European Journal of Sustainable Development Research
2023, 7(2), em0218
e-ISSN: 2542-4742
https://www.ejosdr.com

MODESTUM

Research Article

OPEN ACCESS

Smart transport in the conditions of the cities in the Slovak Republic

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Citation: Dousa, M. (2023). Smart transport in the conditions of the cities in the Slovak Republic. *European Journal of Sustainable Development Research, 7*(2), em0218. https://doi.org/10.29333/ejosdr/13070

ARTICLE INFO

Received: 11 Sep. 2022

Accepted: 26 Jan. 2023

ABSTRACT

The main purpose of the article is to interpret the issues of the topic through a detailed empirical analysis, both from a theoretical and practical point of view. The aim of this article is to propose solutions for cities in the Slovak Republic through a set of selected indicators of sustainable urban development in the field of transport. Specific proposals were formulated on the basis of a detailed analysis of the current state of selected cities in the Slovak Republic with more than 50,000 inhabitants in the area of selected activities, which are defined as key for sustainable development in the field of smart transport. In this article, we provide a comprehensive view of the issue of sustainable development of cities and municipalities in the Slovak Republic in terms of the requirement to increase their sustainability in the future and to provide smart, efficient, accessible public services that increase the quality of life in the area. This article is part of the solution of Project VEGA no. 1/0837/21 "Spatial and temporal aspects of EU cohesion policy: Lessons learned and future perspectives" and Project VEGA no. 1/0055/21 "The importance of smart technologies in the process of mitigating the economic and socio-psychological impacts of the COVID-19 pandemic on the quality of life of citizens".

Keywords: smart transport, smart mobility, sustainable urban development, municipalities, the Slovak Republic

INTRODUCTION

The significant increase in human activity in recent development stages has been inextricably linked to increased negative impacts on our planet (BuzzFeedVideo, 2016). The result is that humanity is depriving future generations of suitable living conditions and constantly reducing the quality of the environment (Anand & Sen, 2000). If development, as a natural consequence of human activity, is not tied with sustainability, environmental impacts will soon outweigh its benefits (Desha et al., 2011). Such an approach has been the subject of initiatives at the United Nations level with respect to agenda 2030 and local agenda 2021, and the European Union with respect to next steps for a sustainable European future, the charter of European sustainable cities and towns towards sustainability. These steps have been followed by national strategies as well as strategies and initiatives at regional and local levels.

Organizations require new and innovative ideas to survive. Organizations can associate with the dynamic environment outside and reach a competitive advantage through the creation of new ideas and processes. As a result, the management should always be open to new ideas from everyone in the company and not just wait for new opinions to be expressed. Therefore, there are many obstacles and challenges to develop innovation in organizations and managers must solve them and support creative and innovative employees to develop a suitable environment for the development of innovation in the organization (Tajpour & Razavi, 2023). In recent years, modern knowledge-based economics has played an important role in the third mission of universities in relation to the process of knowledge-transfer as a driving force to facilitate innovation and influence innovation, social and economic development in addition to two traditional missions of education and research (Tajpour et al., 2022).

These trends are also reflected at the level of cities, which on the one hand provide a significant proportion of the population with opportunities for employment and for cultural and social activities, education, science and culture. On the other side, cities are places of conflict between nature and civilization that manifest a wide range of environmental, transport, economic, territorial and social problems. It is up to cities to approach this conflict of development and its impacts with the principles of sustainability in key activities. Cities should take responsibility for these issues at their level and start looking for ways–and taking steps–towards sustainable urban development. However, it depends greatly on the respective cities how they take the initiative and adopt strategic measures at their own level. This state of their activities is the subject of this analysis, evaluation and further

recommendations. It has the ambition to contribute to the concept of promoting sustainable development in the conditions of cities of more than 50,000 inhabitants in the Slovak Republic. It is these cities that have the greatest potential for further development, including in connection with the growing trend in population migration to large cities. At the same time, these cities will primarily have to face the new challenges and problems associated with this trend and, on the other hand, will have to cope with the ever-increasing demand for quality, efficient and smart public services (Čepelová & Chmelařová, 2020).

