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ANALYSIS OF POPULATION AGEING IN SLOVAKIA: TIME AND REGIONAL DIMENSIONS

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The population ageing process comprises the changes of age structure, which are indicated by the decrease in the number and proportion of children in the population and increase in the number and proportion of the higher age population categories.

The main aim of the article is to analyse the time and regional aspects of population ageing in the Slovak Republic. The changes of the population age structure in Slovakia over time are evaluated in the years 1900-2005. Regional analysis of this process is oriented to the population ageing in Slovak districts. Using the 2001 census data the regional types of ageing structure are identified by cluster analysis. The relative ageing intensity in Slovak districts between the 1991 and 2001 census is presented by using a hexagonal diagram.

Key words: population age structure, ageing from top, ageing from bottom, districts of the Slovak Republic, cluster analysis, hexagonal diagram

INTRODUCTION

The changes in the demographic behaviour, which have appeared in Slovakia at the end of the 20th and beginning of the 21st century, have been exceptionally intensive and they still attract attention of the academia as well as of the planning, governing and policy-making societal bodies. They are a part of the

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changes that have arisen in the countries of Northern and Western Europe in the second half of the 20th century and that are, with certain modifications, apparent in the countries of Southern, Central and Eastern Europe as well at the end of the century. They arguably stand for some of the most significant changes in the whole population history. This is why they have been justifiably labelled as “revolutionary” and the period of these characteristic changes is labelled as the second demographic revolution or as the second demographic transition. In a simplified way, we can understand the second demographic revolution as the complex of changes in the behaviour and value system of a population that overvalues individualism and personal freedom and at the same time these changes enfeeble the function of marriage and the family (Van de Kaa 1980 and 1987, Lesthage 1983, Pastor 1997 and 2002).

In Slovakia, the changes in demographic behaviour are visible most significantly in three interrelated areas – reproductive behaviour; the family behaviour; and ageing of the population.

The formation of a new model of reproductive behaviour is characterized by the sudden decline of the natural population growth and of the reproduction rates to levels that do not provide for the self-reproduction of the population. The intensity of fertility declines rapidly as well, while the youngest age categories of women record the highest decline. The average age of women at childbirth (particularly at the first childbirth) is rising, which can be judged as the consequence of deferment of childbirth for the higher age categories.

The changes in family behaviour are characterized by the transition from the model of early marriage to the model of late marriage. Apart from the decline of the intensity of marriage, the changes emerge through the rise of marriage age, the proliferation of cohabitating, and through the rise of the extra-marital fertility. The divorce rate shows a slight rise. A significant decline of the abortion rate is recorded, particularly of induced abortions.

The ageing of the population of Slovakia appears both in the long term and over the period of the last 10 years. The recent period is characterized by ageing from bottom (i.e. the decline of the number and of the proportion of the youngest age categories) because of the decline of fertility. Ageing from top (i.e. the growth of the number and of the proportion of the oldest age categories) as a consequence of the average life-length rise is evident as well, although this does not give such a distinctive manifestation. The processes of a population ageing raise the need to deal with a whole range of serious social problems (of the economic and socio-medical character).

Two different approaches are often employed for the study of population ageing. The first approach is characterized by an effort to compare several regional population structures (the interregional analysis) focusing on the differences in the age structures of their respective populations. The latter approach focuses on the temporal changes in the age structures of just one regional population unit (the intertemporal analysis). However, the profitability and the need for the combined approach are apparent in geographical analyses. If ageing is to be understood as a process, its analysis must be grounded in its temporal progress, considerably spatially-differentiated.

TEMPORAL POPULATION AGEING

The age structure, as a fundamental and principal feature of any population (alongside the sex structure), is the result of the effects of the population processes in the last century and it will directly affect the course of these processes for the next century. The proportion of children in Slovak population has diminished from 37.0 % (1900) to 19.0 % (2001). The number of the population over 65 years has grown to 484.8 thousand citizens; the proportional growth means from the value of 4.7 % to 11.5 %. Applying the UN classification¹, we can say that Slovakia belongs to the old populations with the value of more than 7 % (since 1961).

