

# Spatial Effects of Industrial Restructuring in the Visegrád Countries

DÁNIEL KUTTOR, Ph.D.  
ASSOCIATE PROFESSOR

e-mail: kuttor.daniel@uni-miskolc.hu

## SUMMARY

*During the transition period the Visegrád Countries (Czech Republic, Hungary, Poland, Slovakia) had to be integrated not only into the international political, legal, defence systems, but also the European and global production structures, chains. This rapid integration (or rather reintegration) process made significant effects on the production activities, which influenced the role of industry in the national economies, the structural distribution, the environmental emission and the geographical extent.*

*Keywords: Visegrád countries, industrial restructuring, spatial economics*

*Journal of Economic Literature (JEL) code: O14, O18*

---

## INTRODUCTION

---

Since the turn of the decades 1970-80, a considerable spatial and structural transformation can be observed in industrial production globally. The major changes have been induced by the opening up of the economies of China, the Eastern block countries and then of India. The Asian and Eastern European countries integrating into the global economy have provided hundreds of millions of workers and consumers, as well as abundant sources of resources and raw material supplies. In addition, the accelerating technical development has exerted a significant effect on the special location and structure of the secondary sector.

This global transformation has not left the industries of the Central-Eastern European countries untouched either. The rapid change in East-West orientation has lent an individual characteristic and development path to this region. During the transition period, the forces of de-industrialisation and re-industrialisation acted jointly, although with a shift in terms of space and sector. As a result, the production sectors of the Visegrád countries (Czech Republic, Poland, Hungary and Slovakia) underwent considerable changes (Barta 2002; Kiss 2010). It is important to state and emphasize that in spite of the vigorous tertiarisation of the economies, the industry has maintained its significance in the economies of the region, both in terms of the employment of workers and of the production of added value (Enyedi 2009). The performance of the processing industry fundamentally determined export capacity (the extent of volume), and had a direct effect on the growth of the entire economy

(other sectors) as well as the revenue level (Horváth 1999).

All this justifies a detailed structural and spatial examination of the secondary sector, with special regard to the processing industry.

## CONCEPTUAL AND THEORETICAL BACKGROUND

---

The secondary sector includes the sectors of the production, processing and construction industries. These activities transform the raw materials and primary products of the primary sector into usable and consumable forms. The widening of the secondary sector is a consequence of the industrial revolution within a given national economy. The process began in England in the second half of the 18<sup>th</sup> century and is still continuing. In the course of the more than two hundred years the global diffusion of the phenomenon has taken place, with only a few segments of the Earth being left untouched. The phenomenon of industrial production and employment gaining ground is called industrialisation. According to the explanation in the encyclopaedia, the concept means the introduction of large-scale mechanised technology into the national economy of a given country. From the early 19<sup>th</sup> century to the middle of the 20<sup>th</sup> century, the developed countries saw an expansion of the industries of the secondary sector parallel with a reduction in the role of the agrarian sphere and an expansion of services. The underlying reasons for the growth of the industry expressed in absolute numbers were considerable changes in sectors and structure

(Szalavetz 2007). The structural changes lent a cyclic motion to the development of the entire economy (Kondratyev- or k-cycles). From the 19<sup>th</sup> century on, a variety of industries played the driving role (textile industry, steel making, chemical industry, vehicle manufacturing, information technology, etc.).

In the middle of the 20<sup>th</sup> century, the countries of the developed world reached what is called the post-industrial phase, where the role of the secondary sector became secondary behind that of the tertiary sector (services). The primary cause of the process is that the number of those employed in the industry decreased together with the value produced. Issues of the environment, labour market, regulation and budget contributed to the cutting down and decrease. The phenomenon is called de-industrialisation and is typical of several regions in North America and Western Europe (Rodwin & Sazanami 1991). This caused the largest decline in output and labour market disturbances in the regions with heavy industry or mono-structure production (Mid-England, Northern Spain, Northern Italy, Luxemburg, the Ruhr region, etc.).

