

Josef Kubik<sup>1</sup>

## ZLIN PUBLIC TRANSPORT IN COMPARISON WITH CITIES OF A SIMILAR SIZE IN CZECH REPUBLIC \*

*This contribution strives to answer the question what further development of public city transport will be. If city governments do not start using restrictive policies, the intensity of private motor vehicle transport will grow because the number of cars used is getting higher.*

*Keywords: public city transport; private transport; Zlin; traffic.*

*Jel classification: M31; O39.*

Йосеф Кубік

## ГРОМАДСЬКИЙ ТРАНСПОРТІ М. ЗЛІН У ПОРІВНЯННІ З ІНШИМИ МІСТАМИ АНАЛОГІЧНОГО РОЗМІРУ В ЧЕХІЇ

*У статті зроблено спробу відповісти на питання щодо того, яким може бути розвиток міського громадського транспорту в найближчому майбутньому. Доведено, що керівництву чеських міст необхідно вводити обмежувальні заходи для транспорту в міській смузі, що пов'язано з постійно зростаючою інтенсивністю використання приватних транспортних засобів.*

*Ключові слова: міський громадський транспорт; приватний транспорт; Злін; пасажиропотік.*

*Табл. 12. Літ. 20.*

Йосеф Кубік

## ОБЩЕСТВЕННЫЙ ТРАНСПОРТ Г. ЗЛИН ПО СРАВНЕНИЮ С ДРУГИМИ ГОРОДАМИ АНАЛОГИЧНОГО РАЗМЕРА В ЧЕХИИ

*В статье сделана попытка ответить на вопрос о том, каким может быть развитие городского общественного транспорта в ближайшем будущем. Доказано, что руководству чешских городов необходимо вводить ограничительные меры для транспорта в городской черте, что связано с постоянно растущей интенсивностью использования личных транспортных средств.*

*Ключевые слова: городской общественный транспорт; частный транспорт; Злин; пассажиропоток.*

**Introduction.** In the last few years, and future will not be different, economic and noneconomic activities are required to be environmentally friendly in all elements, and to be sustainable in relation to limited and non-renewable raw material resources and energy sources.

Mobility of people, especially mobility in cities and agglomerations, is closely connected with the issues stated above. The topic of urban mobility is a vital part of city organization. The critical view on urban mobility mainly refers individual traffic. This traffic contributes negatively to global as well as local pollution, noise and vibrations, traffic jams and high accident rates. It also influences people's of health. Strategic planning as well as solving connections, investing in infrastructure, organizing urban traffic belong to principal and long-term tasks of all city representatives, not only in Czech Republic.

<sup>1</sup> Tomas Bata University in Zlin, Czech Republic.

\* This paper was supported by RVO – The Application of a new scientific field of culinary tourism in order to increase performance in tourism in the Zlin Region.

The article focuses on lowering interest in public transport which was confirmed by the research. This trend emerged in Czech Republic after the year 1989 when the number of cars began to grow. Public transport companies have to face a decrease in the number of people using public transport. Statistics provided by the Department of Transport and Association of Public Transport Companies of Czech Republic points out that there is almost 2% decrease each year. There are more reasons for this situation, but the principal one is higher individual vehicles number.

G. Petrovicka (2007) states that it is absolutely necessary for the cities with more than 50,000 inhabitants to have a regular city transportation service. In the 2007, 96 cities throughout Czech Republic offered a city transportation service. Our aim is to concentrate on the cities of the size 80,000 to 100,000 inhabitants and we will evaluate the position of Zlin in this comparison.

The advantage of city transportation is providing regular transport services when vehicles are often low-floored, thus making getting on and off much easier for the elderly and mothers with prams or pushchairs. These vehicles are equipped with platforms for wheelchair users, there is the sound system announcing bus stops, there is a good line connection, and there are practical travel cards and season tickets that make travelling easier. In case of breakdown or other troubles, transport controller is able to organize a substitute transport. The disadvantages from the service operator's perspective are higher costs due to the price of low-floor vehicles and higher prices of fuel. Moreover, city transportation system is not financed by the regional authorities the money comes from sales only and city budget as well.

The input data regarding the level and development of passenger traffic are the state data about the number of inhabitants, number of passengers and transport performance during 1995–2013 in Czech Republic (Ministry of Transport, 2014).

