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Sustainable mobility in urban conditions- multimodal approach for greener cities: insights from Slovakia

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Abstract
The consequences of sustainable and greener mobility have been demonstrated previous year by the pandemic situation. One significant benefit was to reduce the level of noise, dust and air pollution from the traffic in many European countries due to reduced mobility most of the population. Positive phenomena was also recorded in the Slovak Republic. Today's urban mobility offers new, more sustainable ways of transport for residents, especially app-based and shared-ride services, which have become increasingly widespread and very popular. Undoubtedly offer a level of convenience unseen before in the urban mobility systems throughout the world. Although new forms of transport are developed in most Slovak cities, their operation is not very rational and therefore individual car transport still dominates at the expense of sustainable ways of transport. In our paper, we analyze the traffic situation in the city of Nitra, as the large number of trips in the course of the peak-hours often results in severe traffic congestion. Multimodality is one of the solutions to improve the current traffic situation, as it allows urban residents to choose from a range of alternative travel options. The main aim of this paper is to determinate the possibilities of multimodal urban mobility in the city of Nitra in addition to analyze how the potential change in the variability of choice of means of transport affects the urban mobility behaviour. In order to meet stated objectives, a marketing research was conducted. The research findings point to the fact that the current urban infrastructure and overall possibilities are limited, the consequence of which is that travel behaviour of citizens does not demonstrate the features of sustainable urban mobility. Our results point to major differences in attitudes of Nitrás residents from different urban and sub-urban areas.

Keywords Sustainable mobility · Multimodal travel choices · Public transport · Traffic

1 Introduction

An aspiration of governments for a 'renaissance' of their cities is a defining feature of contemporary urban policy. Smart and sustainable urban planning offer a succinct, critical and timely exploration of urban regeneration strategies throughout the world [1]. Based on the latest assumptions and studies, the world is already much more urbanised than previous decades. Projections show gradual shift in residence of the population from rural to urban areas. Today, approximately 55% of the global population lives in urban areas, the new reports lead to an estimate that this proportion will reach an increase to 68% by 2050 [2]. Urban mobility becomes one of the most challenging tasks in densely populated cities, large urban centers, since traffic congestion is an everyday problem. Year by year, the number of vehicles in urban regions increases exponentially, however this situation is not followed by suitable road infrastructure expansion. This unfortunate scenario leads to severe road traffic congestion, what is considered as a major problem in modern societies, resulting in great deal of time wasted in traffic [3]. There is no doubt about the strong need to foster logical planning of city infrastructure, especially urban transportation [4]. Over the last 20 years, we have seen the negative consequences of the expansion of individual car transport, especially in the countries of Central and Eastern Europe,

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Slovakia is no exception. Cities call for a new change in urban mobility that takes into account sustainable urban systems and thus meets the future needs of citizens for efficient and comfortable travel in a fraction of the time and with regard to the environment [5]. The need for greener and more sustainable means of urban mobility is also confirmed by the fact that car transport is one of the world's biggest sources of greenhouse gases [6]. Globally, transport accounts for around a quarter of CO2 emissions. And much of the world's transport networks still remain focused around the car. In car dominated cities, the journey to and from work are the bookends of the daily grind for many people all around the world. The negative phenomenon is that many people use private cars to travel to work daily. Most of these commuter trips represent single-occupant vehicle trips [7]. It is estimated that sole occupant trips represent more than 77% of all commuter trips in the U.S., almost comparable data shows several surveys for Europe [8, 9]. European citizens mobility is heavily centred on personal car. Car belongs to the most used means of transport for everyday mobility, commuting to work but also for long distance trips. Statistics show that public transport is quite more used in East Europe countries, however not due to better public transport services, but it is assumed that due to lower car availability [10].

Car transport is at its peak in Slovakia, people are buying more and more cars and traveling less by public transport. There were 500,000 more cars in Slovakia in 2016 compared to 2012, and in total there are already 2.1 million of them. According to predictions, this trend should continue in the coming years [11]. The overall traffic situation in Slovakia and especially in its urban areas does not show elements of sustainability. As it can be seen in the Fig. 1, individual car transport contributes to satisfying transport requirements to the greatest extent, as the number of passengers records year-on-year increases. In the last ten years (2010–2019), the increase in persons transported by individual transport represented 5.14%.