Today Asia creates tough competition not only through the newly industrialised countries for the manufacturers in Europe and North America, but the fast development of China and India further increases the gravitational effect of the Far East and Southern Asia. That is why in the western world the economic policy objectives frequently include re-industrialisation, for the performance of the secondary sector often exerts a direct influence on the creation of value and jobs, which is of strategic significance concerning social and trade policies as well (Kocziszky 2008; Barta 2008).

However, it is not a matter of indifference in what way re-industrialisation and the revitalisation of the secondary sector takes place in Europe, particularly in Central-Eastern Europe. What industries will be introduced and will settle there?

If the mono-structural manufacturing industry based on mass-production is to (re-)appear, it is possible to talk of re-industrialisation. If, however, we can witness the settlement of production with a diversified structure under modern conditions (infrastructure, management, labour market, others), we can speak about neo-industrialisation (Landesmann & Székely 1995). The emerging 'new' production and sectoral structure will thus determine the labour market situation, revenue-producing capacity, the economic development path of a smaller region or even of an entire national economy for a longer period.

Inspired by the above ideas, the author wishes to find the answers to three questions in the paper:

- What tendencies can be discovered in the industries of the countries of Central-Eastern Europe in the period of transition?
- Is it possible to talk about industrial restructuring and which type of re-industrialisation has emerged?

- What spatial (regional) dimensions did the restructuring have?

The examination has been expanded to cover the Visegrád countries. For the calculations the data in the on-line sources of OECD Factbook, EuroStat and the World Bank were used (EuroStat 2009; OECD 2008).

The examination of the secondary sector did not include the construction industry: only the processing industry was analysed.

The data available allow monitoring of the complete period of transition, while at the same time the time horizons of the regional and structural changes are limited to the period 2000-2007.

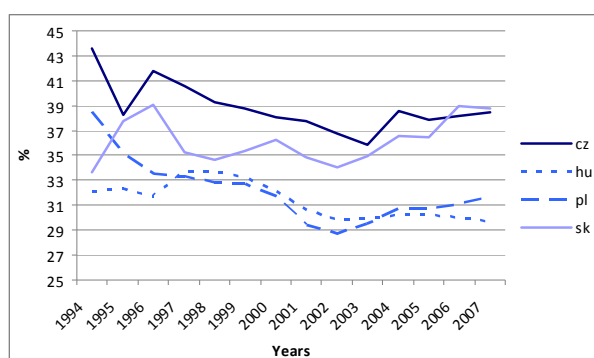
In spite of the fact that the financial crisis of 2008 opened a new chapter in the history of the development of the world economy, the analysis of its effects will be neglected here, due partly to the currently limited availability of the data, and partly to the complexity of the issue.

## STRUCTURAL CHANGES IN THE INDUSTRIES OF THE VISEGRÁD COUNTRIES

The political changes of 1989 launched dramatic de-industrialisation processes in Central-Eastern Europe. The crash of the markets within the scope of the Council of Mutual Economic Assistance, the non-realisation of investments, the lack of competitiveness, the unfavourable sectoral structure and the economic slump in Western Europe led to a marked decrease in industrial output. The industrial added value decreased in Czechoslovakia by 27.83% in 1991 and by nearly the same value (27.72% (10.40 and 17.32)) in Hungary in two years (1990-1991). In Poland the depth of the J-function (called so due to its shape), i.e., the extent of the recession was not that large, but its duration in time was longer, for the decline had already started in the mid-1980s.

By 1993 and 1994 the significant decrease in the industrial added value came to an end, but the annual change index continued to show a fluctuation and volatility (Illés 2002). With the exception of Hungary, the other three Visegrád countries experienced several years when the industrial added value decreased. These declines can be traced back to structural problems and to a variety of effects of the different privatisation methods (Dabrowski et al. 2004). The form of privatisation fundamentally determined the development of the volume of foreign capital investment. Although Hungary was exempt from these structural declines in the 1990s, the 'investment boom' following the accession to the European Union in 2004 and the dramatic industrial growth emerging as its consequence could not be experienced here, which also has its underlying causes in the structural problems.