The ageing of the Slovak population is evident and it is present in the sense of its basic definitions. Tab. 1 also confirms the total growth and the decline of the number of subject age groups – the processes of ageing from the bottom and from the top happens simultaneously.

The core of our evaluation focuses, however, on the population ageing in the time succession of the period 1950-2005 where we can address the changes in a more detailed way.

Tab. 1. Indicators of population age structure in SR

rok	0-14 (number in thousand)	0-14 (%)	65+ (number in thousand)	65+ (%)	80+ (number in thousand)	80+ (%)	Is (%)	Ms (%)
1900	1,033	37.0	131	4.7	15	0.5	12.8	44.70
1910	1,104	37.8	148	5.1	16	0.6	13.4	46.30
1921	980	32.7	160	5.3	16	0.5	16.8	30.70
1930	1,062	31.9	200	6.0	21	0.6	19.2	28.80
1950	995	28.9	230	6.7	30	0.9	23.2	18.60
1961	1,315	31.5	292	7.0	39	0.9	23.2	19.60
1970	1,233	27.2	418	9.2	50	1.1	33.6	9.50
1980	1,302	26.1	519	10.4	77	1.5	39.7	3.50
1991	1,314	24.9	543	10.3	104	2	42.4	0.70
2001	1,015	19.0	611	11.5	102	1.9	60.2	-14.30
2002	975	18.1	616	11.5	115	2.1	86.5	-17.59
2003	944	17.6	620	11.5	122	2.3	90.1	-17.02
2004	919	17.1	626	11.6	127	2.4	93.9	-21.98
2005	894	16.6	633	11.7	131	2.4	97.3	-24.11

Source : Verešik, J. (1974)., FEDERÁLNÍ STATISTICKÝ ÚŘAD (1985). Historická statistická ročenka ČSSR,

ŠÚ SR (1992). SEDB 1991, ŠÚ SR (2002). SODB 2001.

ŠÚ SR (2003-2006).

Is (ageing index) = (Population 65+ / Population 0-14) * 100

Ms (Billeter's index) = ((Population 0-14 – Population 50+) / Population 15-49) * 100

¹ The UN classification – the ratio of the population over 65 years is the key:

1st stage – a young population: less than 4 %,

2nd stage – a mature population: 4-7 %,

3rd stage – an old population: more than 7 %.

Ageing from bottom (Fig. 1)

The proportion of the child constituent of the population (0-14 years old) decreased from 29 % in 1950 to 16.6 % in 2005. In the period 1961-1991, the child constituent made up more than a quarter of the whole population. In total numbers, the maximum of children is recorded in the years 1961-1964 and 1985-1988 with more than 1,300,000 children in the population. The absolute peaks of the number of children are direct consequences of the increased number of births.

The first peak is a consequence of the improved socio-economic conditions immediately after the Second World War. We can thus identify a compensative period in the population course of Slovakia that is characterized by positive features in population reproduction (the increase of natality, fertility, the marriage rate and the natural population growth) and which lasted until the middle of the 50's. (Vaňo ed. 2000).

The second peak is related to the increased fertility in 1973-1979. This is a secondary increase, given by a high number of women in the age of the highest fertility and reinforced by pro-natal policies (Vaňo 2001).

In the last fifty years, the average annual decline of the proportion of children is 0.2 %. The average total decline was 2 108 children. The most significant decline is in the period of 1990-2005 when we register the decline of more than 2.6 % per year. The number of the child constituent reached the historical minimum in 2005 (894,0 thousand). This is a consequence of the radical decline of natality in the 1990s.

