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CHANGES OF HUMAN RESOURCE CONCENTRATION AND SPECIALISATION IN HUNGARIAN INDUSTRY

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ABSTRACT
On certain areas of Hungary different industry structures evolved and various industries became dominant in each region. The spatial location of certain industries was influenced by several social-economical factors (the historical traditions of production, ownership, available labour force and equipment, resources, etc.). In case of the regionally differentiated industrial structure in some areas different profitability, human-resource usage, technical standards, different risk factors and market opportunities must be calculated. In the years following the regime-change the transformation in Hungarian economy resulted in significant changes in the sectoral and regional structure of the industry in the field of human resources as well. These changes demand to carry out studies that provide answers whether any concentration can be observed at the spatial organization of industry sectors and also if an increase or decrease in the industrial specialization is characteristic of a certain county regarding human resources.

Keywords: industry, specialisation, concentration, human resources, Herfindahl and Dissimilarity index

INTRODUCTION

In the European Union countries, including Hungary, the spatial structure of industry changed significantly in the field of employment. Sometimes the number of employees decreased in certain industrial sectors (mining; food, drink and tobacco production; textile, leather goods and shoe production), while in other industrial sectors the opposite can be observed, i.e. an increase (engineering; Basic metal, metal processing products) (ABONYINÉ PALOTÁS – KOMAREK, 2005). This raises the necessity of examinations, which can help find out if there was an increase or decline in concentration of industries concerning spatial organisation in the past few years and also if there was a characteristic change in the industrial specialisation with regard to employment. In order to monitor the changes of the past few years, it is important to consider the spatial concentration of Hungarian industrial sectors and the sectoral specialization of employees in each area at different times (OLÁH – SZABÓ, 2001; BARTA, 2002; HORVÁTH, 2002; KISS, 2010; ABONYINÉ PALOTÁS – KOMAREK, 2011; BODNÁR, 2011).

MATERIAL AND METHOD

There are several indices to measure the industrial specialisation and the spatial concentration of the industrial sectors (e.g. Concentration index, Hoover-index, Theil-index, Herfindahl index, Dissimilarity index). Out of these indices two were selected to determine the industrial specialisation and the spatial concentration of the industrial sectors of Hungarian counties by employees.
The value of the Herfindahl index (absolute specialisation and concentration) can be between 0 and 1, while that of the Dissimilarity index (relative specialisation and concentration) between 0 and 2.

Herfindahl index (absolute specialisation):

$$H_j^S = \sum_i \left(S_{ij}^S\right)^2$$

Dissimilarity index (relative specialisation):

$$DSR_j = \sum_i \left| S_{ij}^S - S_i \right|$$

where:
i = industry
j = county

S_{ij}^S = i industry of j county share from total employees in j county industry

S_i = i industry share from the total employees in Hungarian industry

Herfindahl index (absolute concentration):

$$H_i^C = \sum_j \left(S_{ij}^C\right)^2$$

Dissimilarity index (relative concentration):

$$DCR_i = \sum_j \left| S_{ij}^C - S_j \right|$$

where:
i = industry
j = county

S_{ij}^C = i industry of j county share from total employees in Hungarian industry

S_j = j county share from the total employees in Hungarian industry

The data provided by the Central Statistical Office (KSH – Központi Statisztikai Hivatal) were the base for my work. The data of industrial employees by the site of employment were examined.
The studied time interval is between 2000 and 2008. There were frequent changes in TEÁOR (Standard Classification System of Industrial Activities) numbers; therefore this is the period that allows the comparison and the analysis of data and drawing conclusions.

RESULTS AND CONCLUSIONS

In the basic period (2000) the highest index values were represented by Fejér, Vas, Győr-Moson-Sopron, Jász-Nagykun-Szolnok and Pest Counties considering **absolute specialisation**. Fejér County is primarily due to the processing industry, including a prominent role of engineering, basic metal and metal processing industry.

