

Development of Suburbanization in the Context of Socio-economic Changes in Urban Areas on the Example of Poland

Agata Mesjasz-Lech

Czestochowa University of Technology, Poland
agata.mesjasz@poczta.fm

Aleksandra Szczepańska

Czestochowa University of Technology, Poland
olabelof@op.pl

Abstract: Suburbanization is driven by the development of cities. People and businesses leave city centers and move to suburban areas because of social and economic considerations. The goal of the article is to identify the causes of suburbanization in Poland in the context of these two aspects and to determine the direction and degree of change in population movements observed in urban, rural and rural-urban communes for individual Polish voivodships over the period of 2004-2014.

Keywords: suburbanization, urban logistics, urban, rural and rural-urban communes

1 Introduction

Socio-economic development of urban areas is connected with broadly defined suburbanization processes. The expression urbanization [Lat. Urbanus – urban] is understood as social and cultural processes which manifest themselves through the development of cities, increase in their number, spreading urban areas and a higher percentage of urban population. [1] Factors which influence these processes are: population movements and trade and industry development. In such circumstances, urban centers are becoming too small and lacking space which results in the creation of highly urbanized metropolitan centers.

Urbanization processes can be discussed according to the following aspects [2]:

- Spatial aspect – urbanization is concerned with the size of cities, complexity of urban settlement forms and urban areas. It is connected with the expansion

of urban spatial planning areas in a way typical for cities, regardless of city boundaries.

- Demographic aspect – urbanization is concerned with population movements from rural to urban areas, urban population concentration and the growth of population on a given area.
- Economic aspect – urbanization is based on a constant increase in the number of people employed outside the agricultural sector.
- Social aspect – urbanization promotes the so called urban life style and also contributes to spreading social, economic and cultural patterns to rural areas.

In cities live already more than half of the world's population. [3] The empirical results have shown that "extent of urban population (or employment) might depend on crop production closely around that city, and transport costs between the city and elsewhere. [4] Unfortunately, urbanization often leads to the reduction of life quality due to eg. climate change, greenhouse gas emission, in which CO₂ [5, 6, 7, 8] and pushes people to move to suburban areas. The process of city centers depopulation accompanied by the development of suburban areas, which is also due to the movement of businesses, is called suburbanization. Knowing the principles of suburban areas creation and development is crucial to the proper placement of logistic infrastructure in the net of cities and around them. That is why suburban areas should be part of urban logistics system whose goal is to pull all economic entities operating in a city and around it together, with the consideration of economic, ecological and social aspects. [9] Suburbanization is connected with migratory flows. For this reason, the goal of the article is to identify the causes of population migration from city center to suburban areas and to determine the dynamics of this change and connections between the development of suburban, urban and rural areas in Poland in the years 2004-2014.

2 Character of the suburbanization process

The development of urban areas leads to adapting of adjacent lands. The increase in the population and suburban areas activity is called suburbanization. Etymologically speaking, the term's origin is in Latin – suburbium [Lat.] means a residential area either peripheral or lying outside city boundaries. [10] Suburbanization is understood as a further development of urban areas outside the central zone and is one of the four stages of city development. The other three are: urbanization (urban areas development), de-urbanization (decrease in population in central areas, and then in external areas, it leads to agglomeration reduction) and re-urbanization (renovation of cities, economic structure changes and the improvement of the environment) [11]. The term suburbanization is used in three basic spatial contexts [12]:

- Within administrative city borders (the so called internal suburbanization, on underdeveloped areas of the city).
- Outside the borders of the central city, within the closer suburban zone (urban fringe, suburban zone, peripheral zone) characterized by the spatial continuity of investment areas.
- Outside the closer suburban zone within the further suburban zone (urban-rural fringe, peripheral zone) giving the impression of a rural area.

3 The reasons of suburbanization in Poland

The history of suburbanization in Poland does not go back farther than 20 years and the term was transplanted here from the analyses of rapidly growing American cities (especially after the Second World War). In Poland the dynamic development of suburban housing estates is the consequence of the transformation of urban areas from socialist, then post-socialist into capitalist. The specific nature of the Polish suburbanization is due to the interaction of such factors as: shortages on the residential market – the aftermath of socialism (even though about 7million flats were built from the 1950s to the late 1990s, the problem lingers on), strict housing construction standards for block housing estates built on a mass scale which in 2006 were home for nearly 40% of Poles (Public Opinion Research Center 2010), progressing material and social degradation of communal urban resources, and, lastly, high land prices within the administrative city boundaries [13].

