

## **URBAN DEVELOPMENT OF BRATISLAVA: SUBURBANIZATION IN YEARS 1995-2009**

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### **Abstract**

#### **Urban development of Bratislava: suburbanization in years 1995-2009**

This paper deals with 14 years of urban development in Bratislava, especially aimed at the suburbanization processes. The main subject of this paper is to find the spatial shape of suburbanization in that case, the intensity of suburbanization and the regularities suburbanization occurs under. Furthermore, the main goal of this paper supposes suburbanization to be dynamic and changing throughout the derived time framework. Confirmation of this has to be done together by theoretical and empirical knowledge. All above mentioned assumptions have been confirmed.

### **Keywords**

Bratislava, migrations, suburbanization, stages, urban development

## **1. Introduction**

Modern suburbanization has become the one of the popular phenomena in growing cities in the second half of 19<sup>th</sup> century. During 20<sup>th</sup> century, this turned to be the object of several sciences such as architecture, spatial science, geography, economy, sociology or ecology. Therefore, there is a lot of points of view to this process and thus lot of definitions what suburbanization is and what not. It is beyond the scope of this paper to analyze or introduce all of these definitions, but in respect to the mostly geographic-related papers, we can aggregate the relevant definitions into three groups by the way how they consider such process.

The first meaning of suburbanization may be understood as a part of the conception of the stages of urban development introduced by Klaassen (Van den Berg and Klaassen 1986). According to this model, suburbanization is the second stage in city growth and occurs after the urbanization phase. Regarding to demographic changes in city and its surrounding, authors have distinguished two sub-stages: (a) relative decentralization when the population of city surroundings is growing faster than in city itself and (b) absolute decentralization when the city suffers from population decline whereas the surroundings population is increasing. This model has been discussed in detail and strongly criticized by some authors due to incredibility of its cyclical and some other features (Champion 2001, Storper and Manville 2006, Fishman 2005).

In the second meaning, suburbanization is considered as a sociologic issue in case the urban population is moved to the rural environment while the urban way of life is being infiltrated along with (Boyer 2001). Sometimes, suburbanization is treated as a paradox process of seeking a lost community and individualization as well. Bauman (2004) considers the actors of suburbanization tired of anonymity and uniformity in city, so they are looking for new unordinary environment, which will finally find in the city surroundings. This seems to be the most typical especially for young families (Rerat 2012).

The third environmental meaning treats suburbanization as the one of the most important factors responsible for the land cover change (Antrop 2004). Suburbanization is often the most profitable activity to be located in the closest city surroundings without taking the environment into account.

For the purpose of our work, the first meaning of suburbanization is the most important. In spite of proclaimed incredibility, we perceive the Klaassen model as a good tool to determine the stage of city's development omitting its cyclical feature and disurbanization stage (which occurs when the population of entire urban region made up by core city and ring is affected by population decline). Hence, we understand the stage of suburbanization in case, when the population in urban ring is increasing faster than as in the city.

## **2. The Position of Bratislava**

Bratislava, the capital city of Slovakia located in Central Europe, went through different governing systems throughout its history. This has been reflected in some features such as in spatial form, stages of population growth, administrative boundaries, etc. Equally, the environmental conditions affected the city's development as well.

It seems to be beyond the scope of this short paper to introduce the basic environmental conditions and modern history in brief, but we perceive that as a basis to understand the suburbanization processes in case of Bratislava. The city itself is located on the confluence between Danube and Morava River, both representing a significant spatial barrier, especially in the past, when the technical development was not on the current level. Likewise, but less intensively, the Little Carpathians mountain range also works as a barrier. The strength of these rivers as a barrier has been increased, since they have become boundary rivers. Morava was a river separating the Cisleithania from Transleithania in Austro-Hungarian Kingdom till the end of World War I in 1918. Afterwards, in interwar period, the rivers became a boundary among Czechoslovakia and Austria and Hungary respectively. In postwar period until 1989, sections of these rivers located within Slovakia were part of the well known "Iron Curtain" which made Bratislava impossible to expand towards nowhere but north and east.

