

THE EFFECT OF THE DEVELOPMENT OF BICYCLE TRANSPORT FROM THE POINT OF VIEW OF THE INHABITANTS OF THE CITY OF BRATISLAVA

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Abstract

As part of a change in the division of transport work, bicycle transport has made the most progress in recent years. As the largest city in Slovakia Bratislava, is trying to keep up with foreign cities. In recent years, it has developed projects that have made it possible to increase the development of cycling in the city. The last major cycling survey was conducted in 2011 by Cyklokoalícia. This survey aims at determining the momentum of bicycle traffic by identifying its greatest shortcomings or, conversely, the most positives. The data from the analysis given will also be used to develop a concept for the development of bicycle transport in the city of Bratislava.

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Key words

- Mobility,
- Cycling traffic,
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- Survey.

1 INTRODUCTION

Slovakia is a country that still lags behind other countries in the world in the development of transport. Cities should focus on all modes of transport when determining their development and growth. In recent years, emphasis has been placed on non-motorized transport, such as bicycle transport, which has a positive effect on the environment and overall sustainability in a city. The problem of sustainable mobility is a longstanding issue in Slovakia that needs to be addressed. The city of Bratislava was chosen, as it lacks a developed cycling infrastructure. Based on the missing documentation, a survey which could help us to take a closer look at people's views on the matter and also initiate the basis for a design of the development of bicycle transport was created. The questionnaire addresses the basic issues affecting the attitude of the inhabitants of the capital of Slovakia on the issue of bicycle transport. It was shared on social networks and also in cooperation with Cyklokoalícia. After the gathering of sufficient answers, the questionnaire was evaluated and compared with the questionnaire conducted in 2011 by Cyklokoalícia to determine how people's attitudes towards cycling in the city of Bratislava have changed over the past 10 years.

2 THE IMPACT OF CYCLING ON SUSTAINABLE MOBILITY

Based on a methodology (European Commission, 2011) written by European Union experts, individual Member States (MS) plan to reduce their greenhouse gas emissions by 60%. As the current transport system is still unsustainable, it is clear that transport in the next 40 years cannot develop in the same way as before. If the current approach were to continue, transport's dependence on fossil fuels would only not increase, but would reach 90%. In this way, CO₂ emissions from transport would be one-third higher in 2050 than in 1990. In order to reduce greenhouse gas emissions, Member States have set 10 targets for competitive and resource-efficient transport systems. The first goal is to halve the use of "conventionally powered" urban transport cars by 2030 and phase them out of cities by 2050. Also, MS intend to achieve the introduction of essentially CO₂-free urban logistics in large city centres by 2030. This measure would also significantly reduce other harmful emissions in public areas of a city. Some Western European countries have been making progress on sustainable mobility plans for years and are trying to create acceptable conditions for cycling in their cities. These countries are based on their

national cycling strategies, which currently serve as a model for other European countries, as they have managed to ensure that the share of cycling in urban mobility is significantly higher than in other countries (The Netherlands 27%, Denmark 19%). In 2015, Slovakia adopted its own national strategy for the development of bicycle transport (Ministry of Transport, Construction and Regional Development of the Slovak Republic, 2015). The national strategy sets out several priorities for achieving the sustainable development of cycling. One of these priorities is the development of a cycling infrastructure. It tells us that it is necessary to ensure the conditions for the creation and updating of planning and strategic documents integrating cycling and ensuring sustainable urban mobility. An equally important condition is the construction of a new cycling infrastructure, which can be divided into a main one, which includes the bike paths themselves, and an additional one, which includes bicycle stands and shelters, information boards and signs. Based on the set priorities of the National Strategy, various benefits can be expected for the development of bicycle transport (Fig. 1).