In the period 1994-2007 Slovakia produced simultaneously the highest average growth rate (7.15%) and the highest extent of fluctuation in terms of industrial added value. The performance of Hungary provided a counter-example: the average growth rate was the smallest (5.14%) but at the same time the most balanced. In terms of the ratio of industrial added value against GDP (Gross Domestic Product), the positions of the Visegrád countries underwent significant changes. Only in the case of Slovakia was it possible to register growth in the period examined, which resulted in Slovakia presenting the same characteristics as the Czech Republic by 2007. In the latter it was possible to observe a slow amortisation of the share of the industry; this trend was changed only by the recovery following EU accession. The positions of the other two countries also came closer to each other in this period. However, Poland and Hungary followed different trajectories (development paths) to get to their final positions in 2007. While in Hungary the industrial recovery of the beginning of the period was able to increase the relative weight of the secondary sector within the entire national economy, and the processes leading to losses of market began to act only subsequently, in Poland these trends appeared in a reverse time sequence (Ehrlich et al. 1994). Following the apparent de-industrialisation of the 1990s, there came an improvement in position from 2002 on (Figure 1).



Source: author's compilation based on World Bank data

Figure 1. Industrial added value in percentage of the GDP

In spite of the fact that the ratio of industrial added value against GDP decreased in most cases, industrial output still exerts a decisive impact on the performance of the entire economy. This is proved by the strong concurrent movements of the annual changes in the GDP and in the industrial added value. The high correlation values of the two figures (Cz: 0.90; Hu: 0.92; Pl: 0.92; Sk: 0.41) provide proof of this.

But what were the extent and intensity of industrial restructuring in reality? In order to give the right answer to that question, an analysis of the processing industry was done at sectoral level, on the basis of the types of indicators used above (added value and workers). The compatible data currently available (EUROSTAT) are for the period 2000-2007.

For better organisation, the industries were grouped by their technology intensity. In the grouping the EUROSTAT methodology was followed. Further details on the industries included in the research and their categories are given in the table in the Appendix. The table below shows the percentage changes in the number of workers and added value from 2000 to 2007 by individual categories and countries (Table 1).

Table 1. Percentage change in workers and added value by 2007 as compared to the basis of the year 2000, % (2000 = 100)

		Workers	Added value
Total	Total	104.63	215.60
	CZ	100.43	221.88
	HU	102.37	200.02
	PL	112.55	163.35
	SK	103.17	277.15
low-tech	Total	91.59	169.80
	CZ	84.70	165.29
	HU	96.70	157.56
	PL	103.91	145.84
	SK	81.04	210.50
medium-low-tech	Total	115.45	246.95
	CZ	106.80	236.94
	HU	117.27	226.35
	PL	122.91	209.49
	SK	114.80	315.04
medium-high-tech	Total	121.34	243.29
	CZ	112.63	238.21
	HU	119.71	236.95
	PL	125.31	200.61
	SK	127.70	297.38
high-tech	Total	118.89	225.12
	CZ	141.88	195.40
	HU	115.09	219.58
	PL	122.74	150.58
	SK	95.85	334.92

Source: author's compilation based on EUROSTAT data

Poland, where an increase of 12% was registered, there were no significant changes in the number of workers in the processing industry, however, their distribution by industries showed considerable modifications by the end of the period.

Low-tech industries (with low technology intensity) showed a significant loss in their weight in the labour market. Medium-low-tech activities (with medium-low technology intensity) produced identical tendencies in the Visegrád countries. In the period examined, all economies showed a marked increase in the number of workers employed.

By contrast, the medium-high-tech segment (with medium-high technology intensity) showed the largest average growth with a considerable scatter among the growths of the individual national economies. The labour

market roles of high-tech industries (with high technology intensity) – with the exception of Slovakia – increased during the period, which hints at a favourable change of direction in the restructuring of the industry.

The averaged, aggregate values prove the dynamic restructuring among the workers of the industry in the Visegrád countries. This is supported by the sectoral lists as well, which present the sectors with the largest growth and decrease on the other hand.

Industries creating the largest numbers of jobs in comparison:

- NACE code 34: Vehicle, transportation equipment manufacturing (181.5%);
- NACE code 30: Business machine and computer manufacturing (156.4%);
- NACE code 25: Rubber and plastic goods manufacturing (149.3%).