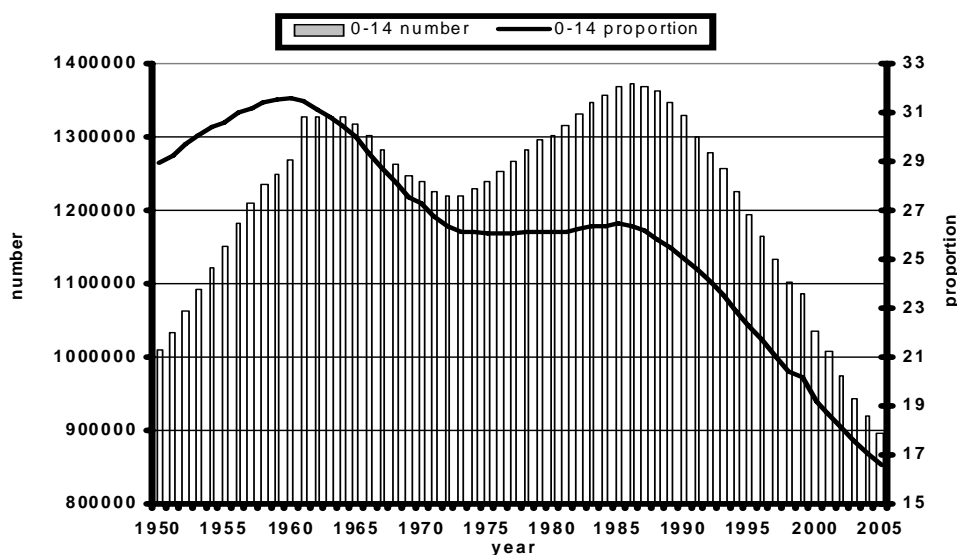


Fig. 1. Pre-productive age group in SR (1950-2005)

The productive age group of the population (Figs. 2 and 3)

The population of the age of 15-64 stands for the productive age group. Its size increased to almost 42% in the analysed period. The total number moved from 2,242 thousand in 1950 to 3,849 thousand in 2005.

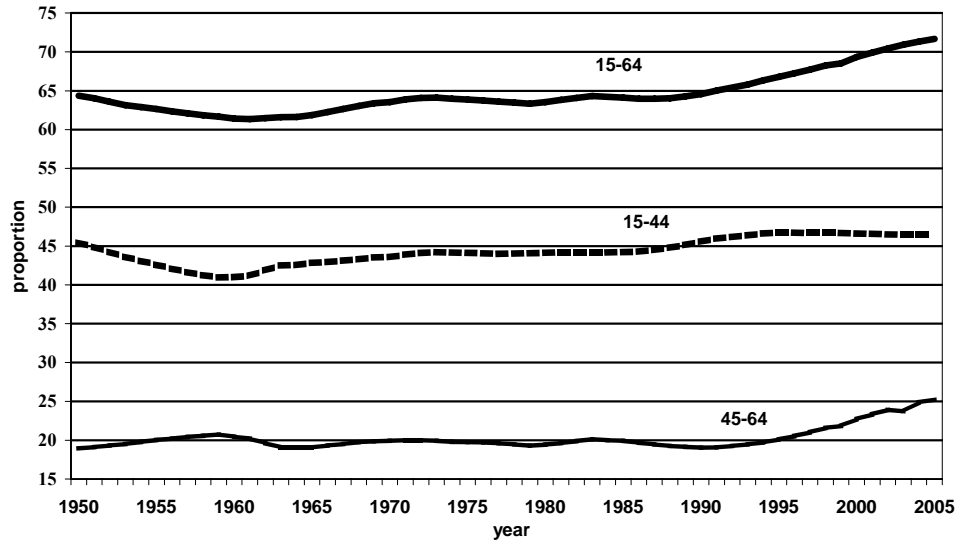


Fig. 2. Productive age groups in SR (1950-2005)