Prolonged negative and unfavourable development in the modal split in favour of roads, especially individual (non-public) transport exemplifies the necessary need to implement a new development vision and transform the Slovak transport sector in favour of more sustainable solutions, which need to be addressed at present. These key transport sector problems belong to the serious issues which must be addressed at the level of local governments. It should be noted that several Central European countries face similar problems. A sustainable integrated multimodal transport system that which will be implemented in accordance with the society's economic, environmental and social needs should be developed in every urban transport system [13].

Multimodality is a general term that can be used in many different contexts and disciplines, today it is often associated mainly with the field of transport. In transport, multimodality represents integrated transport system consisting of several different means of locomotion and their combination [14]. In urban areas its main task is to facilitate the movement of people from place to place in order to make it faster and more efficient. The advantage of multimodal transport lies in a higher willingness of people to exchange a car for means of public transport, which they can effectively combine and save time [15]. Optimizing urban mobility in the context of multimodal public transport is increasingly gaining traction and going forward in many studies. It has the potential to raise the current way of transporting people to a higher level, to reduce the environmental footprint of transportation and at the same time to make the optimal use of infrastructure [10, 16].

Transport planners and different groups of stakeholders try to help cities address mobility challenges, identify travel demand management strategies and more often promote the effective combination of various transport modes

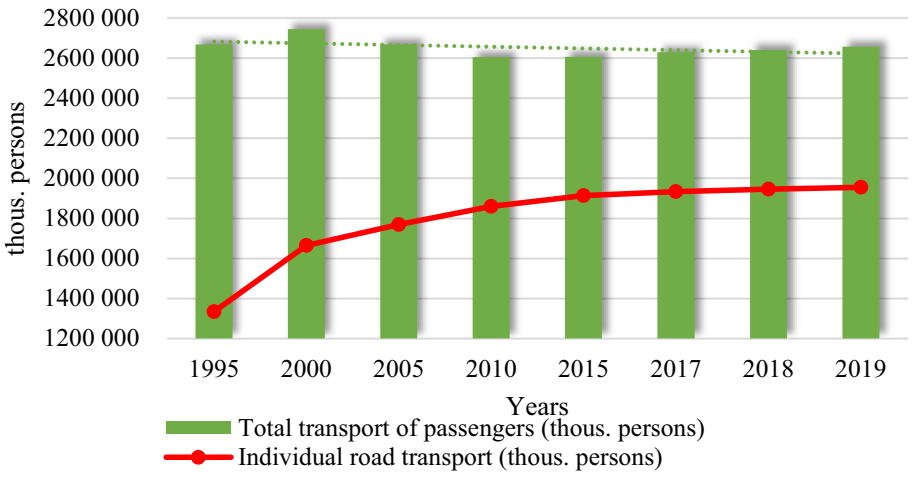

Fig. 1 Development of individual road transport [12]

as a significant key to achieving more sustainable urban mobility in the future [17]. Policymakers and local authorities are constantly striving to find solutions that will have the effect of significant reduction in car use in urban areas and shift to more efficient vehicles with convenient choices in order to stem the unsustainable travel behaviour trends associated with modern-day, car-dominated travel, all with a specific focus on improving commuters' quality of life, limiting environmental impact and reducing air pollution [18].

All efforts relating to concepts such as traffic congestion, commuting travel time, mobility space usage, access to mobility services, multimodal integration, quality of public area and opportunity for active mobility lead to enforce the strengths of the green modes and newly emerging mobility services, such as car sharing and bike sharing, which can be linked to provide a smart alternative to the private cars, what may then contribute to a reduction in the car usage [19]. The modern mobility services are well developed in various metropolitan regions and are gradually integrated in the existing public transport structures, e. g. by multimodal booking and information options [20, 21].

Multimodality affects households and individuals themselves. It should be noted that in addition to the population in assessing impacts and factors, the most important attributes of the wider urban environment being relevant. In objective, this mostly involves referring to a city size, distances and urban structure [19]. However, some experts suppose that multimodal public transport indicates that people change transport mode, which may mean that they can no longer perform their usual activity patterns, what can result in even increased car use [17]. On the other hand, Nobis defined a positive relationship between a municipality population size and multimodal behaviour, as public transport is also involved in the combination of various modes of transport [22]. Local authorities encourage the promotion of using public transport, mainly due to minimalization the negative effects of car traffic. In many cases, the main cause of insufficiently served urban and suburban areas is the low population density of individual locations, what makes public transit not economically viable [23]. The integration and full functioning of public transport multimodality is the only solution to tackle transport, especially urban mobility in a sustainable way, it is most ideal choice that is more efficient, low-cost, greener and contributes to the quality of life in the city. In general, personal transportation in an urban area, which is characterized primarily by individual road transport cannot work effectively. This use of transport space is inefficient, and the space requirements of road transport are almost impossible to satisfy. Different transportation technologies with significantly varying properties regarding usability, infrastructural demands and environmental consequences are the solution for the sustainable mobility in future [15, 24].