Current causes of Polish suburbanization can be discussed in the context of three aspects [14]:

- Social aspect – motorization increase, improvement of housing conditions without the need for giving up a career, changing a flat for a house with a backyard.
- Economic aspect – cheaper building plots accessibility on suburban areas.
- Industrial aspect – moving of trade and production businesses to suburban areas.

Following residents and broadly understood business, also the sector of services increasingly moves to peripheral areas. The suburbanization of services started in Northern America in the middle of the 20th century and intensified in the 1980s [15]. This phenomenon has also been observed in Europe and Poland since the 1990s.

4 Consequences of suburbanization

Due to its spontaneity, suburbanization is highly detrimental. Its results are visible in the spatial, economic and social spheres. As far as the spatial aspect is concerned, suburbanization leads to the degradation of the environment, including forests, rural, landscape and recreational areas. It is connected with the transformation of suburban areas into investment sites and adapting them for residential and economic functions which results in environmental pollution and natural resources destruction [16]. In terms of the economic aspect it leads to the disintegration of the central city through depopulation which reduces tax revenues. Taxes paid by residents and businesses on urban zones are raised due to the ineffectiveness of transportation. The city faces additional costs of social and technical infrastructure development and services connected with it [17]. In the social aspect, suburbanization breeds society polarization, lack of neighbor relations, and conflicts between indigenous and incoming people. Times of commuting to work, school or shops increase contributing to traffic jams and water and air pollution. What is more, growing of cities leads to the disappearance of central urban trade (shopkeepers) for the benefit of supermarkets and malls, unemployment increases intensifying poverty in the center of the city, estate values drop and the city's image is damaged [18]. Spatial planning of areas adjacent to city borders should therefore be well thought over with the above aspects in mind. Unfortunately, developing metropolitan areas in an orderly manner is doomed to fail in Poland due to the lack of proper laws and tools for planning highly urbanized areas [19].

5 Analysis of change dynamics and correlations in the suburbanization process in Poland

The pace of suburbanization in Poland differs from one region to another. Following this fact, a dynamics and correspondence analysis in terms of population in urban, rural and urban-rural communes was carried out. The dynamics analysis shows that in comparison to 2004 there was a decrease in urban-rural communes population in 2014. Table 1 shows the relative changes for the year 2014 with a base of 2004.

Voivodships	Average population in gminas [%]		
	urban	rural	urban-rural
Lower Silesia (V1)	-2,77	9,02	0,70
Kuyavia – Pomerania (V2)	-2,53	8,01	1,25
Lublin (V3)	-2,54	-0,70	-5,87
Lubusz (V4)	-0,76	6,64	0,46
Łódź (V5)	-6,24	-0,04	-2,61
Lesser Poland (V6)	5,91	6,46	-4,95
Masovia (V7)	1,96	3,97	7,15
Opole (V8)	-5,82	-3,30	-5,15
Sub-Carpathia (V9)	1,47	-1,12	-3,37
Podlissia (V10)	0,03	-3,80	-6,10
Pomerania (V11)	4,71	13,83	1,67
Silesia (V12)	-4,53	4,61	1,70
Kielce (V13)	-4,73	-1,31	-1,51
Varimnia and Masuria (V14)	-0,08	4,30	0,44
Greater Poland (V15)	-2,56	9,56	4,16
Western Pomerania (V16)	-0,47	7,90	-2,13

Table 1

Relative changes of average population in gminas in Poland for the year 2014 with a base of 2004 by voivodships.

Source: Own calculation based on [20].

The most significant changes in the urban-rural communes population were observed in the following voivodships: Masovia, Pomerania, Lublin, Opole, Lesser Poland, Greater Poland, and:

- In the cases of Masovia and Greater Poland, the average number of people in 2014 grew in comparison to 2004 by 7.15% and 4.16% respectively.
- In the other voivodships the average population number was smaller in 2014 compared to 2004, with the biggest drop in Podlissia – by 6.10%.
- The changes in the average population number in the voivodships Lublin, Masovia, Pomerania and Opole had the same direction.
- In Lesser Poland the drop in the average number of people in urban-rural communes was accompanied by an increase in rural and in urban communes.
- In Greater Poland there was an increase in the average population number in urban-rural communes and a simultaneous drop in urban communes and increase in rural communes.