**Table 1. Number of passengers and transport performance**  
(Ministry of Transport, 2014)

	Unit of measure	Year				
		1995	2000	2005	2010	2013
Number of people in CR	mln people	10,300	10,300	10,300	10,500	10,500
Passengers delivered	mln people	4,980	4,922	4,969	4,768	4,697
Percentage of individual traffic	%	34.1	40.1	42.9	41.3	42.8
Percentage of city transportation system	%	48.4	47.1	45.7	47.4	46.3
Transport performance	mln people per km	88,023	95,667	98,867	96,127	97,569
Percentage of individual vehicular traffic/transport performance	%	61.9	67.2	69.4	66.1	66.3
Percentage of city transportation system/transport performance	%	16.5	15.6	15.1	16.2	16.7

Note: 1) data without air transport; 2) in 2010 there was a change in the methodology of census regarding road traffic.

We will add information from the Annual Abstract of Transport Statistics since 1998 (Ministry of Transport, 2014) to the data stated. "The percentage of public transport in transport labour distribution was falling in the 1990s in favour of individual vehicular traffic, which was visible due to higher number of cars and their usage.

An all-day transport labour distribution at the beginning of the 1990s was: 75% of public transport, 25% of individual traffic (morning rush hour – 9–10 a.m.). In 1998, it was already at the level of 60:40".

#### **Theoretical solutions.**

*City, population, mobility.* City is a geographically defined area with such features: high population density, compactness and concentration of buildings, demographic and social structure of inhabitants depending on the current economic situation, i.e. industry, business and services. A city offers administrative, educational, business and cultural functions to its larger surroundings.

According to the demographic yearbook of Czech Statistical Office (2014), there were 10,512,400 inhabitants in the country, while in the cities with more than 20,000 inhabitants lived 4,518,400 people, which is 43%.

*Table 2. Cities by the number of inhabitants* (Czech Statistical Office, 2014)

	Number of cities	Number of inhabitants	% out of the total number of inhabitants in CR
More than 1 mln	1	1,243,200	11.8
More than 100,000	4	943,500	9.0
From 50,000 to 100,000	13	978,800	9.3
From 20,000 to 50,000	45	1,352,900	12.9

Inhabitants of different types and sizes of places have various needs. Some of them can be satisfied right at the place where they live whereas others call for a change of place. In this case, the need for transport is the so-called related need. People must be mobile and able to react quickly and effectively to the need of changing the place on regular as well as irregular basis for the reason of having different initial and final destination where they want to do some activities. The reasons why people change places are most often place of living, place of their work or commuting to an educational institution, offices, shops, services, but also to do some cultural or sport activities etc.

A person living in a certain place decides about what kind of transport he/she would use. Such person considers various subjective requirements, preferences and possibilities. The important aspect in this decision is also the choice of various types of transport which a particular city offers. Usually it is possible to choose from walking, going on bicycle, public transport or individual vehicle. Other types of transport are regarded as seldom ones.

Travelling of people from the urban mobility perspective is a mass feature. It is possible to recognize certain features and regularities in it. Long-term foreign research in the field of transport in cities show that place of living or cultural environment do not influence these at all. The average time spent on travelling by various types of transport stays the same as well as the speed with exception of individual vehicles.

**1. The average number of journeys per working day.** U. Becker et al. (2008) in their research on German cities in 1972–2003 state that people normally have 3 journeys per working day; City Hall of Graz (2013) states that people have 3–4 journeys on average per day; according to I. Brabcova et al. (2015) every Swiss person had 3.5 journeys on average per day in the last 30 years.

**2. The average travelling time per day.** U. Becker et al. (2008) state that it is approximately 60 min; City Hall of Graz (2013) states it is 60–90 min; according to I. Brabcova et al. (2015), it was 70 min in 1984, and in 2005 it was already 100 minutes.

**3. The average travelling distance per day.** The sources used agree that first two indicators stay stable in the long term. A significant change is visible when mentioning travelling distance per day. U. Becker et al. (2008) state that in 1972 it was 5 km, in 1987 – 15 km, in 1991 – 20 km and in 2003 – 29 km; City Hall of Graz (2013) for the year 1991 gives the information of 5.3 km and for the year 2013 – 6.8 km; according to I. Brabcova et al. (2015) it was 29.4 km in 1984, 38.4 km in 2005. All the sources agree and claim that the mentioned changes are due to individual traffic. According to the research done in 2008 in Munich (Germany), more than 60% of the journeys within the city by any means of transport are shorter than 5 km.