The prominent position of Vas County in this field is due to its engineering industry and light industry (textiles, leather products and footwear), while in case of Pest County it is also the engineering industry and the food industry (food, beverages and tobacco). The number of employees in engineering industry indicated a higher concentration in Győr-Moson-Sopron and Jász-Nagykun-Szolnok. In the base year the counties with the lowest absolute specialization were Borsod-Abaúj-Zemplén, Csongrád and Veszprém. In case of these counties, the index is 0.14 or below this value. The reason for that is there were no dominant industry sectors in these counties, which would have a determinative role in employment.

Table 1. The absolute specialisation of Hungarian industry by employees in different territories

Name of territorial unit	2000	2002	2004	2006	2008
	Herfindahl index				
Budapest	0,16	0,16	0,16	0,15	0,15
Pest County	0,24	0,21	0,22	0,20	0,20
Fejér County	0,25	0,27	0,25	0,26	0,25
Komárom-Esztergom County	0,18	0,20	0,26	0,34	0,37
Veszprém county	0,14	0,14	0,14	0,15	0,17
Győr-Moson-Sopron County	0,21	0,21	0,22	0,21	0,21
Vas County	0,25	0,24	0,24	0,23	0,23
Zala County	0,18	0,20	0,24	0,24	0,26
Baranya County	0,15	0,14	0,14	0,14	0,15
Somogy County	0,20	0,19	0,17	0,20	0,22
Tolna County	0,20	0,19	0,18	0,16	0,16
Borsod-Abaúj-Zemplén County	0,13	0,14	0,15	0,17	0,18
Heves County	0,18	0,19	0,19	0,23	0,25
Nógrád County	0,16	0,16	0,16	0,16	0,18
Hajdú-Bihar County	0,17	0,17	0,16	0,16	0,16
Jász-Nagykun-Szolnok County	0,21	0,21	0,20	0,23	0,25
Szabolcs-Szatmár-Bereg County	0,17	0,18	0,17	0,17	0,18
Bács-Kiskun County	0,17	0,17	0,18	0,18	0,18
Békés County	0,17	0,18	0,18	0,16	0,17
Csongrád County	0,14	0,14	0,14	0,14	0,14

Source: author's figures based on KSH data

In 2008 Komárom-Esztergom, Zala and Heves Counties caught up with Fejér County. The processing industry involving machine industry as well as basic metal and metal production play an important role in Fejér County, which takes up significant labour capacity.

The „catching-up" of Komárom-Esztergom County with Fejér County is due to engineering since the number of employees in this sector has almost tripled from 2000 to 2008. Zala and Heves Counties could also improve owing to machine industry. In case of these counties the value of absolute specialisation reached or exceeded 0.25. Pest and Vas Counties lost their previous advantage in this field. By 2008 the index value for Pest County fell back to 0.20, while that of Vas County to 0.23. The setback can be explained

particularly by the fact that the number of industrial sectors (in Vas County it was mainly engineering, as well as textile, leather goods and footwear industry) employing plenty of labour previously was decreasing from 2000-2008. Concerning Pest County it is true that employment improved in terms of the number, but the growth took place not only engineering and food, beverage and tobacco manufacturing typical of the county, but equally distributed among the various industrial sectors. At the same time it is a fact that in other industrial sectors (e.g. wood, paper products and printing, basic metal and fabricated metal products) the growth was higher than in the previous sectors (machinery, food, beverages and tobacco products).

Examining the trend of absolute specialization in employment, we can conclude that comparing 19 counties to the capital city there was an opposite direction. In the capital and in four counties (e.g. Tolna, Hajdú-Bihar) the index of the absolute specialization in the industrial employment decreased from the base year to the current year, while it increased in ten counties (e.g. Szabolcs-Szatmár-Bereg, Somogy) and it stagnated in five counties (e.g. Csongrád, Békés).

The increase was primarily due to the fact that certain industries (such as engineering, basic metal and metal products) the degree of concentration increased in employment and thus the given industry of the given county became dominant in employment (e.g. mechanical engineering in Komárom-Esztergom County). The decrease of the index can be explained by the negative direction of change in the number of employees, as well as a more even distribution of employees by sectors within the county.