Looking at the whole 2004-2014 period, the changes in the average number of people in communes in all voivodships are non-substantial. In table 2 average annual rate of change of average population in gminas in Poland by voivodships in the period 2004-2014.

Voivodships	Average population in gminas [%]		
	urban	rural	urban-rural
Lower Silesia (V1)	-0,19	0,58	0,05
Kuyavia – Pomerania (V2)	-0,17	0,52	0,08
Lublin (V3)	-0,17	-0,05	-0,40
Lubusz (V4)	-0,05	0,43	0,03
Łódź (V5)	-0,43	0,00	-0,18
Lesser Poland (V6)	0,38	0,42	-0,34
Masovia (V7)	0,13	0,26	0,46
Opole (V8)	-0,40	-0,22	-0,35
Sub-Carpathia (V9)	0,10	-0,07	-0,23
Podlissia (V10)	0,00	-0,26	-0,42
Pomerania (V11)	0,31	0,87	0,11
Silesia (V12)	-0,31	0,30	0,11
Kielce (V13)	-0,32	-0,09	-0,10
Varimía and Masuria (V14)	-0,01	0,28	0,03
Greater Poland (V15)	-0,17	0,61	0,27
Western Pomerania (V16)	-0,03	0,51	-0,14

Table 2

Average annual rate of change of average population in gminas in Poland by voivodships in the period 2004-2014

Source: Own calculation based on [20].

In the 2004-2014 period no voivodship showed a significant annual average drop or increase in the average urban-rural, rural or urban population number – the annual average change tempo in all voivodships assumes values lower than 1%. In the case of urban communes, both the annual average change tempo and the relative one-based increase in the average population number in most voivodships assumed negative values. And although the values for urban and rural-urban communes were positive, there is no correlation in the average population changes in these communes. At most, it is possible to speak of a moderate correlation between the changes in the average number of people in urban-rural and rural communes, and the correlation is positive which means the change direction is the same (statistically significant Pearson correlation coefficients on the level of 0.05 assumed respective values of 0.61 and 0.62 for the increases and average rate of change).

The study was complimented by a correspondence analysis of the average number of people in urban, rural and urban-rural communes by voivodships for the 2004-2014 period. Table 3 shows eigenvalues for analyzed set of data.

Number of dimensions		Eigenvalue and inertia (all dimensions) The total inertia = 0.00979 Chi2=12943, df=30 p=0.0000				
		Singular value	Eigenvalue	% of inertia	Cumulative %	Chi square
2014	1	0.096315	0.009277	94.72259	94.7226	12260.26
	2	0.022734	0.000517	5.27741	100.0000	683.07
2004	1	0.101001	0.010201	94.63452	94.6345	13599.03
	2	0.024050	0.000578	5.36548	100.0000	771.02

Table 3

Eigenvalues for analyzed set of data
Source: Own calculation in Statistica Software

For the analyzed variables, the first dimension allows to recreate 94.72% in 2014 and 94.63% in 2004 of the total inertia, the second dimension allows to fully explain the inertia. The profiles are situated in a two-dimensional system for both years 2004 and 2014.

The correspondence analysis confirms the correlation analysis for the discussed years. The first axis (Fig. 1a and 1c), which has the biggest share in the inertia, emphasizes two commune groups in terms of the average population number: urban communes is one group and rural and urban-rural communes is the other. The second axis (Fig. 1b and 1d) seems to separate urban and rural communes, whereas urban-rural communes are close to the axis center which means their profile is similar to the average profile.

