

# Annales Universitatis Paedagogicae Cracoviensis

Studia Geographica VIII (2015)

*Antonín Vaishar*

## Kuřim – the largest small town in the South-Moravian Region (Czechia)

### Abstract

The author has dealt with a role of the small city of Kuřim (population ca. 11,000) in the suburban zone of Brno. Based on statistical data and field research, this small town was analysed with its own activities in jobs and services to compare it with suburbanized villages almost completely reliant on commuting to the main city. Kuřim is a subordinated job centre and junction of the public transport distributing transport flows on the north-western fringe of Brno, including mutual commuting between Brno and Kuřim. Some indices like unemployment rate or education structure are expressively better at Kuřim than in Brno. On the other side, a poorer social infrastructure (in comparison with other small towns of similar size) signalizes weak central role of suburbanized small town in this sphere – except of some administrative activities. Possible losing of their own identity in view to proximity of Brno is another important factor for suburban small towns. The intensive traffic puts high demands on the road network which sometimes lags behind the population development. Future development is unclear. Kuřim grows due to the natural increase (as a consequence of earlier young families inflow), whereas the construction of flats and further immigration have been almost stopped during the economic crisis.

**Key words:** commuting; Kuřim; population development; small town; suburbanization

### Introduction

The small towns are a very important part of the Central European settlement system. They seem to be not very important from the viewpoint of the urban geography, being seemingly backward, less innovative and directed to the productive branches. However, from the viewpoint of rural geography, these towns are centres of the countryside ensuring jobs, services and social contact for their rural hinterland. They often represent local or micro-regional identity as well (Vaishar and Zapletalová, 2009). In many countries small towns play a role of market places for agricultural and other products from their hinterland (Heffner and Solga, 2006).

The small towns do not form any unified group of settlements. They differ according to their historical development, economic basis, geographical position etc. One of their types is that of small towns situated in the suburbanized zones. The

suburban small towns play an important role in the hinterland of cities. Unlike suburbanized villages, which depend on the commuting to cities almost for everything, these towns dispose with basic spectrum of activities. They sometimes also concentrate relatively large industrial or commercial parks, thus offer jobs (Vaishar and Zapletalová, 2007). On the other side, suburban small towns are threatened with loss of their identity.

The town of Kuřim was selected as an example of the suburban small town for the analysis. This town has grown rapidly in the last decade and overtook all other small towns in the South-Moravian Region by the population number. Being suburbanized, it can be also considered as multifunctional. The aim of the author was an analysis of the recent development of Kuřim with possible general conclusions, concerning the role of suburban small towns and their possible future development.

### **Small towns and their role in the suburban development**

Investigation of European small towns as a part of the countryside has not along tradition. Much research has been undertaken on both urban issues and rural areas, but the number of recent studies dealing with small and medium-sized towns is limited (van Leeuwen, 2010). This research has started in 1950s and 1960s. a role of small towns was evaluated in different ways: as a positive (places of widening innovations to the hinterland), a negative (places exploiting rural hinterland) or the intermediate (Tacoli, 1998).

United Kingdom (Courtney and Errington, 2000, Powe and Shaw, 2004), the Alpine states (Perlik et al., 2001) and countries with large rural areas, like France or Spain have played the most important role of small towns investigation in Western Europe.

The importance of the small town sector research has increased also with the transformation processes in the post-socialists countries (e.g. Kwiatek-Sołtys, 2004, Rydz, 2006). Konecka-Szydłowska et al. (2010) stated increasing share of service sector in all small towns. However, such a development is slower in small towns in the areas where the people have more possibilities to ensure their demand on services in great and medium-sized cities. Borsig et al. (2011) point out the social capital of small towns.

The small towns are important centres, especially in peripheral areas where low competition of more important centres exists. The role of suburban small towns is different to the certain extent. Some of them are in fact large villages with very limited social infrastructure and other activities which have grown from original rural settlements. Other suburban small towns have their own economic activities and historical heritage, too. Salamon (2007) points the evolution of these owns from agrarian to post-agrarian settlements. Kwiatek-Sołtys et al. (2014) stress the attractiveness of small towns. Capel (2009) argues that present small towns are easily connected with the rest of the world but they offer different quality of life in comparison with large cities. Courtney et al. (2007) discovered that fulfilling the role of small towns in the rural milieu depends on a special mix of firms. Is it true also for suburban towns with globalized architecture and urban pattern?

Heffner and Twardzik (2015) divide surroundings of small towns in the suburban zones of Silesian region as follows:

- agricultural (of dominant agricultural function and agricultural services);
- tourism-oriented (of a significant share of tourist function in the local economy);
- urbanised, often also industrialised

Under suburban influences, residential function increased its importance, sometimes at the expense of original productive activities.