The topic of the article is the sustainable urban development of the Slovak Republic. When processing the article, attention is focused on the conditions of cities in the Slovak Republic with more than 50,000 inhabitants, specifically in the city of Prešov. The research part of the article focuses on applying a selected set of indicators of sustainable urban development in the surveyed cities. Emphasis is placed on determining the level of potential for implementation these indicators and evaluation of these indicators in the surveyed cities. This article has the benefit of a clear theoretical and practical explanation of the current state of sustainable urban development in local government in the Slovak Republic. Raising awareness of this situation allows the surveyed cities to better promote and evaluate the implementation of this concept, which is becoming a prerequisite for achieving competitiveness, efficiency, speed, availability and performance of local government in terms of the requirement to provide quality and smart public services. We consider this to be the current challenges for the public administration, and therefore also the local self-government we are researching. The elaboration of the issue of sustainable urban development in the environment of cities in the Slovak Republic with more than 50,000 inhabitants may be a future stimulus for implementation of the recommended changes.

SMART TRANSPORT (MOBILITY)

Sustainable management of urban areas is becoming during the last decades, one of the most important challenges of the 21st century that resulted in the concept of "smart city" (Manders et al., 2020). The city can be defined as "smart" when social capital, traditional, and modern (ICT) communication infrastructure encourages sustainable economic development and high quality of life (Šurdonja et al., 2020). Cities around the world are confronted with urgent problems such as traffic congestion, parking problems as well as noise and air pollution (Benevolo et al., 2016; Gupta et al., 2019; Schreieck et al., 2018; Willing et al., 2017a, 2017b). One of the main reasons for this is the popularity of the use of private cars.

Smart mobility is often highlighted as a key system without which the smart city could not be sustainable (Cecco, 2019). Several smart solutions have been analyzed and implemented in the context of smart mobility/movement in the cities and beyond (Behrendt, 2016). Many of these solutions are based on IT and they include a vehicle navigation system, e-parking, e-ticket, info-mobility signalization, demand-responsive transport, car sharing, bike sharing, public transport live tracking but also some innovative solutions are not necessarily related to IT (walking bus) (Michałowska & Ogłoziński, 2017).

Urban areas are often associated to IoT-enabled opportunities for innovation, as the ubiquitous concept of smart city testifies (Porru et al., 2020). The role of smart public transport is bound to increase in our ageing societies. Older people are less likely to drive, and more likely to have mobility difficulties, and to depend on public and community transport provision (Behrendt et al., 2017).

METHODS OF RESEARCH AND DATA

The aim of this article is to propose solutions for cities in the Slovak Republic through a set of selected indicators of sustainable urban development in the field of transport. Specific proposals were formulated on the basis of a detailed analysis of the current state of selected cities in the Slovak Republic with more than 50,000 inhabitants in the area of selected activities, which are defined as key for sustainable development in the field of smart transport.

This analysis was selected for research that was recommended according to the pilot methodology of the central authority for the development of regions in the Czech Republic. This methodology was modified for the conditions of Slovak cities with more than 50,000 inhabitants and then applied for the selected area of transport. The indicators were revised according to the availability of data and the specific problems of individual cities.

The application part of this article focuses on the environment of the local government of the Slovak Republic, specifically the level of cities. Cities have the greatest potential for development in the future, also in connection with the growing urbanization and depopulation of the countryside. There are also many problems that cities will have to face in the future. One of the possible solutions is to apply the principles of sustainable development in practice and to implement the smart city concept.

For the purposes of the questionnaire survey, the municipal authorities of the Slovak Republic (specifically 10 municipal authorities of the surveyed cities) were elected as a research sample as executive bodies providing organizational and administrative affairs of the municipal council and the mayor.