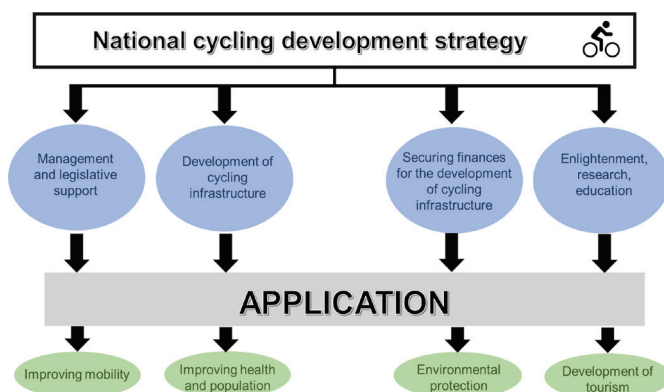


Fig. 1 Priorities and benefits of the national cycling development strategy

Each city has specific conditions, so it must adapt the National Strategies and create its own documents to meet the goals of sustainable mobility. The city of Bratislava has created several strategic documents that take bicycle traffic into account. These documents include a zoning plan, transport master plan, the principles for the development of cycling, and pedestrian transport, which are included annually in the action plans for the development of cycling and pedestrian transport for the given years. Although the city has these documents, the problem is their interconnection, and the concept of bicycle transport in the future is not addressed in detail. This is based on the statement that: "Cycling routes in Bratislava are not safe or interconnected, there are few of them. This is despite the fact that the number of bicycles in Bratislava is greater than the number of cars. Almost every household has access to a bicycle, while only 65% of households own a car" (Vallo et al., 2018).

The importance of increasing the share of bicycle traffic is addressed not only in Slovakia but also abroad (Vaismaa et al., 2012) (Ton et al., 2019). An increase in the share of bicycle traffic has a positive effect on improving air quality and the associated reduction in emissions from traffic (Neves and Brand, 2019). The creation of concepts at individual levels should be comprehensively devoted to individual elements of the cycling

infrastructure, such as, for example, bicycle parking (CROW platform, 2011) (European Cyclists Federation, 2018). All these elements should be included in a single manual for a given city or state (CROW platform, 2016) (Manoela et al., 2014) (Nabors et al., 2012). Improving cycling infrastructure will help to change the division of transport labour, which will not only be reflected in environmental and economic terms (Floater et al., 2014) (Gehl Architects, 2010), but also in terms of accessibility (Rode et al., 2014). With shorter commuting distances using walking or cycling, the sales of local businesses can be increased (Guy, 1983) (Guers, 2018) (Koopmans et al., 2013). Cities where such local economic growth have occurred include New York City, which by building bike lanes, BUS lanes, and increasing public spaces, has achieved economic growth just in local stores. The above considerations show the importance of multimodal planning in urban transportation network design, where, if designed properly, a city can support different social groups of residents and improve their living standards (Litman, 2018) (Schlosser and Schlosser, 2018).

3 EVALUATION OF SURVEY

In December 2021, a questionnaire was created, which was in electronic form due to the ongoing pandemic situation. It was created on the my.surveio.com website, where the collection of responses took place until the end of January 2022. It consisted of 11 questions, which were used to find out the basic viewpoints of respondents on cycling. Information was also obtained on the regularity of the use of bicycle transport, the purpose of the transport, parking sites, accidents, etc. The questionnaire was published on the Facebook and Instagram social networks. To increase awareness of the survey, Facebook groups such as Cyklokoalícia, Bicykluj Bratislava, Švihaj šuhaj, and STU Bratislava helped.

A total of 280 people participated in the survey, 194 of which were male, which represents 69% of the total number of respondents, 80 were female (29%), and 6 people (2%) chose the option of a different gender (Fig. 2).

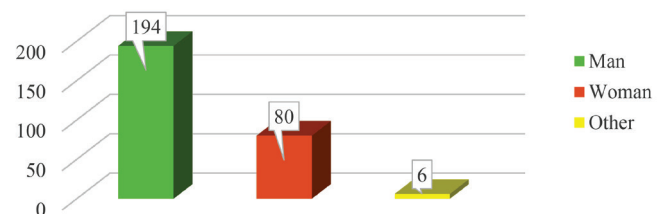


Fig. 2 Evaluation of the question asking about gender

Of the 280 people surveyed, people aged 26 to 40 most often use cycling. It is this age group that accounts for 50.7% of the total responses. The next most common response was from riders aged 19 to 25, with a percentage of 23.9%. Between the ages of 41 and 60, the percentage was 21.4%. The survey involved 6 people aged 61 and over, 4 people aged 16 to 18, and 1 person under 15 years old. From the resulting data, the small representation of age groups 61 and older and respondents under 18 years of age could be due to the publishing of the questionnaire mainly on Facebook and Instagram groups,

in which seniors and youth under 18 years have little active representation (Fig. 3).