#### The results of analytical research.

*Distribution of transport labour – modal split.* Modal split (Seidenglanz, 2007) of passenger transport is a transport characteristic describing percentage of journeys within a particular place of living. A journey means transfer of a person from one place to another. In this sense, neither distance nor time spent on journey is of any significance. For the purpose of our research, using modal split from the Census of Population, Houses and Flats (SLDB, 2001) seems to be the most convenient one. The advantage of this source is using the same methodology across the state. However, information is not complete as only journeys to work and schools are considered, which is about 50% of the total number of journeys.

Table 3. Modal split, %, according to (SLDB, 2001)

	walking	bicycle	public transport	bus	train	individual vehicles	Total
Prague	18	1	62	3	0	16	100
Cities with 100,000–1000,000 inhabitants	23	2	58	3	0	14	100
Cities with 50,000–99,900 inhabitants	31	5	35	9	2	17	100
Cities with 20,000–49,900 inhabitants	49	7	15	10	3	16	100
Cities with 10,000–19,900 inhabitants	52	8	7	13	4	16	100

Note: Cities are divided into categories by the number of inhabitants at the time of (SLDB, 2001).

Distribution of transport labour in cities shows clearly a significant influence of the number of inhabitants on the type of transport used. The percentage of vehicular traffic within the total number of journeys is basically the same across all categories (sizes of cities). Significant differences are visible when mentioning other types of transport. In large cities with more than 50 thousand inhabitants, various forms of motor traffic are essential whereas in the cities with less than 50,000 inhabitants, it is non-motor traffic. In cities with more than 50,000 inhabitants, city transportation system prevails – for larger cities are typical for higher percentage of public transport. This data confirms the fact that size of a city determines the level and structure of

urban transport systems in the long term as well as the distribution of transport labour itself.

**Table 4. Distribution of transport labour according to the length of journey in cities with 50,000–99,000 inhabitants depending on the distance in km, %, according to (SLDB, 2001)**

Distance, km	0–1	1–2	2–3	3–4	4–6	6–9	9–12	12–15	15–20
Walking	84	65	24	1	-	-	-	-	-
Bicycle	1	6	12	11	11	5	2	-	-
Public transport	8	16	36	76	77	69	29	-	-
Individual vehicles	5	11	24	11	11	24	49	61	23
Bus + Train	2	2	2	1	1	2	2	39	77

The data shows that walking is the most common form of getting from one place to another when the distance is up to 2 km. Going on bicycle is complementary when the distance is 2 to 6 km. Using public transportation system is most common when the distance is 2 to 12 km. However, individual vehicular traffic is significant across the whole spectrum of distances, mainly the ones longer than 6 km.

Table 2 shows that each group of cities of the same size has its typical distribution of transport labour. In Table 5 we present the modal split of a group of cities that are part of the category of cities with 50,000–99,900 inhabitants. These had more than 80,000 inhabitants according to (SLDB, 2001).

**Table 5. Modal split (cities with 80,000–99,900 inhabitants), according to (SLDB, 2001)**

	Inhabitants	Type of transport, %				
		Walking	Bicycle	Public transport	Bus + Train	Individual vehicles
Liberec	99,000	30	1	46	7	17
Ceske Budejovice	97,000	29	11	37	7	17
Hradec Kralove	97,000	23	16	39	4	15
Usti nad Labem	95,000	24	0	53	8	15
Pardubice	91,000	27	18	33	6	15
Havirov	86,000	35	1	22	27	18
Zlin	81,000	22	2	51	7	18

It is evident from the data stated that there is high percentage of using city transportation system in the cities of Usti nad Labem and Zlin. It is getting closer to the level reached in the cities with more than 100,000 inhabitants.

Our analysis comes out of the database regarding the distribution of transport labour (SLDB, 2001). These results do not provide this characteristic. Therefore, it is not possible to evaluate the extent and the level of modal split changes after 10 years within the group of the cities monitored.

Statutory town of Zlin (2013) data mentions distribution of transport labour in Zlin and according to (SLDB, 2011). Therefore, it is possible to make a comparison. The city of Otrokovice is also in the table as the city transportation system is provided for both cities at once.