The small towns in suburban zones could be basically of two origins. The first group is formed by original villages which have gained residents and sometimes also commercial activities in the process of suburbanization. Such small towns usually lack central functions and almost fully depend on the collaboration with the respective city. They are often mono-functional and have hardly any realistic urban character.

The second group consists of original (often medieval) small towns which were impacted by the suburbanization later. Such small towns usually keep their traditional hinterland (although it uses to be at least partly overlaid with the gravity power of the city). These small towns have an urban character as a rule. They serve as sub-centres in the territory and reduce the load of the core city in sectors of basic urban services. They could also serve as nodes of public transport.

Unlike pure suburbs, suburban small towns have their identity, their landmarks, natives, public spaces and public life. They are able to absorb some hundreds of newcomers. By such a way they manifest a positive role in the suburban area breaking down the concentration of people and activities in urbanized space. On the other side they are just threatened by loss of their identity because they can be perceived as parts of the core city: those small towns located in, or close to, metropolitan regions run the risk of becoming 'suburbs' (Servillo et al., 2014).

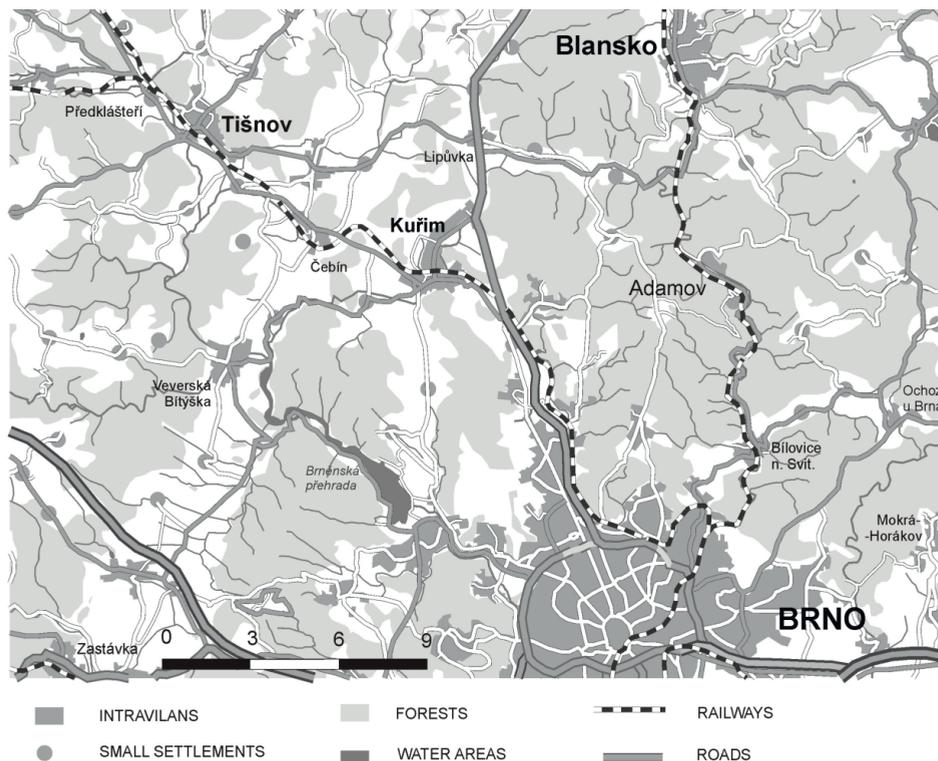
The small towns in suburban positions are places of conflicts among different, often antagonistic activities: residential, agricultural, daily recreation for the population of the core city, manufacturing, infrastructural (Darly and Torre, 2013). Productive functions mingle with non-productive ones. Businesses extrude environmental functions under pressure of the market condition connected with the big city. Concentration of such features can be found just in the vicinity of suburbanized small towns which often serve as transport junctions.

## **Kuřim and its role in the south-Moravian settlement system**

The South-Moravian settlement system consists of the city of Brno, five medium (district) towns with 20 – 35 thousand inhabitants, 11 small towns with 4 – 12 thousand inhabitants and rural municipalities. Brno (statistically 378,000 inhabitants, in reality more than 500,000) is too large for the Region because this city was a Moravian capital in the past and its gravity extends far behind the regional border. Five district towns are relatively of the same size of 20,000 people (Znojmo with population of 35,000 being the only exception). The countryside (small towns and rural municipalities) is divided into 4 basic categories: suburban countryside, inner periphery, borderland periphery and intermediate countryside (Vaishar et al., 2011).