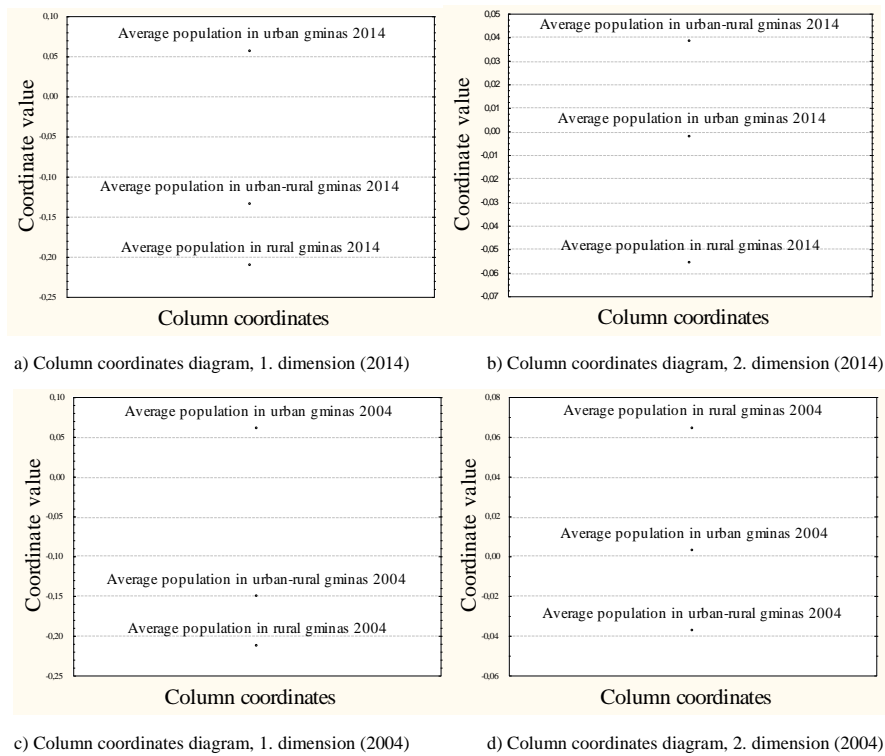
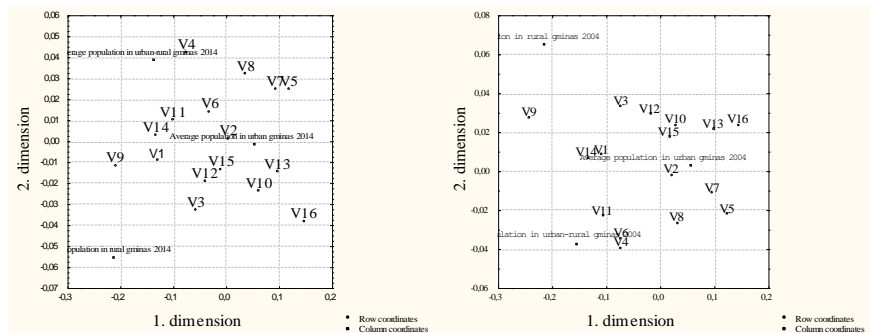


Figure 1.
 Column coordinates diagrams for the years 2004 and 2014.
 Source: own elaboration in Statistica Software.

Also an interpretation of the point's position representing one profile in relation to all points representing the other profile type was carried out (Fig. 2).



Row and column coordinates diagram for 2014

Row and column coordinates diagram for 2004

Figure 2.

Row and column coordinates diagram

Source: own elaboration in Statistica Software.

In 2004 in voivodships Lubusz, Lesser Poland and Pomerania , and in 2014 in Lubusz voivodship relatively more people lived in urban-rural communes. But in most voivodships the majority of population lives in urban communes, especially in typically industrial vovivodhips: Silesia, Masovia, Łódź, Kuyavia - Pomerania, Greater Poland. But the comparison of the row and column coordinated diagram for the years 2004 and 2014 shows that people increasingly choose rural communes for their place of residence.

6 Conclusions

The main causes of suburbanization in Poland are: motorization increase, the improvement of housing conditions, and especially the preference of living in a house to living in a flat, accessibility of cheaper building plots in the suburbs and the migration of businesses to suburban areas. Suburbanization in Poland does not have a mass character. From 2004 the changes in the area of urban-rural communes were only slight - their average area in 2014 compared to 2004 even decreased by 1.17%. The biggest drop was observed in the Lesser Poland voivodship (2.06%). The increase of the average area of urban-rural communes occurred in a small number of voivodships: Kielce (by 2.01%), Podlassia (1.55%), Silesia (0.94%), and Lublin (0.78%). However, the increase in the average area of these communes is not on par with the growth in the average number of

population which in the analyzed years was highest in Masovia (7.15%) and Greater Poland (4.16%). It is also hard to draw analogies between the changes in the average number of people in urban-rural, rural and urban communes. The case of Poland is actually somewhat out of ordinary in terms of the character of changes as the analysis of the 2004-2014 period shows no correlation between the influx of people to urban communes and the depopulation of rural communes. City continues to be the main place of residence and work of people in Poland.