Therefore, the ring representing the suggested city influence is not circle-shaped, but crescent-shaped. However, the suburbanization was considered as the "pure capitalistic phenomenon" and had not been developed during the socialist period due to three major circumstances:

1. Building restriction in so called "non-central municipalities<sup>1</sup>", what resulted in broken demographic balance because ageing inhabitants had not enough resources to recover their old houses, whereas young inhabitants was forced to live in the industrial cities (Bašovský 1995)
2. Low difference of real estates' prices in cities and surrounding rural areas, so living in city was cheaper regarding to the transportation costs (Musil 2001). Cities have been usually better equipped than rural communes, especially in terms of apartment amenities (e.g. central heating, hot water, flushing restroom, etc.).
3. "Lame urbanization" (Węclawowicz 1998) - process typical for socialist countries, where urbanization had been driven directly by government without taking the negative externalities (society, geographical conditions, ethnical structure) into account. Some socio-pathogenic phenomena's such as countrymen locked in pre-fabricated apartment houses, different social classes living together on one store, etc. have appeared.

Meanwhile after the fall of socialism and since Slovakia has joined EU and Schengen Area, the situation has become different and the influence of Bratislava is expanding even towards Hungary (e.g. Bezenye, Dunakiliti, Hegyeshalom, Rajka municipalities) and Austria (e.g. Berg, Hainburg an der Donau, Kitsee, Wolfsthal municipalities). First significant indications of suburbanization beyond the territory of Slovakia have appeared just few years ago and are not the object of this paper due to expected difficulties with obtaining proper comparable data.

### **3. Current research state in case of Bratislava**

Being the capital and largest city, Bratislava and its surrounding have become the most used example of suburbanization in Slovak scientific literature. Furthermore,

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<sup>1</sup> In former socialist Czecho-Slovakia, some more populated municipalities (except cities and towns), similar to small towns had been selected as "central municipalities" (CM) (in Slovak language "strediskové obce"). Along with cities and towns, only CMs were supposed to being developed. Therefore, other non-central municipalities (in Slovak nestrediskové obce) were under the building closure.

the suburbanization processes in its hinterland are the most essential. Therefore, there are a lot of papers devoted to suburbanization in Bratislava, basically, following the classification mentioned above. Regarding to demographical approach, Bratislava has been studied individually (Slavík and Kurta 2007) or by comparing to other cities (Bezák 2011; Vigašová and Novotný 2010; Novotný 2011; Hudec and Tóth 2012). Apart from this first approach, the sociologic research of Bratislava and its hinterland involving the areas beyond the territory of Slovakia has been also made (Zubriczký 2010). Due to fact that Bratislava is located within the area of very, perhaps the most fertile soils, the research devoted to land cover changes caused by suburbanization has also proved to be very important (Šveda 2010, Šveda and Vigašová 2010) in respect to the environment.

Besides all of these mentioned works, there is still a lack of papers focusing on individual development of the suburbanization in different time sections. Although some definitions stressing the time aspect has been written in Czecho-Slovakian conditions (Sýkora 2001, Matlovič and Sedláková 2004), the time is often underestimated in papers related to individual suburbanization.

The last two mentioned works (Sýkora 2001, Matlovič and Sedláková 2004) imply the existence of phases in terms of suburbanization, probably based on so called trade-off theory, which has been introduced in Slovakia (Buček 2006) as well. According to this, suburbanization is often driven by two major factors:

1. Transportation costs including the price of the transportation whatever it is related to public transport or individual transport. In terms of suburbanization, the theory assumes increasing transportation costs by increasing distance from the center of the core city.
2. And land rents meaning the average price of real estates. Due to market mechanism, lack of space in city which obviously generates greater demand for accommodation or commercial activities increases the living costs. In terms of suburbanization, the theory assumes decreasing prices of real estates by increasing distance from the center of the core city.

The sum of these two factors is called overall costs and is different in every distance from the core city. We may assume the best place for suburbanization to be in the distance with the lowest overall costs because it can attract a lot of suburbanization actors. Nevertheless, as the territory along the distance with best conditions for suburbanization has some territorial limitations or alternatively, any local government decisions leading to construction attenuation may appear, we may expect the most intense suburbanization to shift into different distances. Spatial saturation and thus, the lack of space caused by suburbanization might be the significant factor responsible for land rents and hence overall cost increase.