The set of small towns consists of 21 municipalities with population of more than 4,000. Between the last two population censuses, the number of inhabitants of the South-Moravian small towns increased by about 2%. Another 22 municipalities in the Region have also the urban status but their urban character is doubtful.

Kuřim is situated north to north-west of Brno in the Boskovická brázda furrow and on the foothills of Bobravská vrchovina highland, on the fringe of the Baba Natural Park. Lying 14 km from Brno, Kuřim is served by the Brno-Tišnov railway. The 1<sup>st</sup> class road Nr. 43 passes off near the eastern fringe of the town (Fig. 1).



**Fig. 1.** Geographical location of Kuřim

Source: Drawn by J. Pokorná

Although the first written message of the town comes from 1226, the village of Kuřim originated probably during the Premyslide colonization in 12<sup>th</sup> century. Kuřim had been the serf village and then it was sold to Brno in 1547. Economic development had been interrupted by wars (Thirty Years' War in 17<sup>th</sup> century, the Napoleonic wars at the beginning of 19<sup>th</sup> century). When the railway Brno-Tišnov was opened in 1885, some urban development started. But at the same time, this railway divided the village into two parts which began to develop separately (Kuča, 1998, Fig. 1). Kuřim gained the urban character only after WWII (officially in 1965), thus its centre has no historic urban character.

The most important industrial plant TOS (Factory of Machine Tools) was established in 1942 within the German war economy. Construction of a new settlement Podlesí (a detached part of the town at the present) for German technicians of the Klöckner Hamburg firm was evoked. Due to the existence of the factory, Kuřim was bombed by both US and Soviet air forces at the end of the WWII.

The first housing estate was built after the WWII. Later it was followed by other prefabricated housing ones, in the socialist realism style (Fig. 2). It included also new urban centre with services. In the whole socialist period also family houses were built. New constructions in this period resulted also in destroying and rebuilding some old parts of the original settlement. Thus, at the present time only the south-western part of the town with the church and the chateau is of some historical value.



**Fig. 2.** View on the socialist part of Kuřim from the railway line

Source: Photo A. Vaishar

Recently, the suburban constructions grew in the south-eastern fringe of the town (Fig. 3). They consist of both family and apartment houses. The complex includes also supermarkets and other infrastructure.



**Fig. 3.** Kuřim, the suburbanized part of the town

Source: Photo A. Vaishar

## Contemporary role of the town in the suburban process

The long term population development of Kuřim (Fig. 4) shows the increase throughout the whole observation period. The municipality kept the rural size till 1920. The rapid increase in the period 1921 – 1991 was due to the industrialization. After a short stagnation, the growth has accelerated again in the last decade, as the result of suburbanization.