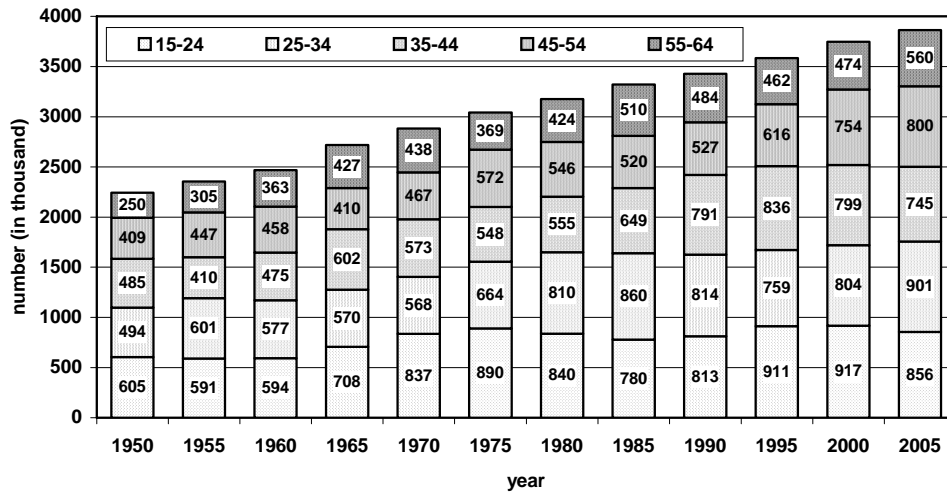


Fig. 3. Development of selected productive age categories in SR (1950-2005)

We can see the decline of the proportion of this age group in the course curve in the 60's, when the low number of people born during the Second World War progressed here. Since 1988, the ratio of this group has incessantly grown. There was a growth of more than 10 %, that is 479,000, in the number of people of working age in 1988-2005. The reason for this growth is based on the structural composition, as the two large "baby-boom" cohorts, born after the Second World War and in the 70's belonged to the age of labour activity. The average annual coefficient displays a continual growth of this age group as its level for the period of 1950-2005 was 1.0 % and the average annual total growth in this group was 28.9 thousand persons.

The proportion of the two age groups (the age of 15-44 and of 45-64) within the discussed group was roughly balanced at the 70:30 ratio until 1994. The age group of 15-44 is the part of the population with the highest reproductive potential and its proportion within the whole population was about 43-45 % with a continuously rising trend since the 70's. Later on, the decline of the proportion in the 15-44 years category is recorded, displaying the more rapid growth of the population aged over 45 years, as the age-groups born after the Second World War shifted into this category. These are the age groups of the population that will move to the post-productive age group in the following period and they will accelerate the process of ageing.

Ageing from top (Figs. 4 and 5)

To specify the old population contributes to the viewpoint on the up-to-date age of retirement. We have evaluated age groups of over 60 years, over 65 years and over 80 years. All selected categories register their maximum levels in 2005, which is caused by the improvement of mortality circumstances, by the prolongation of life expectancy and by the shift of the mentioned age groups (waves).

In total, the number of the population over 60 years had been increasing by an average of 0.7 % per year in 1950-2005.

The number and the proportion of the age group over 65 years bear a temporal progress similar to the previous age group. For the possibility to compare the rates internationally, this age group has a more substantial meaning. The curve of the proportion of this population declines in 1979-1984, as the result of the move of the very small number of persons born during the First World War into this age group. A lower share of these age groups is also distinctive due to the proportion of the category over 80 years, where a decline is evident in 1998. The average annual total growth is 7.3 thousand old persons in the period of 1979-1984, meaning that the number of old people (over 65 years) had increased by an average of 1.8 % per year. Since 1950, the number of old people in the population of Slovakia increased from 232.7 thousand (6.7 %) to 632.6 thousand (11.7 %); for which means growth by more than the 2.5 times.

The population of the age over 80 years records the proportional growth from 0.9 % (1950) to 2.4 % (2005). This age category records the fastest growth of all the already-evaluated categories in the period 1950-2005. Its total number had increased of more than 98 thousand; that means by an average of 2.7 % per year.