Five industries where the number of workers decreased:

- NACE code 18: Clothes and fur product manufacturing and textile dyeing (62.2%);
- NACE code 17: Textile manufacturing (71.1%);
- NACE code 24: Chemicals and chemical products, artificial fibres and chemical fibres manufacturing (87.7%);
- NACE code 26: Non-metal mineral products manufacturing (90.9%);
- NACE code 27: Metal raw material production (96.2%).

In the Czech labour market a marked movement covering the entire vertical structure of industrial workers was observed. What happened in Hungary was smaller both in volume and in extent. In Poland, industrialisation affected industries with low-, medium- and high-technology intensity in a uniform, balanced way. In Slovakia an interesting phenomenon can be observed, for both the low- and the high-technology intensity industries suffered losses in the labour market, and jobs in industry were mainly created in the sectors with medium-technology utilisation.

The question arises: in the context of the above, what differences can be found between the sectoral performances with consideration of the added value?

In the interval of 8 years, the added value increased in the majority of the industries, although the rate of growth varied. Only among the low-tech industries can be found an industry (the textile industry) where the added value decreased at current prices.

In the medium-low-tech and medium-high-tech industries similar trends emerged as in the labour market processes, with a high, above average rate of growth.

Among medium-high-tech activities, the increase in added value shows a highly varied profile, from below average in Poland to outstanding in Slovakia.

The ranking of the sectors covering the Visegrád countries developed as follows in terms of added value. The sectors producing the largest growth and the smallest increase demonstrate the economic restructuring in these terms as well.

Industries with the largest growth:

- NACE code 32: Telecommunications (radio, television) and telecommunication equipment manufacturing (379.9%);
- NACE code 34: Vehicle, transportation equipment manufacturing (324.6%);
- NACE code 25: Rubber and plastic goods manufacturing (284.2%);

And industries with the smallest growth:

- NACE code 30: Business machine and computer manufacturing (152.7%);
- NACE code 18: Clothes and fur product manufacturing and textile dyeing (112.2%);
- NACE code 17: Textile manufacturing (135.5%).

The industrial restructuring of the Visegrád countries also affected the sectoral distribution of the production of added value. The Czech Republic and Hungary showed similarities not only in the comparison in terms of workers, but also in terms of added value. The marked growth of the two countries was driven by the medium-tech industries, with the low-tech and high-tech segments lagging behind. In Hungary the slower industrial growth was accompanied by more marked trends in restructuring. In Poland the increase in added value was the slowest; however, the individual industries played well-balanced roles in the moderate expansion. In the period 2000-2007 Slovakia presented the highest rate of industrial growth, with the technology-intensive industries being the engines of the growth.

On the basis of the multi-aspect comparison of the individual national economies it can be stated that the process of industrial restructuring can be observed in all four Visegrád countries. More similarities than differences can be recognised between the economies, even if unique characteristics of certain sectors can be found. The data allow the conclusion that the strong industrialisation in the Visegrád countries in the period 2000-2007 produced significant structural changes. The winners of this structural change are the mid- and high-tech sectors. This can be regarded as a favourable development, for it suggests a modernisation of the production and processing structure (neo-industrialisation).

## SPATIAL DIMENSIONS OF INDUSTRIAL RESTRUCTURING

De-industrialisation, then the new ground gained by industry, did not affect the regions of the Visegrád countries in a uniform way. The market processes of the transition period increased the inequalities in development between the individual regions. The calculations bear out the findings that among the regions outside the capitals, where tertiarisation was the strongest, the economies of the regions were able to start on a lasting growth path where industrial restructuring

had taken place, and thus jobs were retained and the region was able to become involved in the European and global division of labour.

The regions (NUTS 2 units, of which there are 35 in the Visegrád countries) were examined in terms of the changes in the number of workers in the processing industry and the volume of added value in the period 2000–2007.

The changes in the number of workers in the secondary sector on a national level were described previously, now the regional projection of the changes will be presented. Each of the four Visegrád countries shows a different configuration. Hungary and Slovakia are a couple of contrasts, for while in Hungary all the regions – although to different extents – were affected by the labour market de-industrialisation (decreasing employment in the industry), in its northern neighbour the powerful industrialisation that can be demonstrated at the national economy level made its positive effect felt in all the regions. In Hungary the largest decrease was shown by Central Hungary, as a result of the powerful tertiarisation of Budapest. A similar extent of decrease can be registered in the Southern Transdanubia. The decrease was of the smallest extent in Central Transdanubia. In Slovakia the number of jobs in the industry increased to the greatest extent in the western areas close to Bratislava, and to the smallest extent in the capital itself.