We obtain detailed information sources using data from the Statistical Office of the Slovak Republic, specifically from the Regional Statistics Database. The selection of the sample was also determined by the scope of competencies, whether they are transferred or original competencies. It is true that the larger the city, the greater the emphasis on the quality and quantity of services provided to its inhabitants. For this reason, it was not important to analyze smaller cities and villages. At the same time, it was assumed that cities with more than 50,000 inhabitants will keep records of the data and information needed for the research presented in this article.

Questionnaires were distributed (personally and electronically) to each surveyed municipal office in Slovakia, while the interviewees interviewed in the interview were the

Table 1. Methodical semaphore of sustainable urban development in the Slovak Republic

Evaluation of indicators	Differential of color semaphore	Sustainable development prediction
Baseline: 100% indicator achievement (max)	☺	There is no need to reduce or improve it in any way.
Medium status: Arithmetic average of values surveyed in all cities for individual time periods=50%	😐	Value of indicator contributes to achievement of sustainable urban development by more than 50%, but it needs to be paid attention to & increase its values.
Negative status: Higher or lower than arithmetic average of surveyed values in all surveyed cities for individual time periods=0%	☹	This negative state hinders achievement of sustainability, & it is necessary to stimulate.

Table 2. Which of offered variants have you already implemented, or do you plan to implement in area of "smart mobility"?

	Already implemented	Currently implementing	We plan to implement it by 2022	We do not plan to implement it by 2022
Bratislava	C, D, F, & G	B & E	A	
Košice	F & G	B, D, & E	A & C	
Prešov	C & E	B	A, D, & G	F
Nitra	G	A, B, & F	D	C
Žilina	B, F, & G	D & E	A & C	
Banská Bystrica		F	X, X, C, D, E, & G	
Trnava		X		
Martin		X		
Trenčín		B, D, F, & G	C	A & E
Poprad	B & G		A, C, D, E, & F	

Note. Activities: X: No answer; A: Offer citizens on website of city & municipality applications providing smart parking; B: Support for building infrastructure of charging stations for electric cars & e-bikes; C: Smart traffic management systems–navigation systems to monitor traffic & ensure traffic flow; D: Introduction of information boards at citizens' stops; E: Offer citizens mobile applications about city; F: Free Wi-Fi in public transport or areas; & G: Shared transport–sharing bicycles or cars (Source: Authors' own processing, 2021; Elliott & Urry, 2010)

top representatives of the cities in the surveyed issue in order to find out their attitudes to the issue.

The primary research is carried out on the basis of our own collection of information using a questionnaire survey. The analytical part of this article uses descriptive statistical characteristics in the description of the research sample and indicator sets of sustainable development (arithmetic mean, standard deviation) as well as other quantitative methods.

When we talk about indicator sets, we mean a set of appropriately selected indicators, which as a whole talk about a given phenomenon or subject in a much broader context. We can talk about indicator sets of sustainable development, environment, and transport. Indicator sets are created for strategic documents (program indicators) or for evaluation of local government processes and performance. When we talk about sustainability indicators, it is always an indicator set and not individual indicators; because this issue is so complex that even at the international level there are many approaches and different versions.

Following the content and thematic focus of the questionnaire survey, an indicator set was chosen, according to the ISO 37120 standard: Sustainable community development - indicators for urban services and quality of life, with a focus on transport (smart mobility). The standard applies to all cities, municipalities or local governments that are interested in measuring their performance in a comparable and verifiable way, regardless of size and location. This standard was modified (modified and supplemented by other indicators) and subsequently applied to the surveyed cities in the Slovak Republic. The main reason for the selection was the follow-up to the questionnaire survey, as well as the possibility of availability of statistics at the local level.