It is evident that in the last 10 years there has been a significant shift in the percentage of city transportation system and individual traffic when mentioning distri-

bution of transport labour in Zlin. In the context of having a lower number of inhabitants in Zlin and the general rule about the number of journeys made by the inhabitants during working days, the shift from using public transport to individual traffic is evident. With regard to this, we can make a conclusion valid not only for Zlin. When having the same number of journeys or even lower, the percentage of individual traffic is increasing whereas the percentage of public transport is decreasing. The position and development of individual vehicular traffic within urban mobility can be confirmed by the examples of other cities of a similar size where modal split according to (SLDB, 2001) is available as well as the modal split established for other purposes done by a sample survey.

*Table 6. Modal split for Zlin and Otrokovice, %, according to (SLDB, 2001; SLDB, 2011)*

	SLDB, 2001						SLDB, 2011		
	Otrokovice (19,000 inhabitants)			Zlin (80,500 inhabitants)			Zlin (75,300 inhabitants)		
	Total	Work	School	Total	Work	School	Total	Work	School
Walking	39	32	59	22	16	36	21	16	29
Bicycle	11	15	1	2	3	1	3	3	0
Public transport	33	33	33	51	50	54	43	40	50
Bus + Train	5	4	5	7	7	7	3	2	4
Individual vehicles	12	16	2	18	25	2	35	38	15

*Table 7. Comparison of modal split, %, according to (SLDB, 2001) and author's by a sample survey*

	Ceske Budejovice		Brno		Hradec Kralove		Kladno		Pardubice	
	2001		2001		2001		2001		2001	
Survey		2009		2012		2009		2008		2014
Walking	29	9	20	5	23	13	31	21	27	35
Bicycle	11	9	1	2	16	18	2	4	18	19
Public transport	37	27	61	57	39	30	24	35	33	17
Individual vehicles	17	55	16	32	15	39	21	40	15	28
Bus + Train	7	-	3	-	4	-	21	-	6	-

It is obvious that the results of modal split in the cities under are not compatible. However, we can definitely confirm that individual traffic of higher importance than public one within urban mobility even though the research results regarding regular travelling according to (SLDB, 2001) show a different picture.

In case of the cities mentioned (2009–2013), the number of inhabitants decreased and in connection with that there was also lower number of passengers using public transport, which corresponds directly with lower share of public transport in distribution of transport labour. The most significant finding from the data published is the difference between the cities when mentioning the average number of journeys per year per person, the so-called urban mobility. For example, in case of Pardubice in 2013, it was just 53% out of all the journeys per 1 inhabitant of Olomouc. In case of the agglomeration Zlin and Otrokovice, it was 62%. Public transport is in this case provided by Dopravni spolecnost Zlin – Otrokovice. The numbers regard-

ing passengers are for the whole agglomeration. SLDB (2001) states that modal split for Zlin is typical for the cities with 50,000–100,000 inhabitants whereas the modal split with its features for Otrokovice is typical for the cities with 20,000 inhabitants. Based on the sources accessible, we make division of the total number of passengers between both cities and 86.5% of passengers belong to Zlin. After this modification, the number of passengers transported per year in Zlin went up to 364 journeys per inhabitant per year in 2013.

**Table 8. Number of inhabitants and persons transported in the cities of a similar size, author's construction according to (Transport Company Association of Czech Republic, 2013)**

	2009			2011			2013		
	Inhabitants	People transported	Journey/inhabitants	Inhabitants	People transported	Journey/inhabitants	Inhabitants	People transported	Journey/inhabitants
Olomouc	100,400	58.5	583	99,500	55.4	557	95,500	52.5	550
Ceske Budejovice	94,900	40.3	425	93,600	38.5	411	93,300	39.0	418
Usti nad Labem	95,500	51.4	538	94,300	51.1	542	93,500	45.2	483
Hradec Kralove	94,500	37.0	391	93,500	37.8	404	92,900	34.9	376
Pardubice	90,000	28.4	316	89,600	26.3	294	89,400	26.2	293
Zlin and Otrokovice	94,200	35.9	381	94,200	35.1	373	93,500	31.9	341

**Public transport in Zlin and Otrokovice.** Public transport in Zlin is provided by Dopravni spolecnost ve Zline (DSZO) together with Otrokovice public transport. In 2013, city transportation system had 27 lines, out of which 13 were trolleybus lines. 3 lines mentioned provide connection between Zlin and Otrokovice railway station. Trolleybuses are far more common for Zlin than for Otrokovice. The basic information regarding transportation and traffic performance for both cities as an agglomeration in Table 9.