In the Czech Republic and Poland the processes in the industry have a more mixed spatial pattern. In the Czech Republic the regions of the capital and the country/rural regions are sharply divided. While in Prague the number of industrial workers decreased both in the absolute and the relative values, it increased in the other seven regions. The region of Střední Čechy (close to the capital) and the region in the Northwest (Severovýchod) benefited most from the labour market expansion of the industry. In Poland the wider surroundings of Warsaw (Mazowieckie) showed the largest increase; in addition, the number of workers in the secondary sector increased in most of the regions of the country (ten). At the same time, in six regions the number of workers in the industry decreased (in central Łódzkie, in Southeastern Małopolskie and Lubelskie, in Opolskie in Silesia, and in the Northern Zachodniopomorskie and Kujawsko-Pomorskie).

In terms of added value, each region showed an increase, although its value shows a significant scatter. It is a general phenomenon that an increase of the industrial value higher than the national average took place in the regions of the capital or around the capital (the exception being Mazowieckie in Poland). This is a particularly outstanding performance when it is taken into consideration above that central regions are characterised

by a decreasing or stagnating number of industrial workers. It can be read from the two processes that the capitals are likely to excel in attracting and retaining knowledge- and technology-intensive industries creating a high added value. In addition, the figures disclose that the regions around the capitals also enjoy the benefits of the spatial restructuring of the industry. This lends itself particularly well to measuring in the Czech Republic and Slovakia: in Střední Čechy and Západné Slovensko (Western Slovakia). These trends are less characteristic of Poland.

In the Czech Republic, in addition to the dynamic growth of the capital and the regions around it, Moravskoslezsko achieved a higher level of expansion rate.

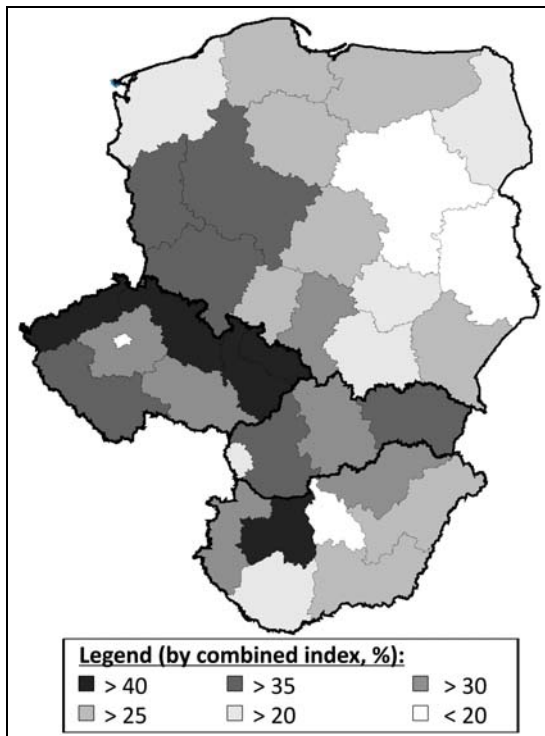
In Hungary, in terms of added value Northern Hungary and Central Transdanubia showed a higher growth, although below average; thus in this case the traditional (northeastern–southwestern) industrial axle of the country is reflected.

It is interesting that in Slovakia the dynamics of the expansion of the industrial value is given not by the region of Bratislava, but by the regions in Western and Eastern Slovakia, where the largest increase in added value could be registered in the complete Visegrád population. The most complex picture in this comparison is also provided by Poland. Among the Visegrád countries Poland has the lowest added value increase while the slower rate is better distributed in spatial terms, for the industrial added value increased in 8 regions at a rate above the national average. It is conspicuous that in these regions employment in industry also increased by a larger rate in the period examined. It follows that in these regions the expansion of production in the labour-intensive industries provided the foundation for this development.