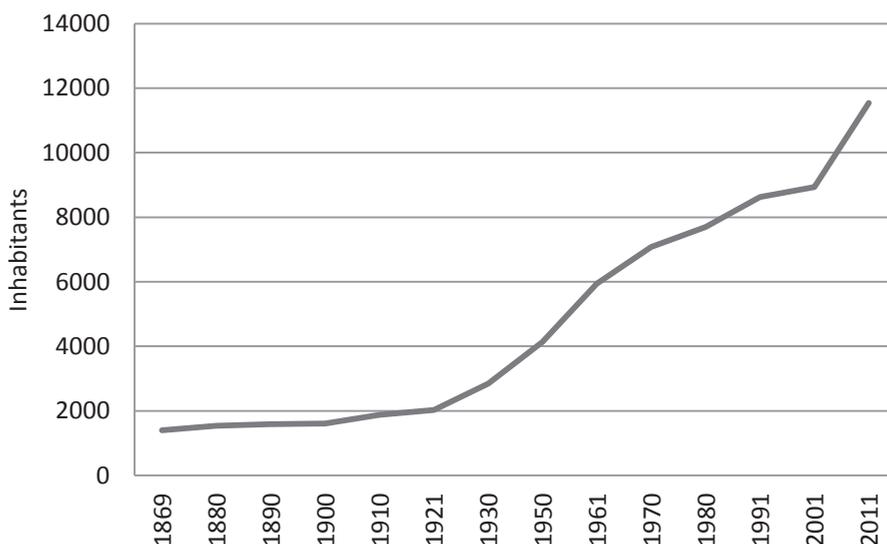


Fig. 4. Population development of Kuřim 1869 – 2011

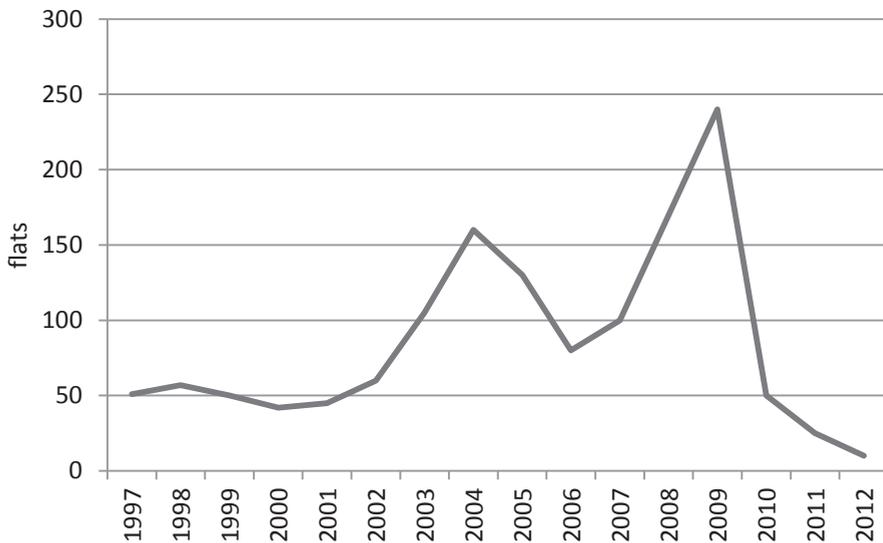
Source: Historický lexikon obcí. Praha: Český statistický úřad 2005 and Population census 2011

In the 2009 – 2013 period, 749 children were born in Kuřim, whereas 432 people died. This was the natural increase of 337 inhabitants; 31.4‰ during 5 years. In the same time, 1,708 persons immigrated and 1 650 emigrated which gave also positive migration net of 58 people (5.4‰). The total balance was positive (36.8‰). Surprisingly, the population of Kuřim has grown mostly owing to the natural increase. The highest positive migration net was registered in 2007 (269 persons). In the years 2011 and 2012, the migration net became negative. The positive natural increase was caused by the suburbanisation in the period 2002 – 2008 and by the baby boomers from 1970s when then socialist government supported natality as the result of beginning of the second demographic transition. Kuřim reached a level of 10,970 inhabitants at 31<sup>st</sup> December 2014.

In the period 1997 – 2010, Kuřim reported the highest share of finished new flats among towns with more than 10,000 inhabitants within the whole Czechia<sup>1</sup> (more than 9 new flats per 1,131

<sup>1</sup> Deník veřejné správy on-line, 19 December 2014, [www.dvs.cz/index.asp](http://www.dvs.cz/index.asp).

000 inhabitants). Since 2008 the construction of new flats was reduced by the economic crisis. Fig. 5 shows the course of new flats finished. It is a question of near future whether the suburbanization process is over or whether the new construction will be restored in the post-crisis period.



**Fig. 5.** Number of finished new flats in Kuřim 1997 – 2012

Source: Praha: Czech Statistical Office

Besides the residential function, Kuřim disposes more activities: concentration of jobs, service for the local people and a close hinterland but also the leisure function. There were 7,445 occupied jobs in Kuřim in December 2013<sup>2</sup>. The number of economic active people was 5,633 in 2011. Taking into account the fact that 2,214 persons from Kuřim commute for work to other municipalities, it is clear that Kuřim offers jobs not only for its own inhabitants, but also for about 4,000 in-commuters. It also signalizes a relative intensive multi-course commuting for work in the area north-west of Brno, including mutual commuting of Brno – Kuřim and participation of other centres of jobs (Tišnov town and villages of Veverská Bítýška, with production of hygiene utilities, Čebín with lime production or Deblín with electrical industry).

Blanc et al. (2007) have divided economy of small towns into three parts: agro-alimentary branch, local economy (directed for local residents) and large economy (exceeding the town and its surrounding). From such point of view, Kuřim has a relatively great share of the large economy. On the other side, Kuřim is the second