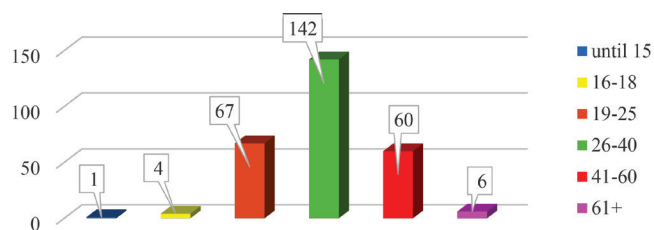


Fig. 3 Evaluation of the age-related question

The third question in the survey was to obtain information on the use of cycling in terms of time. Seven response options were created, which included the regular use of bicycle transport during the year. It was determined that the weekly regularity of rides of our respondents is 66.4%, where 27.96% are the number of people who use the bicycle as a source of transport every day. From the data obtained, it can be seen that respondents aged 26-60 mostly ride every day and, conversely, young people aged 19-25 only ride seasonally (Fig. 4).

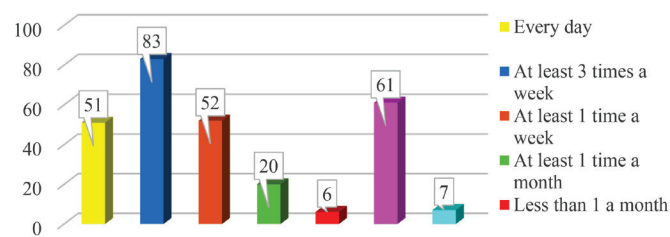


Fig. 4 Evaluation of the question asking about the use of bicycle transport

Question No. 4 dealt with transport by bicycle in terms of ownership. According to the options chosen for the answer, it seems that respondents use only their own bicycle for transport, which corresponds to 70.4% of the respondents. Another option is to get around using public bicycles (bikesharing), where 6.4% of respondents answered us. It can be assumed that due to the pandemic situation, the preference for only this type of transport has not grown among people, which resulted in a low percentage. Of all the respondents 19.6% use both public and private bicycles. The data show us that bikesharing companies are popular mainly in the age category of 26-40 years, while they are not so preferred among young and older people, and the possibility of owning a bicycle prevails (Fig. 5).

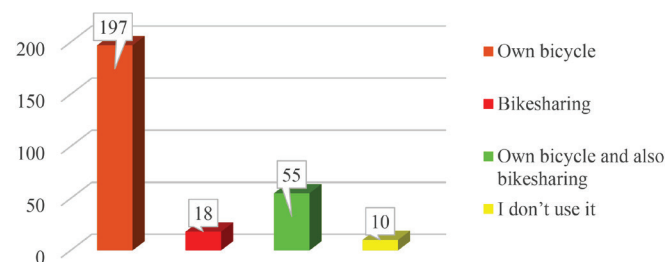


Fig. 5 Evaluation of the question asking about the bicycling method used

One of the questions of interest was whether our respondents have a place to park their own bicycle. Of the 280 respondents, it seems that 40.7% carry a bicycle with them, while 47.1% of the respondents also use public stands or covered spaces for parking. An interesting finding was that only 37 of the 117 respondents who carried a bicycle with them also indicated the possibility of missing bicycled stands, which means that a lack of parking stands is not a reason to carry a bicycle with you (Fig. 6).

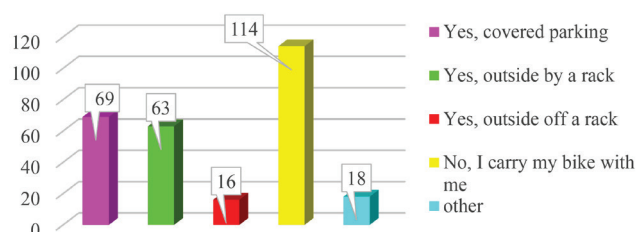


Fig. 6 Evaluation of the question asking about parking options

Question No. 6 addressed the purpose of using a bicycle. The respondents were able to choose the answers that agreed with their most frequent rides. Most respondents (71.4 %) ticked recreation as one of the options. On the other hand, 70.7% chose travel to the post office, bank or shopping as the most common option, while 59.6% of the respondents chose the option of using a bike for work or education. The least chosen option was entertainment, which was given by only 36.4% of the total number. Young people in the 19-25 age group prefer cycling mainly for recreation and not for education and work, while respondents in the 26-40 age group use a bicycle at least three times a week for work (Fig. 7).

