking at the destination point
- Risk of bike theft
- Heavy car traffic
- The distance commuted daily
- Tiredness
- No shower at destination point
- Others: what?

If you have any further remarks regarding your daily travel or the issue of biking for transportation, share them below.
Appendix 3. Interview questions
Translated from Polish

Interview 1. PP-U „INKOM” s.c. Katowice, interviewees: Jan Gregorowicz and Piotr Trybuś, partners in the company, 2014-04-23

1. How was the survey conducted?
2. How did the residents react to the idea of bike as a mode of transportation?
3. What is the municipality’s aim in developing bike infrastructure?
4. When was the tender announced and when did it all start?
5. After having done the analysis and the project, what obstacles do you see in connection to developing bike infrastructure in Gliwice?
6. Do you think that the residents would be able to give up a car for the sake of a bike?
7. How did you decide on the location of bike racks?
8. What are mechanical bike parkings?
9. What does the integration with public transportation look like?
10. How do you assess the possibility of the implementation of this plan?
11. Who had the biggest influence on the final shape of the plan?
12. What is the planned surface of the bike lanes?
13. Is the city going to use the plan in the nearest plans, even the ones for the next year?
14. Is the city considering the planning of residents’ mobility as a solution to some of its transportation problems? Is bike seen as a solution to these problems?
15. Do these documents contain also information on road occurrences including cyclists?
16. What was the role of the Gliwice Biking Board?
17. Does the plan contain any removals of current bike lanes?

Interview 2. Gliwice City Council, interviewee: Dominik Dragon, City Councillor, the Head of City Development and Investments Commission, member of the political party “Civic Platform”, 2014-04-23

1. Is mobility or transport an issue discussed by the City Council?
2. In that case, is Gliwice creating a city for drivers rather than for other travellers?
3. Why is there not a person who would be in charge of the issue of transportation?
4. Is it important for the councillors that the city aims at sustainable transport? Do the councillors see the importance of sustainable transport?
5. Why are the councillors not willing to introduce bike rental?
6. What does it look like now? What is the councillors attitude towards bike as a mode of transport? Does any of them cycle to the council meetings?
7. Do you think that residents of Gliwice prefer a car because of prestige and comfort?
8. How do you assess the probability of implementing the new bike lanes project? Is it possible that it will start to be implemented within the next two years?
9. Does it mean that it will not be implemented on its own, meaning that at bike lanes will start to be added to current infrastructure immediately?
10. Is the city planning to change the modal split so that car share is lower?

Interview 3. The Office of City Streets, interviewees: Artur Grabowski and Michał Dzialach, employed at the Section of Traffic Engineering, 2014-04-25

1. Is there anything such as sustainable transportation or any plans to implement it in Gliwice?
2. Is there anyone responsible for sustainable transport and plans regarding it?
3. Is car a prioritized mode of transportation in Gliwice? Is it primary according to the authorities and decision-makers?
4. Is anything being created so that this alternative is better? Is it really a plan so that the car share is bigger?
5. What are the main entities that take part in transport/ mobility management in Gliwice? Who are the main decision-makers?
6. What is now the role of bikes, according to the Office of City Streets?
7. Where did this share of responsibilities regarding bike lanes come from? Why are there four, not one entity that takes care of bike lanes?
8. Is the cooperation between these entities smooth? Is it going well?
9. To what extent will the new bike lanes project be implemented with new road investments/projects?
10. What are the chances that a bike lane will be painted or built next to a road that does not require any renovation?
11. What will be the surface of the bike lanes?
12. What is included in the bike infrastructure?
13. What about bicycle pumps at the bike lanes? Are any such amenities planned to be installed?
14. What about the bike rental? When will it be started? How will it work?

**Interview 4. The Department of Investments and Renovations, interviewees: Mariusz Komidzierski, the deputy of the head of the department, and Tadeusz Cygan, specialist, 2014-04-25**

1. Why does the city want to develop bike infrastructure?
2. Is bike infrastructure supposed to solve the city’s certain problems, e.g. transportation problems?
3. Are there any plans to change the modal split?
4. Is the city planning to promote the bike in any other way apart from expanding the infrastructure?
5. What are the main entities engaged in creating and promotion of bike infrastructure in the city?
6. What are the main costs and benefits of this investment?
7. Are there any plans regarding bike rental?
8. Is Gliwice a city for drivers? To what extent is bike perceived by the authorities and residents as a mode of transport? Is it going to be considered a mode of transport?
9. What is the probability that this bike lanes plan will start to be implemented in the upcoming years?
10. What are the economic benefits for the city? How can the city benefit from the fact that its residents will change from cars to bikes?
11. Is the bike plan an element of a bigger sustainable transportation policy in Gliwice, or is it an independent point?

**Interview 5. The Gliwice Biking Board, interviewee: Bartosz Wojtynek, 2014-04-28**

1. When was the Gliwice Biking Board established and what for?
2. Do you as the GBB represent cyclists more than other organizations?
3. What are your current main goals?
4. What is your cooperation/ communication with the city hall? To what extent do they respect and recognize you more than other bike organizations?
5. What is current authorities’ attitude toward promoting a bike as a mode of transport?
6. How do you assess the importance of this problem for the city? To what extent is it essential for the city?
7. Is it important for the city to introduce bike as a mode of transport or is it rather because other cities do so?
8. What is GBB’s contribution to the shape of the new plan of bike lanes?
9. Does the Office of City Streets contact you first or do you have to contact them when new projects are being done?
10. What was your role during the consultations regarding the bike lanes plan?
11. Were your suggestions included in the plan?
12. What are your achievements so far? What did you manage to do/ change?
13. According to you, what is the residents’ attitude toward utilitarian cycling?
14. What are the challenges connected with the implementation of bike lanes project?
15. What are the strengths?
16. Do you think that the bike needs to be promoted even more, so that people cycle more?
17. Whose role is it to promote a bike?