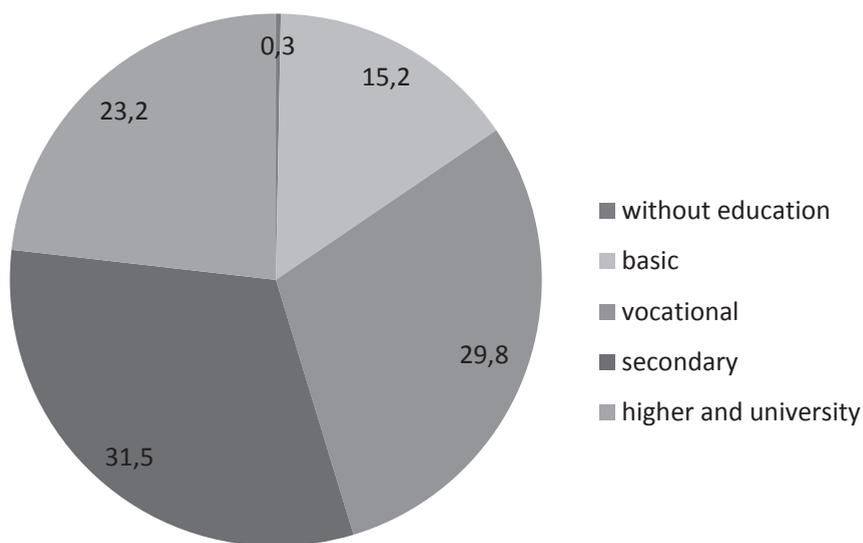
<sup>2</sup> Notice No. 186/2014 Coll. of the Ministry of Finance about the share of individual municipalities on percentage parts of the national gross revenue on VAT and the tax from incomes.

lowest employment centre in primary branches (1.6%) in the South-Moravian Region, after Brno city.

The unemployment rate in Kuřim was 5.2% in April 2015<sup>3</sup>. The same value was noted in its micro-region. It was below that for the district Brno-Countryside (5.8%) and much less than in the City of Brno (8.2%). Of course, the unemployment before the crisis was even lower (3.4% in August 2008). Nevertheless, the unemployment does not matter in Kuřim.

There are 2,408 business entities in Kuřim – of it 1,609 tradesmen, 317 commercial companies, 255 liberal professions, 11 joint stock companies, 7 state enterprises and 5 cooperatives. These subjects are engaged mostly in commerce (559), manufacturing (346) and building industry (213). However, adding together subjects dealing with scientific, technical, financial, assurance, information and communication services, we came to the number of 658.

Such a structure of activities indicates high professional and educational level of population. The education structure of the population in Kuřim (Fig. 6) is better than the national one. It concerns the people with completed secondary education whereas the share of the people with university education is close to the national level. It confirms the suburban character of the discussed town.



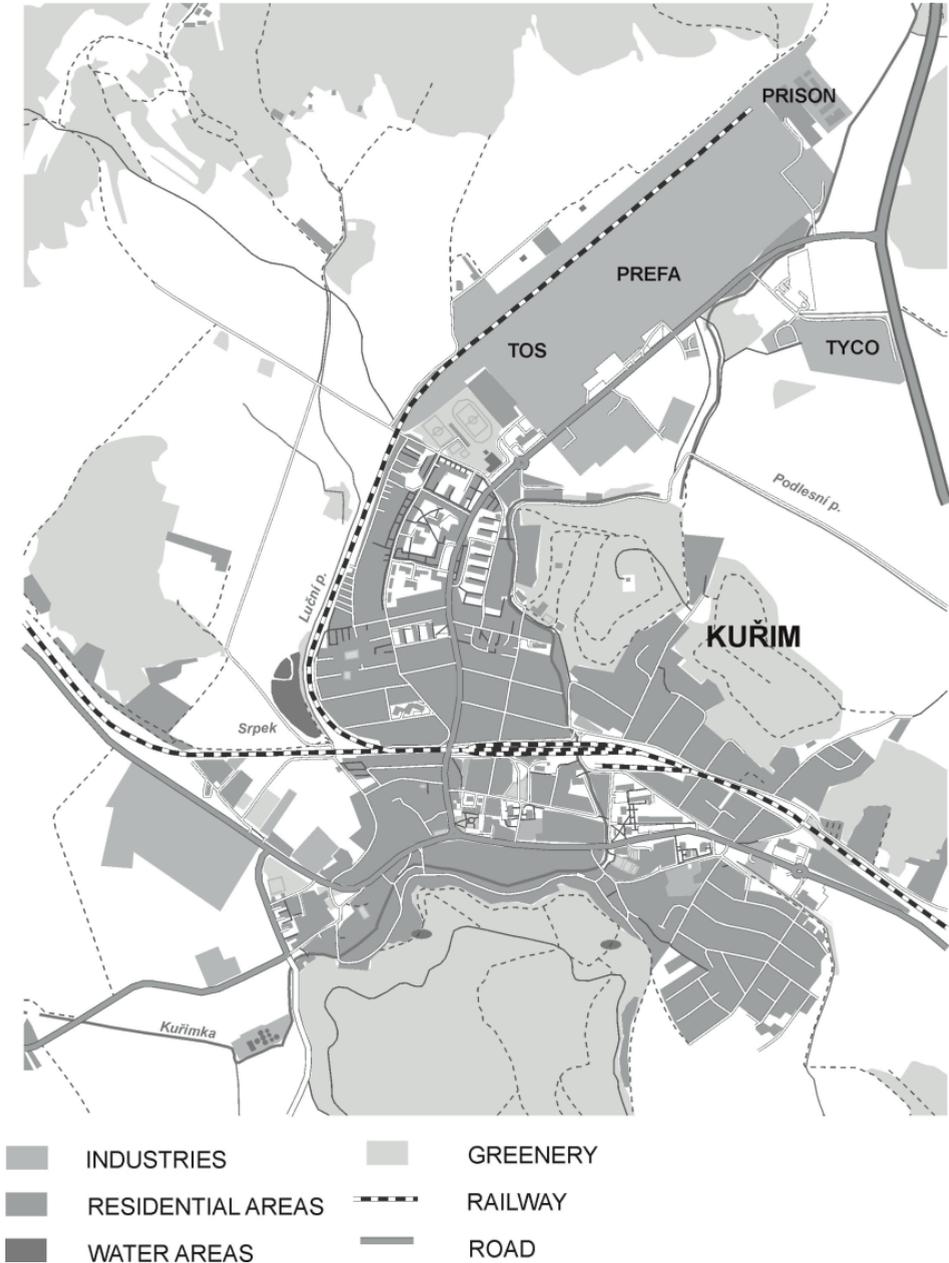
**Fig. 6.** Educational structure of the population of Kuřim in the age of 15 and more [%].