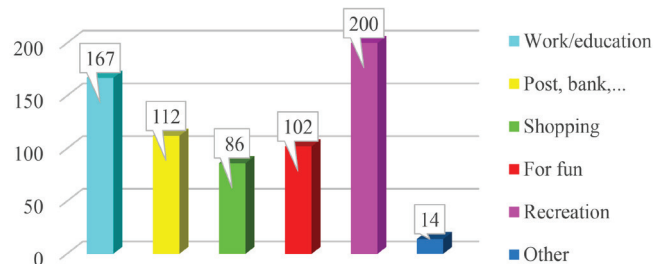


Fig. 7 Evaluation of the question asking for the purpose of bicycle use

Another important aspect was the identification of deficiencies in the infrastructure for cyclists. Respondents chose from the 9 options that they think are most lacking in their city. According to the percentage results, we see that the inhabitants of the city of Bratislava noted a lack of cycling routes the most, which was indicated by up to 82.5% of respondents, as well as separation from car transport, which corresponded to 77.5%. A major shortcoming was also the condition of the existing bicycle paths (42.5%), separation from pedestrian traffic (39.3%), or missing parking stands (32.5%). Less than 20% of the respondents chose more information about the possibilities of using bicycles (maps, tips) or technical equipment (charging stations, pumps, tools, etc) (Fig. 8).

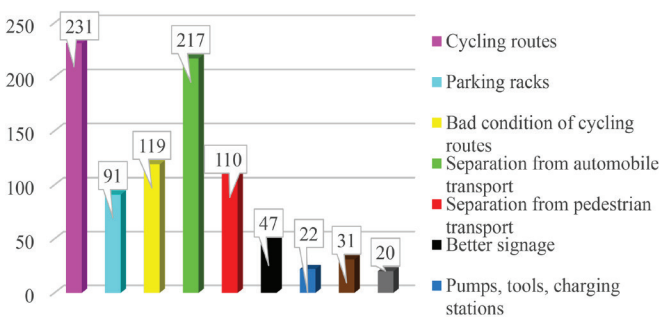


Fig. 8 Evaluation of the question asking about infrastructure deficiencies

Also of interest was whether the respondents used bicycle transport after dark and also when it is raining or snowing. Surprisingly, up to 80.7% said that they ride even after dark, and 48.9% use bicycle transport even in bad weather such as snow or rain. It was found that respondents who ride after dark cited the lack of bike paths and separation from car traffic as the biggest problem.

The accident rate was 23.2%, which was higher than expected. Of the 65 respondents who have had an accident, as many as 41 checked the possibility that they were riding when it was snowing, raining and even after dark. It is assumed that some accidents may be caused by these factors.

4 DEVELOPMENT OF A VIEW OF A CYCLING INFRASTRUCTURE

Based on the two completed surveys, the change in people’s view of the cycling infrastructure and their attitude to the basic issues related to their relationship to cycling was of interest. One of the larger surveys on bicycle transport in Bratislava, which was conducted in 2011, was compared with our survey, so that we could see how the creation of newer projects in the city of Bratislava affected people’s attitudes on the issue. In addition to the new projects that had arisen in the city, attitudes may have been influenced by the attempt to change the division of transport work, i.e., when cities are trying to reduce car traffic and cycling is gaining ground. The results of this year’s survey are marked in blue in the tables. The results of the 2011 survey are in green.

Gender representation has not changed after ten years. From the given data we can see that there is still a higher interest in cycling by men than by women (Tab. 1).

Tab. 1 Comparing the question asking about gender

What is your gender?			
Man	69.3%	Man	67%
Woman	28.6%	Woman	32%

According to the percentage result of the 26-40 year old age group, where in 2011, there was a higher interest in bicycle transport compared to 2021, it was assumed that two thirds of this age group have moved to the category of older than 41 years after ten years. It can also be seen that young people’s interest has not changed (Tab. 2).