**Table 9. City size, transportation and traffic performance (DSZO)**

	Unit	1990	1995	2000	2005	2010	2013
Inhabitants in Zlin	ths inhabitants	87.2	83.0	81.1	78.3	75.5	75.3
Inhabitants in Otrokovice	ths inhabitants	20.7	20.2	19.7	18.7	18.5	18.2
Total population	ths inhabitants	107.9	103.2	100.8	97.0	94	93.5
Transportation performance	mln passengers transport	62.8	63.8	59.5	38.8	35.3	31.8
Traffic performance	mln vehicle/km	6.2	5.4	4.9	4.9	4.8	4.8

Note: in 2003 there was a change in calculation methodology.

An interesting view on the level of public transport in the cities compared is offered by concentrating on making use of trolleybus lines within a city transportation system.

We can declare that traction transport is one of the most important forms of transport and historical one in a way. Bus transport and bus lines were established later, following the previous form of transport, and supplemented the connection

between new parts of cities and historical ones as it was needed. From the data published, frequent use of a traction line is evident in Zlin. Therefore, Zlin is significantly different from other cities. The importance of traction transport for Zlin is also stressed and confirmed by the data regarding transport performance and its structure.

*Table 10. Trolleybus lines within the city transportation system, author's construction according to (Transport Company Association of Czech Republic, 2013)*

	Land area, km <sup>2</sup>	Number of bus lines	Length of bus lines, km	Number of trolleybus lines	Length of trolleybus lines, km	Length of a traction line, km	Making use of a traction line, %
Olomouc	103.4	23	284	7	39	35	111
Ceske Budejovice	55.6	13	455	8	66	73	90
Usti nad Labem	94.0	23	373	11	114	85	134
Hradec Kralove	105.6	25	287	5	36	23	157
Pardubice	82.7	20	406	10	158	60	263
Zlin and Otrokovice	122.4	14	137	13	109	32	341

Note: Traction line is the ratio of length of trolleybuses lines and a traction line.

*Table 11. Transport performance in the cities of a similar size, own construction according to (Transport Company Association of Czech Republic, 2013)*

	Transport performance in vehicle/km			Transport performance in place/km		
	ths km	Traction, %	Bus, %	mln km	Traction, %	Bus, %
Olomouc	6,142	35	65	603	43	57
Ceske Budejovice	5,612	45	55	562	53	47
Usti nad Labem	7,227	47	53	720	58	42
Hradec Kralove	6,154	28	72	485	32	68
Pardubice	5,706	40	60	558	39	62
Zlin and Otrokovice	4,789	65	35	451	71	29

Trolleybus transport has high importance in Zlin. The city of Hradec Kralove is in the opposite situation. The data in Tables 10 and 11 prove the importance of trolleybus transport in Zlin. Public transport performance is more concentrated in space. In other cities, namely Hradec Kralove and Pardubice, it is more scattered in space. It is possible to assume that situation in Zlin can be more positive when gaining other positions in individual traffic than in case of more scattered spaces when talking about public transport performance.

In the final part of our study we focus on the evaluation of Zlin public transport position, and we will concentrate on the evaluation of individual vehicles. Data in Table 12 describe the current situation. It is clear that the figures published for Zlin

alone are under the average for Czech Republic. The increase between 2010 and 2013 was twice higher in Zlin than in Czech Republic as a whole.

*Table 12. individual vehicles dynamics (number of cars per 1,000 inhabitants), author's*

	1990	2000	2010	2013
CR	220	335	422	457
District of Zlin	-	-	225	203
City of Zlin	-	-	306	382

The Regional Office of Zlin Region (2009) forecasts that the development of individual traffic in the Zlin Region in the period 2009–2030 is expected to be 2% growth per year. In connection with the current development trends in public transport, it is possible to expect further changes due to an increase in individual traffic. There probably will be less percentage of public transport use in favour of individual vehicular traffic.

**Conclusions.** Almost 80% of the EU citizens live in cities. In this environment, many significant social changes occur: expanding of suburbs, a shift to service economics, new lifestyles, individualization of life etc. All of this influences urban mobility. Therefore, structural changes lead to growing demand in a motor transport. On the other hand, non-motor transport is not needed that much anymore. When mentioning a motor transport, the position of individual transport is getting stronger whereas the position of public transport is getting weaker. The negative impact of changes mentioned above are evident – air pollution, noise, congestion, accident rate, land fragmentation, general decline in life quality.