Considerations and assumptions of how people combine different travel means is one of the key issues in the contemporary transportation research. It should be emphasized that measuring multimodality behaviours presents some intricacies, since different modes of transport represent various potentials in different conditions that deserve more attention in order to offer an instrument that is effective both on a modelling and on a policy viewpoint [25]. Cities, small cities, or various municipalities should upgrade and prepare new urban mobility plans by taking into consideration all features of sustainable urban strategy. Carefully planned and efficient urban mobility strategy combining efficient services of public transport, charging schemes, accessibility, land-use planning, passengers movement patterns and infrastructure for innovative transport modes are the initial basis for urban prosperity [26]. There is a society-wide consensus on this issue but results in the form of concrete solutions are still lacking. This is mainly due to different political interests and reluctance to solve new and challenging projects [5]. In closing, it is important to note the need to ensure that the strategic concepts of smart urban mobility and sustainable urban mobility are aligned. To a significant extent, this is about bringing technological and social solutions closer together, which are jointly interlinked and inseparable at present [27].

The city of Nitra has been long struggling with the problem of urban transport and trying to find the most suitable and sustainable solution, especially for the satisfaction of its inhabitants. Based on the cooperation of the municipality management with the Slovak University of Agriculture, which is located in the city, we set the goal of preparing a study that would take into account the real conditions for the creation of new urban transport plans. We consider multimodality in transport as a suitable solution for this type of city. Based on the results of our study, other cities with similar characteristics could be inspired.

2 Material and methodology

The main aim of our paper is to examine the possibilities of multimodal urban mobility in the city of Nitra in addition to analyze how the potential change in the variability of ways of transport affects the urban mobility behaviour. Questionnaire survey was conducted within the city of Nitra and its inhabitants. We analysed how the potential availability of various means of transport and their optimal combination can affect the urban mobility behaviour. As individual car transport still dominates at the expense of sustainable means of transport, we tried to examine if the

dominance of a certain mode in the city makes multimodal mobility behaviour more likely, in average. The purpose of our study is to prove that integrating different sharing systems in combination with the urban public transport can significantly enhance the urban mobility. To achieve our goals, we processed various kind of information and data. For theoretical background, secondary data was processed. The presented paper contains the primary data that was acquired from marketing research, which was conducted from March 2020 to March 2021.

The questionnaire was prepared in two configurations – online and printed. Online questionnaires were processed in Google Forms and were available on social network (on Facebook within the groups that bring together the residents of individual urban areas) and sent by electronic emails. Approximately 10% of the total number of submitted and completely filled questionnaires consisted of printed forms, which were filled during personal meetings. Statistical data processing was performed via XLStat.

For the needs of a deeper examination of the subject matter, we used the Chi-Square test of independence and Correspondence analysis as well as Pearson's Phi, Cramer's V, Tschuprow's T and Contingency coefficient. Lastly, 3615 citizens of Nitra were involved in our survey; as it is shown in Table 1, where individual socio-demographic characteristics of respondents are listed (the age ranges are limited according to the Pew Research Center methodology [28]).