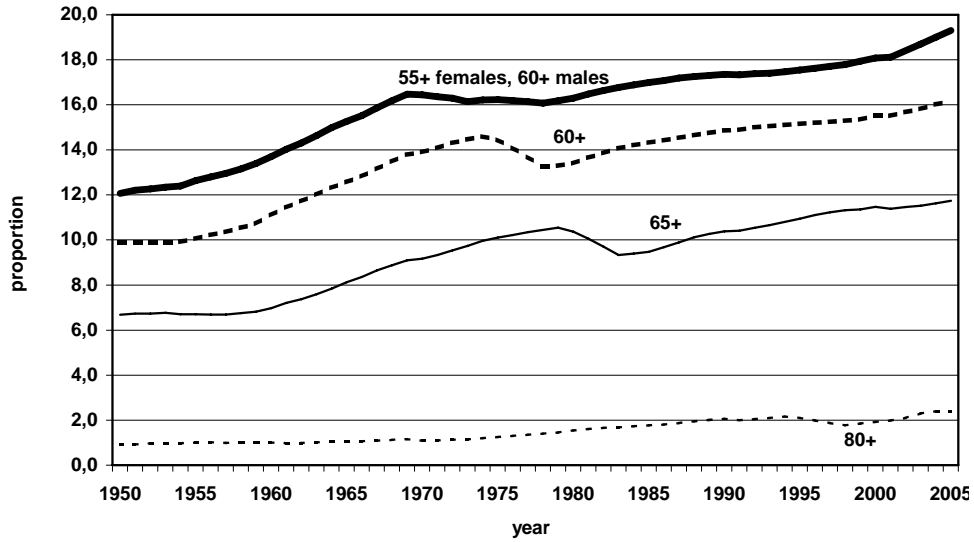


Fig. 4. Post – productive age groups in SR (1950-2005)

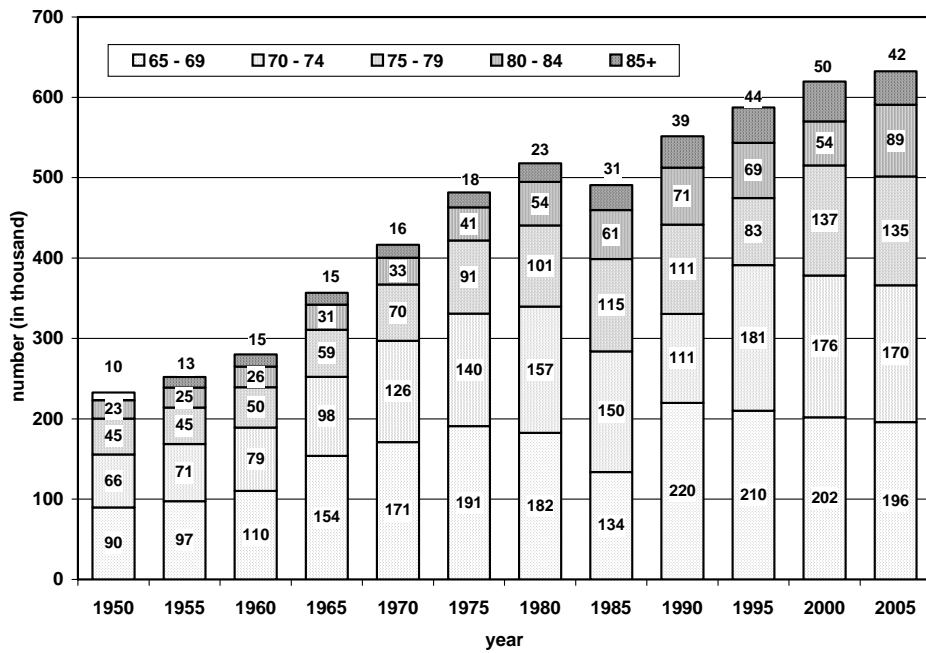


Fig. 5. Development of selected post – productive age categories in SR (1950-2005)

Tab. 2. Average annual coefficient growth (in %) of selected age groups in SR

	0-14	15-64	60+	65+	80+
1950-1960	0.22	0.90	2.50	1.80	2.90
1960-1970	-0.21	1.50	3.50	4.00	2.10
1970-1980	0.48	0.90	0.58	2.10	3.60
1980-1990	0.20	0.80	1.66	0.50	3.80
1990-2005	-2.64	0.80	0.98	0.96	1.30
1950-2005	-0.20	1.00	0.70	1.80	2.69

Source: own calculation

THE POPULATION AGEING OF SLOVAKIA FROM A REGIONAL POINT OF VIEW

Any higher territorial unit can be characterized by the presence of different population structures in its particular sub-units. The difference is apparent in terms of different numbers of population, its dynamics, structure and migration. The level of the differentiation of demographic behaviour in particular territorial units of Slovakia is evident from the changes of age structures and from the different levels of ageing. Studies of regional differentiation employ mainly the information from the 2001 Census (and this is compared in some parts with the results from the 1991 Census).