On this basis, an indicator set was created in the field of transport, which could be used to test the conditions of local government in the Slovak Republic. We used the questionnaire survey method instead of the SWOT analysis to examine the analysis of the internal and external environment. The results are processed and compared clearly and clearly within tables and graphs.

The proposed indicator set is listed and applied in the following tables. The proposed methodological semaphore of sustainable urban development is shown in **Table 1**.

RESULTS

The surveyed municipalities perceive the importance of applying the smart city concept as very important, especially in terms of improving the quality of life of the population, cost savings, increasing the attractiveness of the city, as well as the environmental aspect of the city. However, not only the mayors but also the relevant public administration employees would undoubtedly be helped by the regular application and evaluation of the sustainable development of the given locality. At the same time, this methodological support would contribute to a quick orientation in how it will affect development activities (investment/non-investment project) and the overall sustainable development of the respective site (positive/negative). Representatives of municipalities in the Slovak Republic are calling for such assistance, as shown by the primary research. However, the individual municipalities surveyed are still taking some necessary steps in the field of smart mobility (transport) in their territory. Implementation of individual activities in the field of intelligent mobility in the surveyed municipalities is shown in **Table 2**.

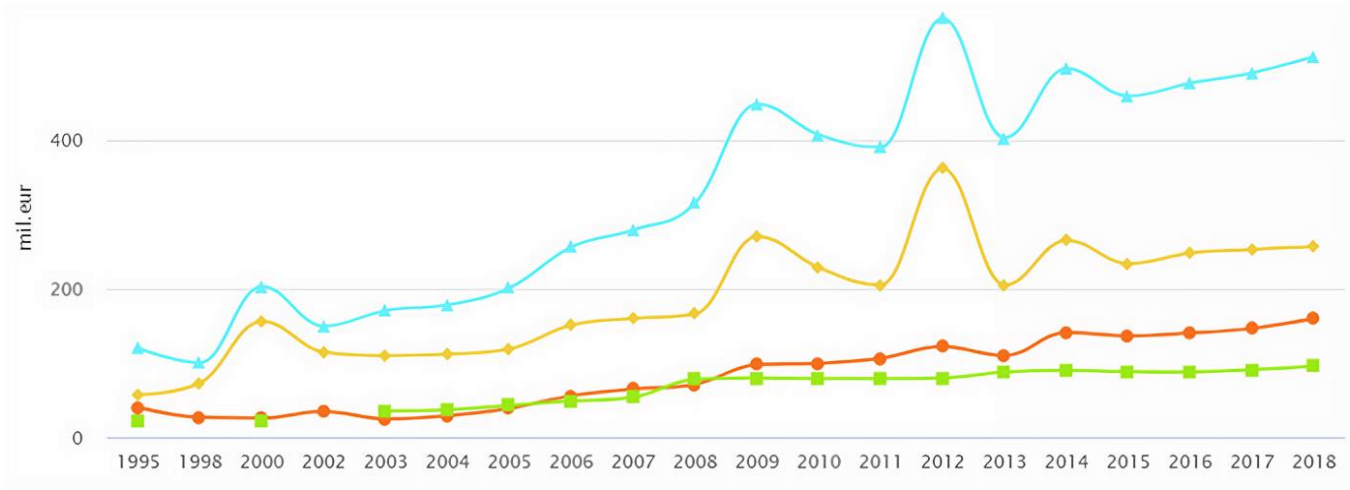

Figure 1. State subsidies to public transport (Slovak Environment Agency, 2020)