3 Results and discussion

3.1 The need for a new sustainable urban strategy in the field of transport in the city of Nitra—the main reasons

We are witnessing different levels of urban mobility development in the world, especially in Europe, with countries that are at the forefront in the urban mobility planning. The policy of urban mobility, including planning, is primarily the responsibility of local public authorities that have been struggling with a lack of funding, insufficient legislation or the absence of professional staff for a long time. The current situation in most cities in Slovakia is critical and requires immediate solutions. The reasons why cities are in unsustainable transport conditions stem mainly from the reluctance of policy makers to look for new innovative approaches and solutions. This problem affects most of the urban residents. Planning the urban transport in the long period of time is complicated, as there may occur several conflicting views and requirements, which often lead to unsystematic steps. One reasonable solution is an inclusive policy. This tendency is also presented by the European Commission that recommends the introduction of sustainable urban mobility plans that supports the balanced development of all important modes of transport towards its sustainability. One of the opportunities to change the traditional patterns of travel behaviour is European Mobility Week (EMW). It is the European Commission's awareness-raising campaign focused on sustainable urban mobility. EMW takes place annually from 16 to 22 September, with the goal of encouraging the European municipalities to enhance, promote and implement sustainable transport among local population. This campaign offers a perfect opportunity to perform sustainable mobility alternatives to urban residents as well as to introduce public multimodal transport and to clarify the problems that cities are facing. The city of Nitra joins to the EMW every year to raise the awareness of its residents about the travel issues and also seeks the contribution to a better progress towards sustainable mobility in the city.

The city of Nitra with its economic potential belongs to the most developed cities in Slovakia, providing many job opportunities. Its almost 80,000 inhabitants make Nitra the largest city in western Slovakia outside of the capital city. Nitra is known worldwide as a center of agriculture and the largest number of festivals and business events takes place here. Because of its strategic geographic location, it has become one of the most important centres of business, culture and education in the country. Thousands of domestic and foreign tourists visit the city every year. Combination of people commuting to work, local inhabitants and students visiting two universities in the centre causes that transport has become a major issue. The city of Nitra covers an area of 100.45 square kilometres (38.8 sq. mi); it is currently the fifth largest city in Slovakia with a population of 76,028 (as of 31/12/2020).

The following figure shows the city of Nitra with its urban, sub-urban areas and satellite municipalities. We marked the center area with a red circle which represents a circle of 2 km. The green circle captures the sub-urban parts of the city. The radius of the green circle is approximately 8 km. The blue circle displays an area of satellite municipalities, which is administrated by the city (Fig. 2).

3.2 Questionnaire research outcomes

The introductory question of our questionnaire concerned the frequency of using various ways of transport for traveling around the city. We found out that the transport in the city shows the elements of monomodality as the urban residents do not use the alternative modes of transport as often as it would be appropriate (Fig. 3). A car was found to be the most commonly used kind of transportation in the city, as 59.4% of the respondents marked this option. The dominance of cars in recent years is clear, people are not so

Table 1 Socio-demographic characteristics of respondents

Socio-demographic variables	Categories	Absolute frequency	Relative frequency (%)
Gender	Female	1874	51.8
	Male	1741	48.2
Age group	18–23 (Generation Z)	851	23.5
	24–39 (Millenials)	1249	34.6
	40–55 (Generation X)	1014	28
	56–74 (Baby boomer)	501	13.9
Economic activity of respondents	Employed	1906	52.7
	Unemployed	94	2.6
	Student	976	27
	Maternity leave	241	6.7
	Retiree	398	11
Urban area	Čermáň	218	6
	Dolné a Horné Krškany	41	1.1
	Drážovce	68	1.9
	Chrenová	916	25.3
	Janíkovce	89	2.5
	Klokočina	1037	28.7
	Kynek	78	2.2
	Mlynárce	37	1
	Párovce	356	9.8
	Párovské Háje	42	1.2
	Staré mesto	497	13.7
	Šúdol	47	1.3
	Zobor	189	5.2

Source: Own data and processing

Fig. 2 The city of Nitra with its urban and sub-urban areas. *Source*: Own processing

interested in "green" options that allow a positive lifestyle choice, such as commuting by bike and e-scooter. The city has only recently begun with "sharing systems" for the alternative modes of transport, which are popular in many cities around the world. These systems are constantly adapting to the current conditions and requirements of the citizens in order to eliminate deficiencies, they are constantly being improved to be fully utilized. This fact is also demonstrated in Fig. 3, as only a small percentage of the respondents indicated frequent or occasional use of bicycles and e-scooters. The traditional means of transport (bus) is underused, as only 21.8% of the respondents use buses often for public transport in the city what is clearly caused by poor route planning. Route networks must be redesigned to provide convenient and optimal links between all city points where there is demand, so that passengers can make complex journeys by using a combination of routes more effectively. On the other hand, we noticed a positive attitude towards walking. Up to 38.9% of the respondents choose walking for personal mobility in