As a result of the transformation the following regional economic configurations had developed in the Visegrád countries by 2006.

The group of the central regions is easy to separate in terms of sectoral distribution. In these regions the role of the tertiary sector is outstanding concerning both the labour market and the added value. In the case of Bratislava and the region of Warsaw (Mazowieckie) it is possible to recognise individual features. In the former industry can be regarded as significant in value creation, while in the latter the role of agriculture as an employer becomes important due to the peripheral, rural regions. This group also includes the region of Szczecin (Zachodniopomorskie).

The majority of the remaining 31 regions (27) possess secondary sectors more significant than average, considering both the labour market and the added value.



Source: author's compilation on the basis of EUROSTAT data

Figure 2. The role of the industry in the economies of the regions (2006)

In the Czech Republic and Slovakia the country regions (outside the capital) show a particularly strong, individual industrial character in both aspects. Only in Western Slovakia (Západné Slovensko), in the 'larder of the Highlands', does agriculture appear as a characteristic sector in terms of added value.

Hungary and Poland present more mixed pictures with more and more diverse regions. In Hungary the earlier (southwestern–northeastern) industrial axle is still evident, but the industrial character appears combined with agriculture also outside of these regions. It is only in Southern Transdanubia that agriculture is an employer with above average weight. In Poland, particularly in the east, the agricultural profile appears markedly and it gradually weakens towards the west. In the easternmost regions the labour market and economic roles of the primary sector are also characteristic. At the same time in Silesia (Slaskie, Dolnoslaskie) and in the south (Malopolskie), as well as in the western and southwestern regions (Lubuskie), industry has maintained its priority role.

In summary it can be stated that industry shows outstanding significance in half of the regions (in eighteen) and has a characteristic role in ten more. In the Czech, Slovakian and Silesian regions with significant industrial traditions and capacities, where it was possible to modernise the production structure via the appearance of foreign working capital in the second half of the transition period, industry continues to have an outstanding significance. The capital regions, with a dominance of the tertiary sector, differ substantially from this, and so do the eastern regions in Poland and the

southern regions in Hungary, with their agricultural characteristics.

## CONCLUSION

In the past two decades the role of industrial activities has shown significant modifications in both inter-sectoral and intra-sectoral comparison. The first half of the 1990s was characterised by strong de-industrialisation in terms of both the economy and of the labour market. The process generated severe social tensions (increase in unemployment and decrease of the income level), however, it exerted a beneficial effect on the environment due to the decreasing emissions. By the 2000s, accession to the European Union, the convergence of the Visegrád countries, the recovery of the global economy and the inflow of capital resulted in a considerable expansion of the production capacities in Central-Eastern Europe, with a simultaneous increase in the number of jobs in the industry as well as in the volume of the exports of goods. This period (2000–2007) involved a restructuring within the secondary sector. As a result of medium- and high-tech industries gaining ground, we can talk about a re-industrialisation of the neo-industrialisation type.

The regional comparison at the same time has shown that the favourable macro-economic processes cover significant spatial differences within the industry. The regions of the capitals (with high-tech activities) and the regions with a favourable geographical location and considerable industrial traditions can be regarded as the winners of the transition. In these areas foreign capital resulted in restructuring, an increase in the efficiency of labour and an expansion of production. At the same time mention must be made of the losers of the transition, of the regions where the restructuring generated by the domestic and international (capital) resources failed to materialise. Thus the share of the industry in the economies of these regions decreased or stagnated at a low level. This exerted a negative effect both on employment and the income producing capacity.

The various spatial elements, or groups of regions established as a result of the analysis, can be described in short as follows:

- The capital regions ('absolute winners') where the economy demonstrated a dynamic growth, labour is flexible and active, the services sector is wide, and production capacity is well-developed with an infrastructure serving it.
- The secondary beneficiary (potential converging) regions, which enjoy a favourable geopolitical location (mostly western), are urbanised, possess considerable and modernised industrial traditions and capacities as well as a well-developed services sector (although of smaller weight) and are thus successfully involved in the European division of labour and value creation.

- The regions that are the losers of the transition ('potential laggards') are the regions with less favourable geographical location, lying on the (inner or outer) periphery, where the economic restructuring is still ongoing, which results in an unfavourable sectoral division of the economy and unfavourable labour market conditions.