The main goal of this paper is to point out how the suburbanization changes its spatial form in different time periods and which municipalities could be marked as suburban leaders on the example of particular urban region of Bratislava.

#### **4. Methodology and data**

In order to fulfill the main goal of this paper, it is necessary to identify the suburbanization in the spatial and time framework. It may be identified by empirical field research or by studying the statistical data provided by Statistical office of

Slovak republic. We have decided to combine both of these two approaches: first to identify the suburbanization by provided statistical data and then to verify it by field research. Some additional questions have appeared as we applied such methodology:

1. What should be the spatial framework of this study?
2. How can be the stage since the suburbanization phase has started identified?
3. Which spatial units should be used?
4. What methodology to use in order to mark studied spatial units as suburban?

In previously mentioned Klaassen's model and its other derivations, the term "urban region" has been noted. Usually, urban region is made up by two sub-regions of internal structure: the urban core and the urban ring. Since the urban core is the part of urban region consisting from the important core city or cities respectively, which can be treated as population source areas according to the suburbanization, the remaining predominantly rural areas can be considered as the region, where suburbanization may occur. Therefore, in respect to this paper, urban ring is equal to spatial framework of our work.

In Slovakia, the system of functional urban regions based on the daily commuting has been introduced and modified by prof. Bezák (1990, 2000) and unlike the official administrative divisions, it is perceived to be the proper and suitable regional system used in different geographical studies (Bezák 2011; Novotný 2011; Hudec and Tóth 2012). Since the internal structure of functional urban regions in Slovakia has not yet been delimited (Bezák 2012), we will treat the administrative territory of Bratislava as the urban core even though its administrative boundaries are often considered as so called overbounded (Ouředníček 2004). Furthermore, we have decided to omit the intraurban suburbanization due to difficulties with data obtaining. Location of functional urban region of Bratislava within Central Europe is illustrated in Fig. 1.

In order to avoid processing of useless data, it is necessary to define the credible time framework to cover the whole suburbanization process in case of Bratislava. Considering that, determination of year when the suburbanization in Bratislava has started seems to be the very important step. As we have defined above, the beginning of the suburbanization stage should be assigned to year, when the population of core city started to decline while the population of urban ring is increasing. According to the table 1, the suburbanization in Bratislava has started in 1996. In order to involve the pre-suburbanization period, we have chosen to extend the time framework to period 1995-2009. Regarding to the methodology, the data after 2009 are not necessary.

The next step is to define the spatial units. As we have noted before, the administrative divisions of Slovakia are not considered as credible according to the geographical aspect of population activities. However, municipalities (in Slovak *obce*), the smallest spatial units the annual statistical data are issued for, seems to be the best way in order to study suburbanization at most highest fidelity.



Fig. 1: Location of functional urban region of Bratislava within Central Europe.

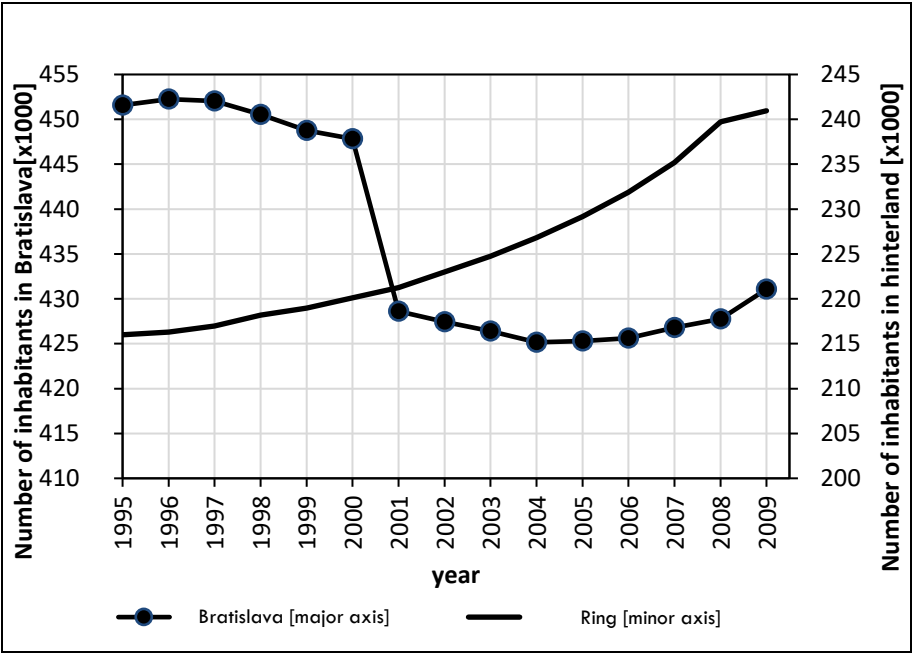


Fig. 2: Population development of Bratislava and its hinterland (1995 – 2009).