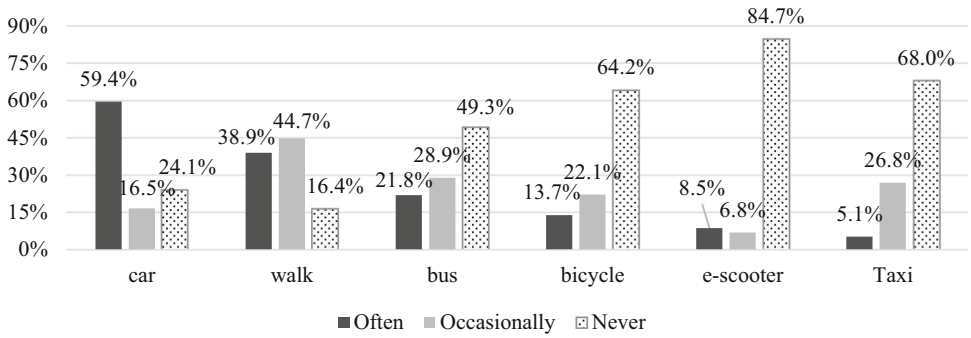

Fig. 3 How often do you use different modes of transport to move around the city? *Source*: Authors' research and processing

the city often and 44.7% of the respondents choose this "healthy option" occasionally.

The dominance and gradual expansion of individual car transport are evident in the city of Nitra, what is also reflected in the high number of cars owned by Nitrás households (Fig. 4). More than 94.3% of the households own 1 or more cars, while only 5.7% of the households do not own a car at all. According to the obtained data, we can confirm an increase in the number of cars owned by Nitrás households compared to previous years and this number will grow until the citýs sustainable urban mobility policy is not resolved.

In comparison with the results of the analysis of how many households own an alternative transportation mean, such as bicycle, e-bicycle or electric scooter, we found that more than 80% of the households own at least 1 alternative mean of transport. Even 41% of the households stated that every member owns an alternative transportation mean.

An important issue in the development of alternative resp. eco-friendly forms of transport in the city is the way how people commute to work within the city of Nitra. Shifting the daily commute from cars to sustainable transport modes, like public transport (bus), bicycling, e-scootering is the goal of current urban transport policy. Only residents working within the city were asked to answer this question. Our intention was to find out the level

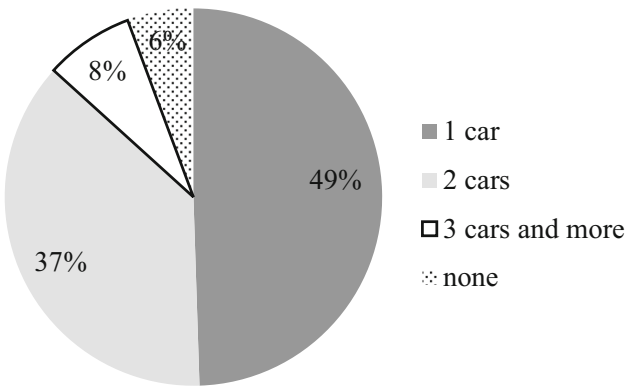

Fig. 4 Car ownership in Nitrás households. *Source*: Authors' research and processing

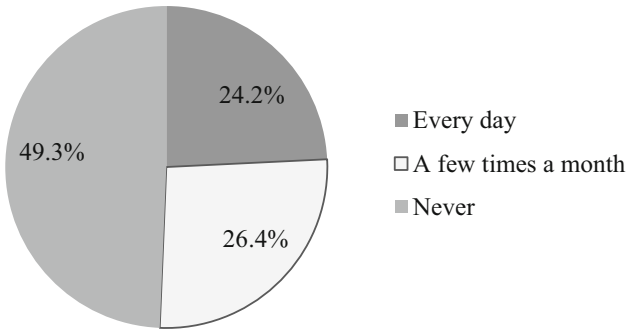

Fig. 5 How often do you use sustainable forms of transport when commuting to work? *Source*: Authors' research and processing

and the frequency of use of these transportation means in commuters behaviour habits. As demonstrated in Fig. 5, almost half of the commuters never used the alternative transportation means (bus/bicycle/scooter). On the other hand, it should be noted that almost a quarter of the commuters go daily to work in an ecological way**.** To sum it up, there are still restrictions and reserves for the full use of alternative transport in the city, which the residents are aware of.