Káčerová (2005) and Mládek et al. (2006) delineate the regional types of districts according to the level of ageing in 2001². The results of both approaches to the evaluation of population ageing gave similar results.

Employing cluster analysis, the authors assign four regional types of districts (Fig. 6). Slovakia can be demarcated into two large regional units in terms of the age structure and the intensity of the ageing. In terms of typology, the border can be drawn through the line of the districts of Púchov, Žilina, Ružomberok, Liptovský Mikuláš through Brezno to Rožňava. To the north of this line, we can consider *the regional type of a young age structure*; to the south of the line (including these districts) we identify *the regional type of an old age structure*.

Regarding selected indicators of the age, national and religious structures of the population, we have derived the following characteristics of the particular regional types.

The regional type of a young age structure. It consists of two units. The first one is situated in the north of Slovakia – between Považská Bystrica and Tvrdošín. The second one covers the whole east of Slovakia apart from the districts of Medzilaborce and Sobrance (which have the oldest age structure in Slovakia). The young age structures of these units make a potential for their progressive reproduction (manifested in the values of natural increase). Such a character of the development is also supported by specificities of the national

² Káčerová (2005) employed the Ball Method, Mládek et al. (2006) employed the cluster analysis method; we present its determination.

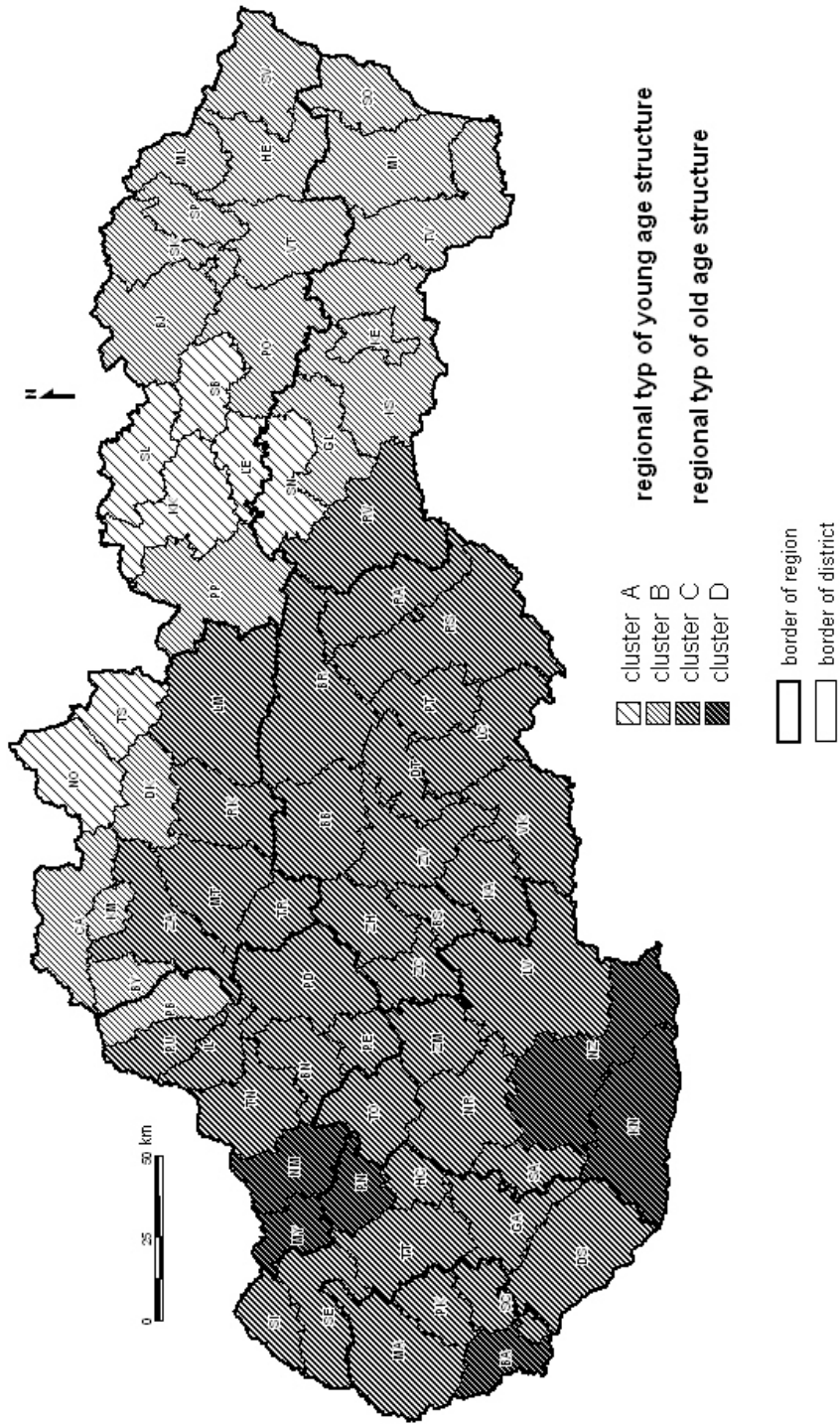


Fig. 6. The districts typology according selected age structure indicators in the Slovak republic (2001)

and religious structure. An impact of the higher level of religiosity is present here (more than 90 % of the population in the regions of Orava and Kysuce are religious). These are mostly Roman Catholic and Greek Catholic populations with the typical higher level of natality and families with more children.

The regional type of an old age structure. The districts of this regional type are situated in the whole of Central, Southern and Western Slovakia. These regional types stand for comparatively older age structures. Similarly to the young regional types, we can talk about the influence of the age structure having a negative impact on the intensity of natality and natural increase. The evidence can be found in the negative values for the natural increase of the population of this regional type. Again, we can consider the impact of the religiosity and of the national structure on the population ageing. The populations of Hungarian nationality with a higher proportion in the southern districts mostly avow an