The performance of the processing industry remains of outstanding significance concerning the future sustainable economic development of Central-Eastern Europe. That

is why it is a priority task to retain and take advantage of the industrial competitive advantages, primarily against the highly developed competitors in Western Europe and North America. To achieve that, the most important tasks seem to be attracting working capital, developing an investor-friendly environment, developing the infrastructure, easing the dual company structures (by supporting SMEs) and ensuring the appropriate vocational and professional training to meet the market demand.

*"The described work was carried out as part of the TÁMOP-4.2.1.B-10/2/KONV-2010-0001 project in the framework of the New Hungarian Development Plan. The realization of this project is supported by the European Union, co-financed by the European Social Fund."*

## REFERENCES

- BARTA Györgyi: A magyar ipar területi folyamatai 1945-2000 (The spatial processes of Hungarian industry 1945-2000); Dialóg Campus, Budapest – Pécs, 2002. p. 272
- DABROWSKI, Marek – SLAY, Ben-Neneman, JAROSLAW: Beyond transition – Development Perspectives and Dilemmas; Ashgate, Hants, 2004. p. 283
- EHRlich Éva – RÉVÉSZ Gábor – TAMÁSI Péter (szerk.): Kelet-Közép-Európa: honnan-hová? (East Central Europe: From where-To where?); Akadémiai Kiadó, Budapest, 1994. p. 570
- ENYEDI György: Regionális folyamatok a poszt-szocialista Magyarországon (Regional processes in the post-socialist Hungary); p. 117-126, in: Lengyel Imre – Rechnitzer János: A regionális tudomány két évtizede Magyarországon (The two decades of regional science in Hungary); Akadémiai Kiadó, Budapest, 2009. p. 468
- HORVÁTH, Gyula: Regional Effects of the Transition in East Central Europe; p. 9-33, in: Hajdú, Zoltán: Regional Processes and Spatial Structures in Hungary in the 1990's; Hungarian Academy of Sciences, Pécs 1999. p. 354
- ILLÉS Iván: Közép- és Kelet-Európa az ezredfordulón (Central and East Europe around the Millennium); Dialóg Campus Kiadó, Budapest-Pécs, 2002. p. 362
- KISS Éva: Területi szerkezetváltás a magyar iparban 1989 után (Spatial restructuring in the Hungarian industry after 1989); Dialóg Campus, Budapest – Pécs, 2010. p. 223
- KOCZISZKY György: Területfejlesztés módszertana (Methodology of regional development); Miskolci Egyetem, Gazdaságtudományi Kar, Miskolc, 2008. p. 268
- RODWIN, Lloyd – Sazanami, Hidehiko (ed.): Industrial Change and Regional Economic Transformation – The Experience of Western Europe; Harper Collins Academic, London, 1991. p. 402
- EuroStat: Europe in figures, Yearbook 2009; Publication Office EC, Luxembourg, 2009. p. 561
- OECD: Factbook 2008, Economic, Environmental and Social Statistics; Publications, Paris, 2008. p. 293
- LANDESMANN, A. Michael – SZÉKELY P. István (ed.): Industrial restructuring and trade reorientation in Eastern Europe; Cambridge University Press, Cambridge, 1995. p. 369
- BARTA Györgyi – CZIFRUSZ Márton – KUKELY György: Újraiparosodás a nagyvilágban és Magyarországon (Reindustrialization in the world and Hungary); p. 1-20. in: Tér és Társadalom, 2008 (22. évf.) 4. sz.
- SZALAVETZ Andrea: Műszaki fejlődés, szerkezetátalakulás és munkaintenzitás (Technical progress, restructuring and labour intensity); p. 4-17. in: Külgazdaság, 2007 (51. évf.) 7-8. sz.
- Official webpage of the Statistical Office of the EU:  
<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>
- Official webpage of World Bank:  
<http://data.worldbank.org/>
- Official webpage of OECD:  
[http://www.oecd.org/document/39/0,3746,en\\_2649\\_201185\\_46462759\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/39/0,3746,en_2649_201185_46462759_1_1_1_1,00.html)