In the next part, we were focused on how residents evaluate the current infrastructure for the use of alternative ways of transport. The results showed that up to 65% of the respondents confirmed that the conditions for the successful development of sustainable mobility in the city are insufficient and greatly limit the use of bicycles and scooters in particular. Despite the fact that many citizens own ecological transportation means, insufficiently developed cycling network and sidewalks are in bad conditions, discourage people from using eco-friendly ways of transport, whether for work or leisure. The purpose of this question is to bring to attention that the promotion of sustainable urban mobility and related multimodality alone is ineffective unless the suitable conditions are created for the actual implementation and functioning.

Various European cities try to motivate their citizens to exchange individual car transport for sustainable transportation methods and their combinations. One such event

is EMW, where the city of Nitra is an annual participant. However, our findings confirmed that only 24% of the respondents know this campaign, take advantage of this week and try to limit the individual car transport more. Almost 64% of the respondents register the activities of this special week but with no effect on their traffic behavior. It was a big surprise to find out that 12% of the respondents are unaware of this event, what opens new opportunities for even better promotion and visibility of EMW in the city.

The following paragraph provides very important information for our research, as we wanted to determine the extent of citizens' willingness to combine various modes of transport when travelling around the city in accordance with the conditions that the continuity of urban transport modes for any direction would be ensured. The research revealed several assumptions. We assumed a dependence between the place of residence and the willingness to combine modes of transport around the city (Assumption 1). We used the Chi-Square test of independence to monitor mutual relations between the willingness to combine different forms of transport compared to the urban area in which the respondents live. Before applying the method, we formulated the following hypotheses:

H0 There is no relationship between the urban area and willingness to combine different modes of transport around the city.

H1 There is relationship between the urban area and willingness to combine different modes of transport around the city.

Table 2 Contingency table for urban area and willingness for multimodality

	I am not sure	No	Yes	Total
Chrenová	92	57	687	836
Dolné a Horné krškany	0	12	58	70
Drážovce	0	9	91	100
Janíkovce	34	13	115	162
Klokočina	125	97	628	850
Kynek	14	18	112	144
Mlynárce	0	17	36	53
Párovce	7	3	130	140
Párovské Háje	6	23	43	72
Staré mesto	76	34	523	633
Zobor	19	17	229	265
Čermáň	28	12	170	210
Šúdol	7	9	64	80
Total	408	321	2886	3615

Source: Own processing, XLStat

Table 3 Results of the Chi-Square test of independence

Chi-square (Observed value)	189,772
Chi-square (Critical value)	36,415
DF	24
P-value	< 0,0001
alpha	0,05

Source: Own processing, XLStat

Subsequently a contingency table was created (Table 2).

Based on the results of the Chi-Square test of independence between the selected two variables (Table 3), we can assume a statistically significant dependence between two categorical variables, we reject the null hypothesis, since the P-value is less than determined level alpha of 5%. By confirming hypothesis H1, we can state that there is a relationship between the place of residence and the willingness of residents to combine different modes of transport.

Subsequently, we visualized the relationships among selected variables by using a multivariate graphical technique called Correspondence analysis (Fig. 6). This method is mainly used to display in more detail the dependencies between the variables in the rows and the variables in the columns of the relevant contingency table, compiled from the monitored data (Table 2). The next procedure was to determine the appropriate number of dimensions to describe the points, this was determined based on the cumulative percentage of the explained inertia. The first dimension explained 65.77% of inertia, the second dimension 34.23%, whereby we achieved 100% inertia in two dimensions.

The distances between the points determine the degree of strength of the dependence between specific points. The distance of the particular points suggests which variables are close to each other, i.e. strongly dependent on each other and which are further apart, i.e. the dependence is low. The citizens' willingness to combine the alternative means of transport is a significant factor for us to suggest possibilities for sustainable urban mobility. As indicated in Fig. 6, a very strong willingness for multimodality was recorded among the residents of urban areas—Chrenová, Zobor, Staré mesto, Čermáň, Párovce Šúdol, Kynek, Drážovce and Klokočina, as the majority of the population lives there. These urban areas are typical by mass housing construction and the people realize the advantages of a fully functional alternative urban mobility system, mainly due to missing parking spots, as poor parking is a long-standing problem in the city. Zobor is characterized differently from other parts of the city, as it is located in the immediate surroundings of the forest. People living there