In 2000 in the field of employment there was a major difference in the sector structure of Tolna, Fejér, Borsod-Abaúj-Zemplén Counties compared to that of the national structure **(relative specialisation).** The index value reached 0.50 in case of the above mentioned three counties. In Tolna County textiles, leather products and footwear production were relatively high, at the same time engineering was low, while in Fejér County the basic metal and metal processing products manufacture resulted in an industrial structure significantly different from the national one. In County engineering was lower, at the same time basic metal and metal processing products manufacture and the higher share of the chemical industry was the cause of the deviation from the national structure. In 2000 the national sample was particularly represented by Somogy, Győr-Moson-Sopron, Zala and Jász-Nagykun-Szolnok Counties in the sector structure. Most labour was employed in engineering, textile, leather goods and footwear production as well as in food, drink and tobacco production.

In 2008 it was still in Tolna and Fejér Counties, and also in Komárom-Esztergom, Szabolcs-Szatmár-Bereg and Csongrád Counties where a significant difference can be found in the sector structure. In case of Tolna and Komárom-Esztergom Counties the index value also reaches or exceeds 0.5. In Fejér County the low food, drink and tobacco production, at the same time the high basic metal and metal processing products manufacture resulted in an industrial structure different from the national one. Similar difference from the national figures was due to a high rate of engineering and a low rate of food, drink and tobacco production in Komárom-Esztergom County, a low engineering and at the same time high electricity, gas, steam and water supply production in Tolna County, a high rate of food, drink and tobacco production in Csongrád County, while low engineering and higher rate or food, drink and tobacco production in Szabolcs-Szatmár-Bereg County. There was a change in the national pattern. In this field the national pattern was mainly represented by Veszprém, Somogy, Heves, Nógrád, Jász-Nagykun-Szolnok and Pest Counties in 2008. That year it was the engineering, food, drink and tobacco products and also basic metal and metal processing products manufacture sectors where most labour was employed. When examining the tendency of the changes in the research

period we find that from 2000 to 2008 the relative specialisation decreased in 11 counties, it stagnated in 6 counties and in the capital, while in 6 counties it increased. It is important to note that the main feature of the national industrial structure is that engineering and chemical industries have improved somewhat, and the food, beverages and tobacco production fell back. The value of relative specialisation stagnated or decreased in the counties where this trend was characteristic. The most significant changes took place in Komárom-Esztergom County (increase in relative specialisation) and in Pest County (decrease in relative specialisation). The former was the result of the significant improvement of engineering, while the latter was that of the decreasing engineering and chemical industry as well as the food, drink and tobacco sector falling back somewhat.

Table 2. The relative specialisation of Hungarian industry by employees in different territories

Name of territorial unit	2000	2002	2004	2006	2008
	Dissimilarity index				
Budapest	0,30	0,29	0,25	0,24	0,30
Pest County	0,31	0,24	0,20	0,17	0,13
Fejér County	0,52	0,57	0,49	0,48	0,44
Komárom-Esztergom County	0,31	0,30	0,36	0,50	0,55
Veszprém county	0,32	0,34	0,35	0,28	0,23
Győr-Moson-Sopron County	0,24	0,25	0,25	0,19	0,19
Vas County	0,46	0,42	0,40	0,31	0,32
Zala County	0,27	0,30	0,38	0,32	0,33
Baranya County	0,35	0,35	0,30	0,29	0,28
Somogy County	0,22	0,26	0,28	0,23	0,24
Tolna County	0,54	0,61	0,56	0,57	0,54
Borsod-Abaúj-Zemplén County	0,50	0,43	0,32	0,34	0,34
Heves County	0,28	0,30	0,25	0,32	0,31
Nógrád County	0,43	0,34	0,45	0,37	0,35
Hajdú-Bihar County	0,31	0,33	0,29	0,29	0,32
Jász-Nagykun-Szolnok County	0,29	0,26	0,26	0,28	0,29
Szabolcs-Szatmár-Bereg County	0,46	0,49	0,36	0,39	0,38
Bács-Kiskun County	0,35	0,30	0,30	0,33	0,34
Békés County	0,49	0,46	0,44	0,37	0,35
Csongrád County	0,38	0,43	0,44	0,48	0,49

Source: author's figures based on KSH data

Considering the **absolute concentration** of Hungarian industry by employment in 2000 it was mining, wood and paper products, printing and chemical industry that showed the highest concentration values. In 2008, however, the former situation changed somewhat, some sectors declined, while others improved.