Tab. 2 Comparing the question asking for age

What is your age?			
19-25	23.9%	19-25	21%
26-40	50.7%	26-40	66%
41+	23.5%	41+	13%

As can be seen, the respondents’ interest in cycling has increased on a more regular basis after ten years, as they only rode once a week ten years ago, while they currently use bicycles daily or at least three times a week (Tab. 3).

Tab. 3 Comparing the question asking about the use of bicycle transport

How often do you use a bicycle?			
Every day	18.2%	Every day	16%
At least 3 times a week	29.6%	At least 3 times a week	38%
At least 1 time a week	18.6%	At least 1 time a week	38%

The data show that respondents stopped carrying bicycles with them, but began to use covered parking and also outdoor stands. Based on the data, it can be assumed that the number of these bicycle storage places has increased (Tab. 4).

Tab. 4 Comparing the question asking about parking options

Do you have a place to park your bike outside your home?			
Yes, covered parking	24.6%	Yes, covered parking	16%
Yes, outside on a rack	22.5%	Yes, outside on a rack	5%
No, I carry my bike with me	40.7%	No, I carry my bike with me	61%

After ten years, it can be seen that the interest in using a bicycle for ordinary things such as a trip to the post office, to the bank or for shopping has increased, which may be due to the greater number of indoor and outdoor storage spaces, as follows from the question before (Table 4). But it can also be seen that interest in a journey for recreation has dropped significantly, which would be worth further examination (Tab. 5).

Tab. 5 Comparing the question asking for the purpose of use

What purpose do you use a bicycle for?			
Work/education	59.6%	Work/education	53%
Post, bank,...	40.0%	Post, bank,...	33%
Shopping	30.7%	Shopping	20%
Recreation	71.4%	Recreation	83%

It can be seen that, according to the percentages, the cycling infrastructure has in general improved considerably,

Tab. 6 Comparing the question asking about infrastructure deficiencies

What infrastructural deficiencies does cycling transport have?			
Cycle routes	82.5%	Cycle routes	94%
Parking racks	32.5%	Parking racks	57%
Better signage	16.8%	Better signage	51%
Information about the possibilities of using a bicycle (maps, tips,...)	11.1%	Information about the possibilities of using a bicycle (maps, tips,...)	52%

which may be a consequence of the successful implementation of cycling projects over the last 10 years (Tab. 6).

The percentages found after ten years show us that the accident rate has increased slightly (Table 7), which may be due to the increased use of bicycle traffic even when it snows, rains or is after dark (Table 8, Table 9).

cilities, the provision of various benefits by the employer, and the construction of sufficient cycling infrastructure by the city will lead to increased interest in this mode of transport and a gradual positive change in the division of transport work, which could affect other cities not only in Slovakia but also in surrounding countries.

Tab. 7 Comparing the question asking about the accident

Have you had an accident on your bike?			
Yes	23.2%	Yes	19%
No	76.8%	No	81%

Tab. 8 Comparing the question asking about riding after dark

Do you ride after dark?			
Yes	80.7%	Yes	75%
No	19.3%	No	25%

Tab. 9 Comparing the question of riding in the rain or snow

Do you ride in the rain or snow?			
Yes	48.9%	Yes	38%
No	51.1%	No	62%

5 CONCLUSION

Although some 112 kilometres of cycle lanes and other infrastructure have been constructed in Bratislava between 2012 and 2022, and larger companies have begun to promote bicycle transport by creating covered storage areas or providing various benefits compared to using other modes of transport, this division of transport work still has not reached a sufficient share. Although fewer people took part in the survey than in 2011, the situation was affected by the coronavirus, where it was not possible to conduct a field survey. Cyklokoalícia, which conducted the 2011 survey, also participated in the promotion. The data from the survey was mainly used to compare the change in public opinion of the population over the last 10 years. The results helped the city evaluate improvements in the overall bicycle infrastructure. The system of building a bicycle infrastructure is not uniform, which is due to an insufficient concept for the development of a bicycle infrastructure in the city. In order to achieve a higher share of bicycle traffic, the city of Bratislava will have to proceed strategically when procuring new projects and building bicycle infrastructure. An important aspect is also the support of bicycle transport by employers or educational institutions. Construction of fa-

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