affiliation with Reformed Christian churches preferring a lower intensity of natality and the model of a single-child family. The same attitude towards the extent of a family is shared by the Evangelical religion of Augsburg Confession believers, having a high average proportion in several districts. A similar character of the reproductive processes can be also seen in the population without any confession. The higher level of urbanization in Western Slovakia arguably contributes to the more intensive process of ageing. The parameters for migration imply, paradoxically, that the young regional type is losing due to migration, while the old regional type is achieving a positive increase by migration.

Changes in the proportions of particular age groups play a significant role in assessment of the process of ageing – both in absolute and relative terms. One of the methods³ enabling the study of temporal and spatial differences in population ageing was employed by Sonis (1981). Podolák (1998) employed it for the cities in Slovakia with more than 10,000 citizens and Pavlíková, Mládek (2001) and Mládek (2004) used it for the set of European states.

We have processed the change of the proportion of the three vector groups in the set of districts of Slovakia, giving the following vectors: $p = 0-14$, $q = 15-64$, $r = 65+$ (share in %). We have used the data from the censuses in 1991 and 2001 (a recalculation of the data from 1991 was necessary, regarding the contemporary administrative organization, Bratislava and Košice have not been segmented in to districts, they have been evaluated as whole cities).

The interpretation of particular combinations of differences enables us to identify three main types of changes in vector structures (Tab. 3) as determined by Pavlíková and Mládek (2001).

The first type (A) is represented by districts that bear features of a significant ageing of the population. It is the most common feature of Slovak districts in the period 1991-2001. It is present in 67 districts, while in 65 districts this stands for the relative ageing from bottom and top and in 2 districts (Levice and Poltár), it is just ageing from the bottom.

³ This method is based on the characteristics of regions (states, districts) using a relative proportion of the three important population age categories (under 15 years, 15-64 years and over 65 years) and their changes in the course of one or more periods. It is based on the comparison of age structures in time as their changes characterize the process of ageing. Such a comparison results in the vector (Dp, Dq, Dr) characterized by the triad of values, giving information about a relative ageing of the population. In the case that $(Dp < 0)$, we identify the ageing from the bottom, if $(Dr > 0)$ it is ageing from the top.