Source: Population census 2011. Praha: Czech Statistical Office.

The TOS factory has survived the transformation. Its production is directed to machining centres and technological workplaces according to the demand of individual customers. Some small machinery firms based on TOS'know-how arose in Kuřim after 1989. Kuřim foundry is another enterprise with a long-term tradition. The Kuřim branch of PREFA Brno produces concrete parts for building industry. The

<sup>3</sup> Integrated portal of the Ministry of Labour and Social Affairs.

TYCO Electronics (part of the global firm TE connectivity) represents a new branch of industry, founded on a greenfield of the Kuřimnorth-eastern fringe (Fig. 7).



**Fig. 7.** Territorial structure of Kuřim

Source: Vaishar et al., 2012

Special activity of Kuřim consists in the localization of a guarded prison<sup>4</sup> for 464 adult male prisoners, with a section for sexual delinquents. Social, health care and social services are less developed. There are 2 basic schools, one vocational school and 27 physicians. Such a weak social infrastructure (in comparison with other small towns) indicates less developed central function of this town.

Nevertheless, Kuřim has some administrative central function as a municipality with extended function. Its office ensures administrative services for 9 rural municipalities in the north-western part of the Brno-Countryside district. These municipalities have about 11,000 inhabitants in total, which is a number similar to the town itself. In reality, all these rural settlements fall individually to Brno. Thus, the central function probably does not cross the administrative activities.

Kuřim is not the tourism centre. Nevertheless, it disposes with some activities attracting also the citizens of Brno. It is necessary to mention the 27-hole Cascade golf course (opened in 2006). Water park wellness Kuřim is another activity of this sort. Walking activities are represented with Baba natural park and the lookout tower on Babí lom hill. Besides of the golf course, which has its own accommodation equipment, all other activities have facultative character.

Transport situation is one of the key factors of the polycentric area development. Kuřim is served by Integrated Transport System of the South-Moravian Region. The main connection is ensured by railway Nr. 250 Brno – Havlíčkův Brod. It connects Kuřim with all main centres of jobs in Brno. The main railway station in Brno is reachable in 27 minutes. In the opposite direction, this railway line connects Kuřim with Tišnovtown which has less inhabitants but fulfils more important central function and has more tertiary activities.

Altogether, 283 connections depart from Kuřim in working days (it means one each 5 minutes in average), of it 90 to Brno<sup>5</sup>. The reminder is directed to other important places in the northern part of the Brno-Countryside district and in the district Blansko. There are another 5 lines with 12 connections out of the integrated system, mostly from the neighbouring Vysočina region. Additionally, the line 310 serves as a municipal public transport connecting all important activities in the territory of Kuřim. It is possible to state that the frequency of public transport is sufficient, but also that Kuřim is one of the nodes of the Integrated Transport System of the South-Moravian Region and there is a variability of alternative goals of commuting. Thus Kuřim is not fully reliant to Brno.