The last problem is how to mark these municipalities as suburban. As the suburbanization is strongly related to migrations, net migration has proved to be the

best way. In respect to the proper data compatibility, normalization by number of inhabitants per each municipality at the end of exposed period is the most important. This can be expressed by simple formula:

$$m_i = \frac{I_i(t; t+1) - E_i(t; t+1)}{P_i(t+1)} \cdot 100 \%$$

where:

$m_i$  = net migration rate per  $i$  municipality

$I_i(t; t+1)$  = absolute number of in-comers to  $i$  municipality during exposed period

$E_i(t; t+1)$  = absolute number of out-comers from  $i$  municipality during exposed period

$P_i(t+1)$  = population of  $i$  municipality at the end of exposed period

The usage of population at the end of exposed period instead of population at the beginning of exposed period or mid-period population respectively is concluding in better expression of value of net migration rate. Thus, the value of net migration rate reflects the proportion of population at the end of exposed period, which might be the result of recent suburbanization processes.

Since the time framework of this paper is too long for annual study of statistical data in detail and for study of suburbanization, it has been disaggregated into five three-years (sub)periods. Due to basic annual statistical data for the year 2012 has not yet been issued, sixth period is impossible to be created. Therefore the time framework could not have been extended to the year 2012. The Tab. 1 shows the list of five suburban periods with its dates.

Tab. 1: Suburban stages in case of Bratislava.

Suburban stage	Period
1.	From January 1 <sup>st</sup> , 1995 to December 31 <sup>st</sup> , 1997
2.	From January 1 <sup>st</sup> , 1998 to December 31 <sup>st</sup> , 2000
3.	From January 1 <sup>st</sup> , 2001 to December 31 <sup>st</sup> , 2003
4.	From January 1 <sup>st</sup> , 2004 to December 31 <sup>st</sup> , 2006
5.	From January 1 <sup>st</sup> , 2007 to December 31 <sup>st</sup> , 2009

The major problem in identifying of suburban municipalities lies on a value of net migration rate that credibly reflects and follows the suburban processes. If this value is underestimated, the non-suburban municipalities can be identified as suburban. Likewise, if is overestimated, some suburban municipalities can be identified as non-suburban. Therefore, the proper estimation of this suburban threshold should be done together with field research.

## 5. Results

Based on the methods mentioned above, we have made the analysis of suburbanization processes in case of Bratislava. As the spatial and time framework

has been properly selected, the last task was to define the credible suburban threshold. It has been proved, that the most credible value of net migration rate in order to distinguish suburban municipalities and non-suburban municipalities in case of Bratislava is 7 % per each suburban stage.