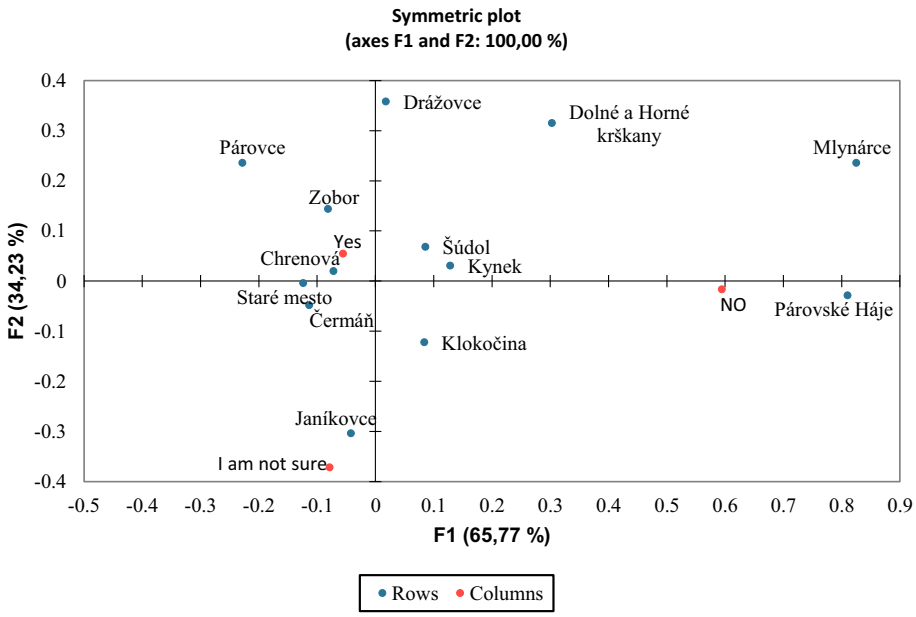

Fig. 6 Correspondence analysis of urban area and the willingness for multimodality. *Source*: Own processing, XLStat

use alternative means of transport more often in connection with recreation on bike paths in the adjacent forest terrain. When we look at another marginal residential area—Párovské Háje, the inhabitants are not willing to combine transport means, the reason is that the city forgot about its satellite municipalities in terms of infrastructure and transport in the long-term, what lead people to bigger reluctance and disinterest in combining transport means and they prefer to use the individual car transport.

A complicated task for most cities is to choose the most appropriate way which would motivate and inspire residents to use and combine various means of transport. The willingness depends on the place of residence, as we found in the previous analysis, so we assume that the willingness will also depend on the age of the inhabitants (Assumption 2). Therefore, we formulated the following hypothesis.

H0 There is no relationship between the age of inhabitants and their willingness to combine different modes of transport around the city.

H0 There is relationship between the age of inhabitants and their willingness to combine different modes of transport around the city.

Table 4 Results of the Chi-Square test of independence

Chi-square (Observed value)	905,052
Chi-square (Critical value)	12,592
DF	6
P-value	< 0,0001
alpha	0,050

Source: Own processing, XLStat

To confirm or reject the significance of a relationship between these two parameters, we applied the Chi-Square test of independence, the results of which we recorded in Table 4.

From the results of the Chi-Square test of independence, we can confirm that the p-value is less than the determined alpha (5%) at the selected significance level 95%, from which we can assume the existence of dependence between the willingness to combine various transport means and age of the inhabitants. To confirm and determine the strength of the dependence, we selected the calculation of the following coefficients—Pearson's Phi, Cramer's V, Tschuprow's T and Contingency coefficient, which are used to interpret the relationships between the variables. The results shown in Table 5 reveal a very strong dependence confirmed by Pearson's Phi and the Contingency coefficient. To verify the strength of the dependence from the previous two coefficients, we subsequently applied Cramer's V and Tschuprow's T coefficient, which confirmed the strong dependence of the selected variables.