The conditions of individual transport are more difficult. The 1<sup>st</sup> class road No. 43 (a section of the European Road No. E461 Vienna – Wrocław) touches Kuřim on its eastern fringe. This two-lane road is extremely frequented (32,099 vehicle units in 2010 in the section to Brno and 22,165 vehicle units in the direction to Svitavy). Many accidents occur because of such traffic, mostly that of international truck transport. The motorway in the same direction began to be constructed in 1939, as one of the results of the Munich Agreement. This construction was stopped in 1942, due to military failures and economic problems of the Nazi Germany, and after the WWII it lost the priority. After 1989 it has been considered with its construction as R43, connecting Brno with the motorway R35 near Hradec Králové. The investment

---

<sup>4</sup> The 3<sup>rd</sup> level of 4 levels of Czech prisons.

<sup>5</sup> Integrated Transport System of the South Moravian Countryside.

was hampered by Greens. Thus the connection of Kuřim with the motorway system is still postponed.

The 2<sup>nd</sup> class road No. 385 (in the same direction as the railway) intersects Kuřim from the east to the west. The traffic is also intensive taking into account the passing of the road through the urban area: 17,304 vehicle units in the section leading to Brno and 14,185 vehicle units to Tišnov. Another 2<sup>nd</sup> class road No. 386 (Brno-Bystrc – road No. I/43) intersects the urban area of Kuřim from the south-west to the north-east. It is considerably less loaded (5,142 vehicle units in the direction to Brno and 9,026 vehicle units in the section to I/43 road). However, the road passes through the main residential and commercial areas of the town with many crossings, where possible are accidents with pedestrians and cyclists. As a result, it is possible to state that Kuřim is overloaded by the road intersecting its residential areas without any possibility of bypassing.

### Suburbanized small town

It is more or less clear that the main advantage of suburbanized small towns consists in some division of functions in the hinterland of a city. Such small towns ensure some jobs and services for local population, which is not so much depending on commuting to the city. Sometimes even counter-current commuting occurs. Thus the traffic flows can be dispersed.

On the other side, suburbanized small towns have usually hardly any central function. Their central impact is drowned by the influence of the city nearby. Both small towns and villages in their hinterland gravitate to the main city. Therefore, the suburban small towns lose an important part of their urban function. It can sometimes culminate in a threat of the loss of identity. Such small towns could be considered for parts of the city.

Nevertheless, in comparison with suburbanized villages – poor on infrastructure, almost complete dependency on the city, one-sided traffic flows, neither public spaces nor public life, small towns are a much better alternative. The question of their sustainability (see e.g. Knox and Mayer, 2009) consists neither in coexistence with nature nor in economic and social aspects, but in their duration as an independent settlement units.

### References

- Blanc, M., Schmitt, B., Ambiaud, É. (2007). Orientation économique et croissance locale d'emplois dans les bassins de vie des bourgs et petites villes. *Economie et statistique*, 402, 57–74.
- Borsig, A., Burdack, J., Knappe, E. (2011). *Small towns in Eastern Europe: local networks and urban development*. Leipzig: Leibnitz-Institut für Länderkunde.
- Capel, H. (2009). Las pequeñas ciudades en la urbanización generalizada y ante la crisis global. *Investigaciones geográficas*, 70, 7–32.
- Courtney, P., Errington, A. (2000). The role of small towns in the local economy and some implications for development policy. *Local Economy*, 15(4), 280–301. DOI: 10.1080/026909400750068013.