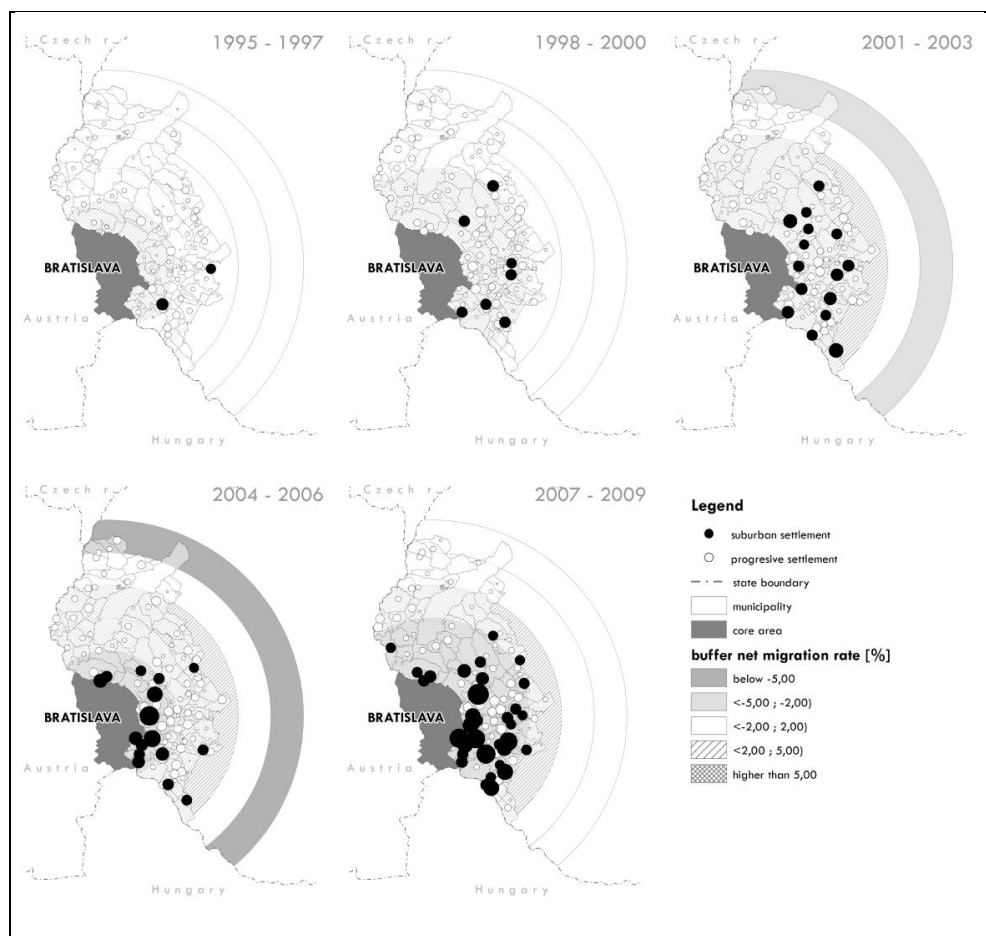


Fig. 2: Development of suburbanization in functional urban region of Bratislava within the suburban stages in 1995 – 2009.

As it can be seen in Fig. 2, the intensity and spatial shape of suburbanization has been changing throughout the time framework of this paper. In the first stage, only two small municipalities were marked as suburban. Also, the significant population increase based on migrations was observed only in closest distance ring. We may assume this stage to be the transition between urbanization and suburbanization period. In the following period, the number of identified municipalities was increased along the average size of suburban municipalities (Tab. 2). In the third period, suburbanization became more essential on the eastern parts of urban ring, while the northern parts still was not affected by such process. This trend has continued in following periods till the end of the time framework. Suburbanization on the east side of Bratislava urban ring has been becoming more and more



essential as well as the intensity of significant positive net migration rate has been becoming greater.

Tab. 2: Municipalities of f.u.r. Bratislava with highest values of net migration rate per each suburban stage.

Rank	Name	Population state at the end of exposed period	Net migration rate	Net migration
1st suburban stage	1.1.1995 – 31.12.1997		2 municipalities identified as suburban	
1.	Hviezdoslavov	312	10,33	31
2.	Jánovce	449	7,16	32
1.	Píla	242	9,92	24
2.	Macov	157	9,55	15
3.	Limbach	1 047	9,17	96
4.	Hviezdoslavov	343	9,01	30
5.	Hurbanova Ves	223	8,97	20
1.	Horný Bar	1 179	15,15	165
2.	Limbach	1 303	14,19	182
3.	Oľdza	303	12,04	36
4.	Hurbanova Ves	250	11,11	27
5.	Hamuliakovo	1068	11,09	117
1.	Zálesie	1 036	27,55	294
2.	Miloslavov	1 219	21,14	244
3.	Chorvátsky Grob	2 077	18,02	355
4.	Marianka	1 153	14,19	155
5.	Rovinka	1 503	13,22	195
1.	Chorvátsky Grob	3 066	32,44	989
2.	Rovinka	2 039	26,09	510
3.	Hviezdoslavov	525	25,90	130
4.	Miloslavov	1 670	25,44	404
5.	Čenkovec	1 106	24,41	269

Resource: Population movement balance in year 1995 – 2009 (issued annually).