It is clear from the results that the capital city Bratislava, Košice, Prešov, Žilina, and Poprad plan to offer citizens applications ensuring smart parking in the city by 2022. The city of Trenčín does not plan to implement this activity until 2022. On the contrary, the city of Nitra, as the only local government in Slovakia, is already implementing this activity. In the area of support for the construction of the infrastructure of charging stations for electric cars and e-bikes, the cities of Bratislava, Košice, Prešov, Nitra, and Trenčín are currently implementing them. This activity has already been implemented in the cities of Poprad and Trenčín. In the area of the introduction of smart transport systems within the traffic management (navigation systems) to ensure its fluidity, the capital city of Bratislava and the city of Prešov, which already use these systems, are at the forefront. On the contrary, the cities of Košice, Žilina, Banská Bystrica, Trenčín and Poprad plan to implement this activity by 2022. The city of Nitra does not plan to implement this activity until 2022. The introduction of information boards at stops for citizens has already been implemented in the capital Bratislava. It is currently being implemented in Košice, Žilina, Trenčín. The cities of Prešov, Nitra, Banská Bystrica, and Poprad plan to start this activity by 2022. The city of Prešov has already offered its inhabitants a mobile application about transport. The cities of Bratislava, Košice, Žilina are currently implementing this activity. The city of Banská Bystrica and Poprad plan to launch it by 2022. On the other hand, the city of Trenčín does not plan to implement this activity. Free Wi-Fi in public transport or in public areas is in the capital Bratislava, Košice, and Žilina. It is currently implemented in the cities of Trenčín, Nitra, Banská Bystrica. The city of Poprad plans to implement this activity by 2022. On the contrary, the city of Prešov does not plan to introduce this activity at all. The system of shared bicycles and cars operates in the capital Bratislava, Košice, Žilina, Poprad. This service is currently being implemented in the city of Trenčín.

In the cities of Prešov and Banská Bystrica, this service is planned to be launched by 2022. Cycling and walking are an important part of the transport mix. However, the degree of car ownership in cities in Slovakia is reaching record levels and the trend is unsustainable. We cannot constantly widen crossroads at the expense of greenery or sidewalks to accommodate the growing number of vehicles. Only a fundamental shift from preference for car transport to preference for public and non-motorized transport can improve the environment, improve public health, reduce traffic noise, reduce greenhouse gas and other toxic gas emissions, improve the quality of life of citizens and help prepare cities to adapt to the climate future.

For example, regulation of urban parking through parking charging is a way to sustainable transport accessibility, especially in central urban areas. It is not a matter of getting people out of the city, but of teaching them that using public transport is more advantageous, more environmentally friendly and, above all, more spatially acceptable. Because strict regulation of parking spaces in city centers can also be one of the tools for sustainable mobility. Cars take up 42 times more space in the city than one regional bus with the same number of passengers. And spaces in cities are already limited today. The starting point for a constant state in traffic jams is the optimization of the entire transport system, including the proposed parking solution as part of it. Experiences from abroad also speak of this (Slovak Parking Association, 2020a).

An internet survey of traffic mobility behavior before and during COVID-19, carried out by the Slovak Parking Association (2020b), showed a clear shift in the use of public transport, especially towards a larger share of car use. The impact of the emergency measures for COVID-19 clearly shows an extremely serious impact on the use of public transport, where, for pandemic reasons, safe passenger distances cannot be guaranteed. This situation was also caused by the measure of some local governments, which relaxed regulatory measures in car parking due to the restriction of contact between the populations in public passenger transport (Slovak Parking Association, 2020b).

Figure 1 shows an indicator that provides data on the number of subsidies from the state budget in the field of public transport–public transport, bus, and rail in the Slovak Republic. In connection with the huge shortfall adopted by local governments in 2020, increased state subsidies to public transport are expected at the level of the 2012 subsidy. The red color shows bus transport, the green color public transport, the orange color rail transport, and the blue color state subsidies for public transport (Pakusch & Bossauer, 2019).