In general, to lower the negative impacts from city transport on the life of people, it is possible to make some modifications regarding current motor vehicles modes. This means to have brand new ones with a good fuel economy and thus lower emissions. Also more preferences should be given to sustainable transport, i.e. walking, bicycles, using public transport, making a lower number of journeys with a shorter distance.

The examples of a good public transport strategy and its application can be seen in large European cities such as Munich, Vienna, Copenhagen, and also cities of a medium size such as Graz, Bern, but also Czech regional cities like Pardubice or Jihlava. The city of Pardubice is having an impressive long-term tendency of transport distribution 4 x 25%: walking, bicycle, public transport and individual car.

Our analysis shows that the mobility feature and its structure is strongly connected with city size. In our case, it was proved that a comparable group from the mobility perspective is formed by the cities with 80,000 to 100,000 inhabitants. However, the statistics available point out significant differences in performance and structure of public transport.

Satisfying people's needs in transport and sustainability of urban transport belong to the principal tasks of city official representatives. The success of this task is linked to the acceptance of a long-term goal by working on principal conceptual documents and follow-up operational plans. Each of the steps mentioned and decisions made require working with qualified data. These are data regarding inhabitants, economic analyses of internal and external infrastructure costs as well as finances spent

on particular types of transport. These documents and evaluation of fair deal with urban mobility contributes to reforms and further sustainable development.

#### References:

- Becker, U., Gerike, R., Winter, M.* (2008). *Zaklady dopravní ekologie*. Praha: Ústav pro ekopolitiku.
- Blazek, J., Uhlir, D.* (2011). *Teorie regionálního rozvoje: nastín, kritika, implikace*. Praha: Karolinum.
- Brabcova, I. et al.* (2015). *Kauzy, dopravní plánování, města, kde to funguje* // [www.auto-mat.cz](http://www.auto-mat.cz).
- City Hall of Graz (2013). *Inhabitant Mobility of Graz*.
- Czech Statistical Office (2014). *Demographic Yearbook of the Czech Republic 2013* // [www.czso.cz](http://www.czso.cz).
- Drdla, P.* (2014). *Technologie a řízení dopravy*. Pardubice, Dopravní fakulta Jana Pernera.
- Kubik, J.* (2006). *Verejná doprava realizovaná zaváděním integrovaných dopravních systémů*. Sborník příspěvků z konference Rozvoj dopravních systémů osobní dopravy na principech udržitelné mobility a přístupnosti. Pardubice: Univerzita.
- Kubik, J.* (2009) *Marketing v dopravním sektoru*. Sborník z mezinárodní vědecké konference Nove trendy v marketingové komunikaci (pp. 177–183). Trnava: Fakulta masmediální komunikace UCM.
- Kubik, J., Chovančova, M.* (2003). *Posilování konkurenceschopnosti městské hromadné dopravy v porovnání s individuální automobilovou dopravou*. Sborník z mezinárodní vědecké konference Przedsiębiorstwa w obliczu procesów globalizacji i integracji (pp. 108–115). Katowice: Gornoslaska wyzsza szkola Handlowa.
- Melichar, V., Jezek, J.* (2014). *Ekonomika dopravního podniku*. Pardubice: Dopravní fakulta Jana Pernera.
- Ministry of Transport (2014). *Transport Yearbooks 1998–2013* // [www.sydos.cz](http://www.sydos.cz).
- Petrovická, G.* (2007). *Analyza osobní dopravy v ČR*. Pardubice, Ekonomicko-správní fakulta.
- Regional Office of Zlin Region (2009). *Strategy transport of Zlin Region*.
- Reznicek, B., Saradin, P.* (2001). *Marketing v dopravě*. Praha: Grada Publishing.
- Schmeidler, K.* (2010). *Mobilita, transport a dostupnost ve městě*. Ostrava: KEY Publishing.
- Seidenglanz, D.* (2007). *Dopravní charakteristiky venkovského prostoru*. Brno, Masarykova univerzita, Přírodovědecká fakulta.
- Statutory town of Zlin (2013). *Transport Yearbook of Zlin*.
- Transport Company Association of Czech Republic (2013). *Annual Report*.
- Transport Company of Zlin and Otrokovice (2014). *Annual Report*.
- Transport Research Centre Prague (2007). *The Study about the Real Part of Cycling Transport on the Division of Transport Labour*. Final Research Report for the Partial Target.

Стаття надійшла до редакції 22.03.2016.