Interesting thing is the low intensity of suburbanization on the northern parts of the functional urban region. According to the land rent map, the real estates are and have been quite cheaper on east than north. It is not confirmed, but we assume this can be caused by Slovnaft oil-factory located near to the eastern administrative boundaries of the city or by close airport with its landing zones respectively. Due to

prevailing western-winds in latitudes where Bratislava is located on, the eastern part of functional urban region can be affected by air pollution produced by Slovnaft oil-factory, what obviously reduces the prices of real estates in such localities. Besides this, the nearby airport with landing zones makes really noisy environment what is not in compliance with the nature of suburbanization (quiet and stress-free living in countryside). Those two factors are not present on the northern parts of urban ring. On the other hand, the analysis confirmed the assumptions proclaimed in the introduction of this paper. The hypothetical place for suburbanization, represented by distances where the suburbanization is more intense, is shifting throughout the time framework of this paper. As it appears in Fig. 2 and Tab. 2, different municipalities became the most suburban regarding to the net migration rate in each stage. The size of suburban municipalities, the number of affected municipalities as well as the number of suburban actors tend to be greater and greater. It seems, the suburbanization in Bratislava compensates the delayed urban development comparing with the western cities by its strength.

## 6. Conclusion

This analysis has shown how the suburbanization processes are changing throughout the history. The basic hypothesis has been proved as we figured out that the distance line of the most intense suburbanization is shifting in the hinterland and has some regularities. Number of municipalities affected by suburbanization is increasing as well as annual number of inhabitants included in these processes. However, there is still a number of unanswered questions to further research. First, how would the suburbanization trends in Bratislava have looked like, if we had had the statistical data of net migration for year 2012 and had created the sixth stage of suburbanization. Second, how would the comparison based on the similar methods has looked like, if we had incorporated other most populated cities in Slovakia or abroad respectively. At last, would the suburban threshold has been different in different cities or not? Nevertheless, we consider this paper to be the proper and valuable contribution into issues related to such processes like suburbanization is.

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## **URBAN DEVELOPMENT OF BRATISLAVA: SUBURBANIZATION IN YEARS 1995-2009**

### **Summary**

There are a lot of proofs in geographical literature related to the difference of urban development among European cities located in the former East bloc and West bloc during the postwar period. Generally, regarding to the housing policy, urban development of eastern cities is perceived as delayed comparing to the west. In the Eastern bloc, suburbanization was considered as pure capitalistic phenomenon, and therefore was prohibited by many regulations, while urbanization and forced growth of industrial cities was preferred. Although Bratislava is located on the boundaries between Austria and Slovakia or Hungary and Slovakia respectively, it is not an exception. This position has significantly limited the spatial development of city. However, suburbanization after the fall of socialism has appeared and currently is the most intense all over Slovakia.

The main goal of this paper has been to verify whether the assumption related to the proclaimed dynamics of suburbanization is true or not. According to that hypothesis derived from the scientific literature, suburbanization should change its spatial shape, intensity and municipalities affected by. The research had to be done combining the theoretical and field research. For this purpose, basic statistical data related to the migrations has been used. In order to identify whether any municipality is suburban or not, the threshold value of net migration rate had to be determined and if the net migration rate was above the threshold, the municipality has been marked as suburban. Regarding to this, determination of the credible threshold of net migration rate was the major problem. As the suburbanization processes related to Bratislava in this paper are not expected to be beyond the travel-to-work area of Bratislava, its functional urban region has been used as the spatial framework. According to the initial appearance of suburbanization as well as to data availability, the time framework between years 1995 – 2009 has been used. For better fidelity, time framework was disaggregated into five three-year periods – suburban stages. The approximation of proper threshold value had to be done in compliance with the field research that proves the best value of net migration rate is 7 % per each suburban stage.

Results of this analysis have shown the correctness of proclaimed hypothesis. Suburbanization is dynamical and is changing around Bratislava throughout exposed time period. In each stage, different municipalities were affected by suburbanization by different ratio. Moreover, the number of affected municipalities is still increasing. It is obvious that suburbanization has become one of the typical urban processes located in surrounding of Bratislava. Further analyses would probably prove, whether this trend will continue or not.