Table 3. Modified indicator set of sustainable urban development in transport in the Slovak Republic (Prešov)

Indicator	MU	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A. Length of bicycle infrastructure	km	X	15.68	X	19	19	19	19	19	28	231.3	231.8
X: Data not available/not registered; Baseline: Increasing by min. 1.5 km per year; Medium condition: Steadily increasing by <1.5 km/year; & Negative situation: Not increasing, but remains the same year-on-year												
B. Price of a combined monthly ticket for all types of public transport in center & within a radius of 5-10 km	Euro	16.60	16.60	16.60	16.60	16.60	16.60	16.60	16.60	16.60	16.60	16.60
Baseline: Below average for the last 10 years (16.60); Medium condition: Equals average for the last 10 years (16.60), or increased by max. 0.30 euro/yr; & Negative condition: Above average for the last 10 years (16.60)												
C. Price for ecological taxi for 5 km in city center during day	Euro	X	2.50	X	4.71	5.75	5.75	5.37	5.26	5.11	4.00	4.00
Baseline: Below average price for this service for the last 10 years (4.72); Medium condition: Equals average price for this service for the last 10 years (4.72); & Negative condition: Above average price for the last 10 years (4.72)												
D. Registered private cars as of 1.1. months of year under review	Quantity	35,438	22,515	27,993	35,631	41,340	42,664	44,589	46,372	48,277	50,607	X
Baseline: Below average for the last 10 years (38,283); Medium condition: Equals average for the last 10 years (38,283); & Negative condition: Above average for the last 10 years (38,283)												
E. Number of public transport accidents per calendar year	Quantity	X	X	X	X	X	X	X	X	X	X	X
X: Data not available/not registered												
F. Number of traffic accidents with fatalities (total)	Quantity	46	41	29	33	30	41	30	29	25	27	X
Baseline: Below average for the last 10 years (33.78); Medium condition: Equals average for the last 10 years (33.78); & Negative condition: Above average for the last 10 years (33.78)												
G. Economic management of transport company of city of Bratislava	Euro (1K)	33,683	24,865	33,607	19,750	13,024	20,869	33,147	28,623	33,147	28,467	X
Baseline: Positive economic results (+); Medium condition: Economic results are negative, but smaller than last year's losses; & Negative condition: Negative economic results (-)												
H. Number of transported persons in public transport	1K	38,530	37,344	35,003	34,730	33,233	32,796	32,082	31,618	31,422	30,823	X
Baseline: Above average number for the last 10 years (33,758); Medium condition: Equals number for last year, eventually is equal to average or increased; Negative status: Below average for the last 10 years (33,758)												
CH. Number of charging stations for electric cars	Quantity	X	X	X	X	X	X	X	X	3	9	12
Baseline: More than eight charging stations in city (average number for the years 2018-2020); Medium status: More than four charging stations in city; & Negative status: Less than four charging stations in city												
I. Number of shared bike in city over the past 10 years	Quantity	X	X	X	X	X	X	X	X	X	20	28
Baseline: Above average (24); Medium condition: Equal to or below average (initial state with expansion in following years); & Negative condition: Below average (24)												
J. Number of cars shared (electric car sharing)	Quantity	X	X	X	X	X	X	X	X	X	X	0
Baseline: Higher than average number of shared cars in city; Medium status: Equal to or less than average number of shared electric cars in city (initial state with expansion in following years); Negative status: Lower than average number of shared cars in city												
K. Number zero-emission & low-emission public transport vehicles in %	Quantity	33.82	35.93	X	39.83	40.34	39.02	X	36.58	42.50	45.20	X
Baseline: Number of LEPT is more than 50%; Medium status: Number of LEPT is evenly represented (40-50%); & Negative status: Number of LEPT is less than 40%												

Note. Source: Own processing 2021 according to data published by Statistical Office of the Slovak Republic, Transport Companies of the surveyed cities in the Slovak Republic–annual reports, Presidium of the Police Force of the Slovak Republic, Chargemap 2020, ISO 37120, Agenda 2030, ECI indicators. Sharengo & public bike application. Association of public transport operators in urban agglomerations of the Slovak Republic & other strategy documents & situational analyzes.