References

- [1] Encyklopedia PWN. Available on:
<http://encyklopedia.pwn.pl/haslo/urbanizacja;3991629.html> [12.03.2015]
- [2] Markowski Krzysztof: Zarządzanie firmą a rozwój metropolii. Available on:
<http://old.stat.gov.pl/bydgoszcz/docs/prez/Markowski.Krzysztof-prezentacja.pdf> [12.03.2015]
- [3] Islam Md. Shahidul, Rana Md. Masud Parves, Ahmed Raquib: Environmental perception during rapid population growth and urbanization: a case study of Dhaka city, *Environ Dev Sustain*, Vol. 16, 2014, p. 443
- [4] Motamed Mesbah J., Florax Raymond J. G. M., Masters William A.: Agriculture, transportation and the timing of urbanization: Global analysis at the grid cell level, *Journal of Economic Growth*, Vol. 19, 2014, p. 365
- [5] Sadorsky Perry: Do urbanization and industrialization affect energy intensity in developing countries?, *Energy Economics*, Vol. 37, 2013, pp. 52–59
- [6] Cho Seong-Hoon, Kim Heeho, Roberts Roland K., Kim Taeyoung, Lee Daegoon: Effects of changes in forestland ownership on deforestation and urbanization and the resulting effects on greenhouse gas emissions, *Journal of Forest Economics*, Vol. 20, 2014, pp. 93–109
- [7] Sadorsky Perry: The effect of urbanization on CO2 emissions in emerging economies, *Energy Economics*, Vol. 41, 2014, pp. 147–153
- [8] Zhu Hui-Ming, You Wan-Hai, Zeng Zhao-fa: Urbanization and CO2 emissions: A semi-parametric panel data analysis, *Economics Letters* 117, 2012, pp. 848–850
- [9] Harris Richard: Suburbanization and Suburbanism, *International Encyclopedia of the Social & Behavioral Sciences (Second Edition)*, 2015 p. 660-666
- [10] Rydzewski Tomasz, Smutek Jan (Ed.): Wpływ suburbanizacji w strefie oddziaływania wielkiego miasta na dochody gmin z tytułu udziału w podatku dochodowym od osób fizycznych w Polsce, *Biuletyn Współczesne*

- aspekty badań przestrzeni geograficznej, Wyd. Bogucki Wydawnictwo Naukowe, Poznań 2012, p. 106
- [11] Tundys Blanka: Logistyka miejska, Wydawnictwo Difin, Warszawa, 2013, p. 19
- [12] Lisowski Andrzej, Grochowski Mirosław: Procesy suburbanizacji. Uwarunkowania, formy i konsekwencje, Wydawnictwo Uniwersytetu Warszawskiego, Warszawa, 2008, p. 224
- [13] Kajdanek Katarzyna: Suburbanizacja po polsku, Wydawnictwo Nomos, Kraków, 2010, p. 12
- [14] Markowski Krzysztof: Zarządzanie firmą a rozwój metropolii. Available on: <http://old.stat.gov.pl/bydgoszcz/docs/prez/Markowski.Krzysztof-prezentacja.pdf> [12.03.2015]
- [15] Jordan Stacy, Ross John, Usowski Kurt: U.S. suburbanization in the 1980s, Regional Science and Urban Economics, Volume 28, Issue 5, 1998, p. 611–627
- [16] Brzeziński Cezary: Procesy suburbanizacji obszarów podmiejskich na przykładzie gmin powiatu pabianickiego. Zmiany przestrzenne, Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 2010, p.170
- [17] Brzeziński Cezary: Procesy suburbanizacji obszarów podmiejskich na przykładzie gmin powiatu pabianickiego. Zmiany przestrzenne, Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 2010, p.170
- [18] Brzeziński Cezary: Procesy suburbanizacji obszarów podmiejskich na przykładzie gmin powiatu pabianickiego. Zmiany przestrzenne, Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 2010, p.170
- [19] Lisowski Andrzej, Grochowski Mirosław: Procesy suburbanizacji. Uwarunkowania, formy i konsekwencje, Instytut Geografii Społeczno-ekonomicznej i gospodarki Przestrzennej Uniwersytet Warszawski, Warszawa, 2008, p. 259
- [20] Database of the Central Statistical Office. Available: <http://www.stat.gov.pl> [12.03.2015]

Management, Enterprise and Benchmarking in the 21st Century
Budapest, 2015