- Courtney, P., Mayfield, L., Tranter, R., Jones, P., Errington, A. (2007). Small towns as “sub-poles” in English rural development: Investigating rural – urban linkages using sub-regional social accounting matrices. *Geoforum*, 38(6), 1219–1232. DOI: 10.1080/026909400750068013.
- Darly, S., Torre, A. (2013). Land-use conflicts and the sharing of resources between urban and agricultural activities in the Greater Paris region: Results based on information provided by the daily regional press. In Vaz, T., N., van Leeuwen, E., Nijkamp, P., eds., *Towns in a rural World* (339–363). Farnham: Ashgate.
- Heffner, K., Solga, B. (2006). Small towns as local economic centres in rural areas. *Bulletin of Geography (Socio-economic series)*, 6, 77–87.
- Heffner, K., Twardzik, M. (2015). The impact of shopping centers in rural areas and small towns in the outer metropolitan zone (the example of the Silesian Voivodeship). *European Countryside*, 7(2), in print.
- Knox, P., Mayer, H. (2009). *Small town's sustainability. Economic, Social and Environmental Innovation*. Basel: BirkhäuserVerlag.
- Konecka-Szydłowska, B., Zuzańska-Żyśko, E., Szmytkie, R. (2010). Role of services in the economies in the small towns in Silesia region and Wielkopolskie voivodeship. *Bulletin of Geography Socio-economic series*, 14(14), 51–62. DOI: 10.2478/v10089-010-0014-1.
- Kuča, K. (1998). *Města a městečka v Čechách, na Moravě a ve Slezsku*. Vol. 3. Praha: Libri.
- Kwiatk-Sołtys, A. (2004). Małe miasta województwa małopolskiego w okresie transformacji systemowej. Kraków: Wydawnictwo Naukowe Uniwersytetu Pedagogicznego.
- Kwiatk-Sołtys, A., Mainet, H., Wiedermann, K., Edouard, J.C. (2014). *Small and medium-size towns' attractiveness at the beginning of the 21<sup>st</sup> century*. Clermont-Ferrand: Presses universitaires Blaise Pascal.
- Leeuwen, E. van (2010). *Urban-rural interactions: Towns as focus points of rural development*. Berlin / Heidelberg: Springer.
- Perlik, M., Messerli, P., Bätzing, W. (2001). Towns in the Alps: Urbanization Processes, Economic Structure, and Demarcation of European Functional Urban Areas (EFUAs) in the Alps. *Mountain Research and Development*, 21(3), 243–252. DOI: 10.1659/0276-4741.
- Powe, N.A., Shaw, T. (2004). Exploring the current and future role of market towns in servicing their hinterlands: a case study of Alnwick in the North East of England. *Journal of Rural Studies*, 20(4), 405–418. DOI: 10.1016/j.jrurstud.2004.07.003.
- Rydz, E. (2006). Rola małych miast w rozwoju obszarów wiejskich. *Studia obszarów wiejskich 11*. Warszawa: Instytut geografii i przestrzennego zagospodarowania PAN.
- Salamon, S. (2007). *Newcomers to old towns. Suburbanization of the heartland*. Chicago: University of Chicago Press.
- Servillo, L., Atkinson, R., Smith, I., Russo, A., Sýkora, L., Demezière, Ch., Hamdouch, S. (2014). *Town. Small and medium sized towns in their functional territorial context* [final report]. Espon & Katolieke Universiteit Leuven.
- Tacoli, C. (1998). Rural-urban interactions: a guide to the literature. *Environment and Urbanization*, 10(1), 147–166. DOI: 10.1177/095624789801000115.
- Vaishar, A., Zapletalová, J. (2007). Suburbanization of small towns – case study Modřice near Brno. *Analele Universitatii din Craiova. Seria Geografie*, 10, 112–126.
- Vaishar, A., Zapletalová, J. (2009). Small towns as centres of rural micro-regions. *European Countryside*, 1(2), 70–81. DOI: 10.2478/v10091-009-0006-4.
- Vaishar, A., Štastná, M., Vavrouchová, H., Stejskal, B., Hlisnikovský, L., Jakešová, L., Kniezková, T., Kozáková, H., Lipovská, Z., Marcianová, G., Náplavová, M., Novotná, K., Oštdalová,

Z. (2011). *Současný stav a vývojové tendenceji homoravské hovenkova*. Brno: Mendelova univerzita.

Vaishar, A., Šťastná, M., Vavrouchová, H., Stejskal, B., Hlisnikovský, L., Kniezková, T., Lipovská, Z., Novotná, K., Pákozdiová, M. (2012). *Maláměsta – motory rozvojeji homoravské hovenkova*. Brno: Mendelova univerzita.

**Biographical note of author:** He graduated at Komenský University in Bratislava in geography. In the period 1975–1993 he worked at Institute of Geography, Czechoslovak Academy of Sciences with specialisation on settlement and population geography. As the scientific secretary of the Institute he was the editor of journals *Zprávy*, *Studia Geographica* and others. Since 1993 he is employed at the Institute of Geonics, Czech Academy of Sciences (until 2007 as a head of the Department of Environmental Geography). Since 2007 he also works at the Department of Applied and Landscape Ecology at Mendel University in Brno where he is responsible for the program Rural Development. He is the executive editor of the international journal *European Countryside* and editor of journals *Moravian Geographical Reports* (Brno), *Europa Regional* (Leipzig), *Rural Studies* (Warszawa) etc.

Antonín Vaishar, Doc. RNDr. CSc.,  
Institute of Geonics, Czech Academy of Sciences, v.v.i.  
Mendel University in Brno  
Zemědělská 1  
61300 Brno  
Czech Republic  
antonin.vaishar@mendelu.cz  
vaishar@geonika.cz