Based on a comparison of the situation in the field of transport in the period under review, it can be stated that the number of cars and the intensity of car traffic in cities in Slovakia, similarly throughout Europe, is constantly increasing, especially at important junctions and major roads. This leads to an increase in transit time, resp. achieving the transport goal, the emergence of extreme traffic congestion, the increase in accidents, and the deterioration of the environment in the city due to increased noise, dust, and emissions from transport. The insufficient preference of public passenger transport over individual car transport or the high intensity of freight transport in connection with the function of the city as an important economic center also contributes to this situation. Unfortunately, this negative trend in urban car preferences has doubled due to the global pandemic crisis (Nikitas et al., 2020).

Most activities in the field of smart mobility are already implemented in the capital Bratislava. In second place is Žilina. Most activities in the field of smart mobility are currently in the city of Trenčín, followed by the cities of Košice and Nitra. On the contrary, the least activities in the field of smart mobility are implemented in the city of Banská Bystrica and Poprad.

The public transport system in Prešov is implemented by a combination of bus and trolleybus transport in the ratio of 55% buses: 45% trolleybuses (**Table 3**).

Indicator	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A	X	100	X	100	0	0	0	0	100	100	0
B	50	50	50	50	50	50	50	50	50	50	50
C	X	100	X	100	0	0	0	0	0	100	100
D	100	100	100	100	0	0	0	0	0	0	X
E	X	X	X	X	X	X	X	X	X	X	X
F	0	0	100	50	100	0	100	100	100	100	X
G	100	100	100	100	100	100	100	100	100	100	X
H	100	100	100	100	0	0	0	0	0	0	X
CH	X	X	X	X	X	X	X	X	0	100	100
I	X	X	X	X	X	X	X	X	X	50	100
J	X	X	X	X	X	X	X	X	X	0	0
K	0	0	X	0	50	0	X	0	50	50	X
Total:	49,5%										

Figure 2. Sustainable development of transport in Prešov according to methodical semaphore (Source: Own processing 2021 according to data published by Statistical Office of the Slovak Republic, Transport Companies of the surveyed cities in the Slovak Republic–annual reports)

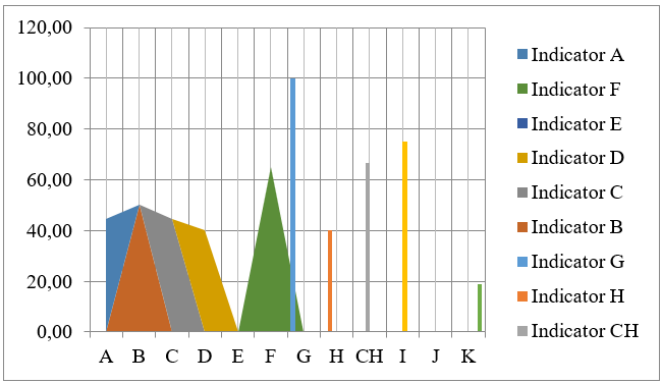

Figure 3. Sustainable urban development in transport in SR (Prešov) (Source: Own processing 2021 according to data published by Statistical Office of the Slovak Republic, Transport Companies of the surveyed cities in the Slovak Republic–annual reports)