We chose a radar graph to visually display the results of the analysis (Fig. 7). It is possible to see the distribution of

Table 5 Results of the Chi-Square test of independence

Coefficient	Value	Interpretation of association
Pearson's Phi	0,864	Very strong
Contingency coefficient	0,812	Very strong
Cramer's V	0,754	Strong
Tschuprow's T	0,731	Strong

Source: Own processing, XLStat

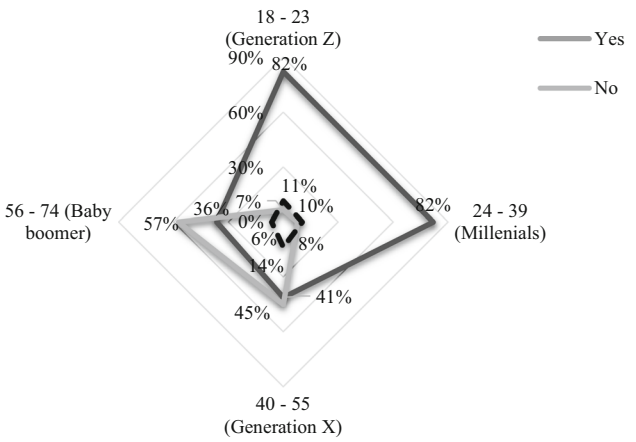

Fig. 7 The willingness for multimodality by generation groups. *Source*: Authors' research and processing

responses by age categories (generation groups). Generation Z and Millenials (both up to 82%) agree that they are willing to combine various transport means and only a small difference (1%) occurred in the answers 'no' and 'I don't know'. This high willingness to combine transportation means stems from the very essence of young people's thinking as they are able to establish themselves to the new conditions very quickly and benefit from new innovative opportunities that are offered. Generation X (45%) and Baby Boomers (57%) recorded a higher percentage of responses with a negative attitude. These generations are in general more sensitive to any changes and therefore it is important to focus on the needs and requirements of this demographic groups, very sensitively target the promotional campaign, which would lead to greater interest and willingness to use alternative transportation means, thereby they can contribute to the sustainable mobility in the city.

4 Conclusion

Nowadays, multimodality in transportation studies is the key issue. Global problems, such as warming and negative environmental impacts, also affect trends in mode of transport. Sustainability in urban mobility and multimodality is a relatively young area of the research. The immediate and direct solution to contribute to the reduction greenhouse gas emission and environmental pollution, is greening of the transportation. The approach to traveling behavior of the population is highly dependent on the level of development of the city and its attitude towards urban transport policy. Individual car transport predominates at the expense of sustainable modes of transport is considerable in many cities. This situation is caused primary by wrong practice in the domain of transport designing in the country.

In our paper we focused on the analysis of modes of transport and multimodality in the city of Nitra, which is presently tackling with the issue of individual car transport expansion resulting in traffic congestion. One way to contribute to better condition is multimodality that allows urban residents to choose from a range of alternative travel choices. The main aim of our paper was to examine the possibilities of multimodal urban mobility in the city of Nitra in addition to analyze how the potential change in the variability of choice of means of transport affects the urban mobility behaviour. Despite the fact the city participates in European Mobility Week every year, the interest of the inhabitants is still not great. Only a quarter of the citizens is actively involved and even 12% of the respondents do not know the benefits of this campaign, which can significantly help to educate inhabitants about alternative and combined modes of transport in the city. The reason for low degree of involvement is a weak promotion by the city (no mentions on social networks, billboards, etc.). The findings connected with the current share of the use of different transport means to move around the city by the inhabitants are not positive as a car is the most preferred transportation mode for 59.4% of the respondents. Unexpectedly up to 49.3% of the respondents have never used public transport (bus) and even 64.2% have never used bicycle. We observed that the traffic exhibits the elements of monomodality in the city as the inhabitants do not often use the sustainability transport mode. We also monitored the inhabitanťs opinion on the existing infrastructure for the development of the alternative transport mode, many of them (65.12%) obviously stated the existing requirements as deficient. The intention of this study was also to point out that the promotion of sustainable urban mobility and related multimodality alone is inefficient unless the appropriate conditions are created.

Nowadays, not every urban area has equal conditions in the accessibility of public transport. Therefore, we needed to obtain very essential information through marketing research, as we wanted to find out the level of willingness to combine different modes of transport when moving around the city, under the condition that the continuity of transport modes for any direction would be ensured. The results of the statistical analysis confirmed the dependence between the urban area and the willingness for multimodality in transport. Our preliminary study showed that integrating different modes of transport (e.g. sharing systems) in combination with the urban public transport can considerably improve the urban mobility for chosen urban areas. The benefit of the city of Nitra is that its satellite municipalities are not very remote from the centre, what allows the journey by alternative transport modes from distant urban areas to the city centre.

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