That year the highest geographical concentration, concerning employment, was found in wood and paper production and printing activities, in chemical industry and other processing industry. The geographical concentration increased in case of food, drink and tobacco production, leather goods and footwear production as well as wood and paper production and printing, while it fell back in mining and electricity, gas, steam and water supply. Stagnation can be observed in chemical industry, non-metal mineral production,

metal raw material and metal processing as well as in engineering. The lowest values can be seen in case of mining in the period between 2000 and 2008. No significant geographical concentration was seen in employment in Hungarian industry during the examined period.

Table 3. The absolute concentration of Hungarian industrial sectors by employees

Industrial sector	2000	2002	2004	2006	2008
	Herfindahl index				
Mining	0,13	0,10	0,09	0,08	0,08
Food, drink and tobacco production	0,06	0,06	0,07	0,07	0,07
Textile, leather goods and footwear production	0,06	0,06	0,06	0,07	0,07
Wood and paper products, printing activities	0,11	0,12	0,11	0,11	0,14
Chemical industry	0,10	0,11	0,11	0,11	0,10
Non-metal mineral products	0,08	0,07	0,07	0,08	0,08
Basic metal, metal processing products	0,08	0,08	0,08	0,08	0,08
Engineering	0,07	0,07	0,07	0,07	0,07
Other processing industries	0,07	0,07	0,07	0,08	0,10
Electric energy, gas, steam and water supply	0,07	0,07	0,07	0,07	0,06

Source: author's figures based on KSH data

Table 4. The relative concentration of Hungarian industrial sectors by employees

Industrial sector	2000	2002	2004	2006	2008
	Dissimilarity index				
Mining	0,95	0,80	0,49	0,48	0,46
Food, drink and tobacco production	0,28	0,28	0,26	0,30	0,36
Textile, leather goods and footwear production	0,43	0,46	0,44	0,40	0,39
Wood and paper products, printing activities	0,37	0,40	0,35	0,32	0,41
Chemical industry	0,44	0,43	0,40	0,36	0,29
Non-metal mineral products	0,62	0,60	0,56	0,51	0,45
Basic metal, metal processing products	0,34	0,35	0,36	0,32	0,33
Engineering	0,31	0,27	0,25	0,25	0,24
Other processing industries	0,31	0,34	0,35	0,34	0,41
Electric energy, gas, steam and water supply	0,35	0,33	0,31	0,32	0,33

Source: author's figures based on KSH data

When analysing the **relative** geographical **concentration** of employment in industry we can claim the following: The greatest difference from the total industrial geographical distribution can be seen in the field of mining and non-metal mineral product manufacture both in 2000 and in 2008-ban. There were only minor changes in the sectors in 2008 compared to 2000. An increase can be observed in three sectors, while in case of seven there was a decrease. The greatest increase occurred in case of "Other processing industries" (which was due to Budapest), while the greatest decrease happened in mining, despite the fact that both in 2000 and in 2008 it was the mining where the greatest difference showed from the total industrial geographical distribution. In 2000 in mining the high concentration of the sector was the result of the share of Borsod-Abaúj-Zemplén and Veszprém County, which was higher than the national rate. In case of non-metal mineral product manufacture the reason for the high relative concentration is the share of Fejér

County within the sector is rather behind that of the total industry. In 2008 in mining the higher concentration of the sector was due to the higher share of Zala and Bács-Kiskun County, and of Veszprém County in non-metal mineral product manufacture compared to the national rate.

The specialisation and concentration examinations of the industrial employment of Hungarian counties reflect the processes of the industry characteristic of the structural and territorial changes of industrial employment of Hungary in the past few years. Due to these changes the role and importance of certain regions and industrial sectors also changed and resulted in a new employment structure.

Concerning employment, the current changes and transformations in the industry structure have not been completed, since both the regional and the structural transformation of the industry is a result of continuous development, that is the reason why the current production investments in Hungary can create a new situation in the regional specialization and sectoral concentration of our industry (e.g. Mercedes-Benz – Kecskemét) with regard to employment.

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