A characteristic feature of public transport in Prešov is the diagonal guidance of the lines of the supporting system, which consists of trolleybus lines and most bus lines. Diagonal lines run through the center of Prešov. The supporting system is supplemented by circuit or radial lines. Bus transport is an additional type of public transport used on less-frequented routes and at peak times. In the city of Prešov, no reserved lanes have been created for public transport vehicles, and also none of the 22 controlled intersections operate in the mode of preference of public transport vehicles (Ministry of Transport, Construction and Regional Development of the Slovak Republic, 2013). Since 2010, there has been an annual reduction in the number of public transport passengers. Despite this fact, however, the transport company manages with a positive economic result. At the same time, the price for a combined monthly public transport ticket has not changed since 2010. On the contrary, the trend in the number of registered passenger cars is growing every year. The inhabitants of the city can also use the services of an ecological taxi in the city with the lowest price since 2011. Until 2018, the length of the cycling network focused only on the territory of the city of Prešov (Prešov, 2018). However, since 2019, the entire district has been part of the cycling network. That is why there is such a significant increase in the table. There is currently only one non-profit organization, Greencubator, which offers a shared bicycle service in the number of 28 pieces, which, unlike the other cities surveyed, is very few. In the city, however, there is a very common shared so-called scooters from bolt. Currently, there is no shared car system in the city. However, the city has 12 charging stations in the city. As far as non-emission public transport vehicles are concerned, the proportion is rather uneven to the number of non-ecological public transport vehicles. However, this trend is gradually declining. **Figure 2** depicts the sustainable development of transport in Prešov according to the methodical semaphore while **Figure 3** shows the sustainable urban development in transport in the SR (Prešov).

Indicator A contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 44.4%. Indicator B contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 50%. Indicator C contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 44.4%. Indicator D contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of only 40%. Indicator E contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 0%. Indicator F contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 65%. Indicator G contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 100%. Indicator H contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of only 40%. The CH indicator contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 66.6%. The indicator I contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 75%.

Indicator J contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of 0%. The K indicator contributes to the achievement of sustainable development in the field of transport in the city of Prešov with a value of only 18.75%. The overall arithmetic average to achieve 100% (ideal state) for sustainable development in the field of transport in the city of Prešov is 49.5%.

CONCLUSIONS

While COVID-19 pandemic has brought about unprecedented challenges for the whole transport sector, it has also highlighted the importance of an agile and resilient transport system in ensuring an uninterrupted supply of goods and people. This, in turn, may present important opportunities for accelerating the rollout of smart mobility. The surveyed

cities approach intelligent mobility well and gradually introduce new technologies to improve transport in their territory. However, the capital city does not always achieve the best results in the research indicators (Winchcomb et al., 2017).

Smart mobility aims to provide efficient, sustainable and connected mobility solutions to congested urban centers. It is often assumed that smart mobility will benefit cities' residents and improve overall accessibility. Nevertheless, smart mobility strategies presuppose that transport users are digitally literate, autonomous and capable of affording either public or private transportation (Ranchordás, 2020). The current mobility system faces severe sustainability challenges and requires a fundamental change. These results raise a number of public policy issues and questions. While COVID-19 pandemic has brought about unprecedented challenges for the whole transport sector, it has also highlighted the importance of an agile and resilient transport system in ensuring an uninterrupted supply of goods and people. This, in turn, may present important opportunities for accelerating the rollout of Smart mobility. As a direct result of the crisis, we have seen transport users adapt their travel and working habits, companies expand their functions beyond the transport of people to deliver medicine and food, as well as a more systematic effort by companies to share data to help inform governments' response to the pandemic.

The practical benefits of this article lie in clarifying the current situation in the field of sustainable development in the conditions of local government in the Slovak Republic, identifying problems of practice and especially in verifying and proposing possible solutions.

This work is ultimately a reference tool for researchers and city planners that provides clear and systematic definitions of the smart transport (mobility) terms of tomorrow and describes their individual and collective roles underpinning the nexus in scope. In future research, we would like to focus on the overall categorization of indicators for all cities in Slovakia, and at the same time, we would like to strengthen the researched area with the area of the environment and social inclusion.

Funding: This study was supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic (Project Vega no. 1/0837/21) and (Project Vega no. 1/0055/22).

Declaration of interest: No conflict of interest is declared by the author.

Ethical statement: Author stated that the COPE and similar guidelines and flowcharts were followed during the study. The study complies with the institutional and national ethical standards. The author further declared that the article is the original study of the author, and it has not been published elsewhere.

Data sharing statement: Data supporting the findings and conclusions are available upon request from author.

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