

Changing Role of Industry in the Economy in the V4 Countries – a Regional Approach

WIOLETTA KILAR, Ph.D.
ECONOMIC GEOGRAPHER; LECTURER

e-mail: W.Kilar@up.krakow.pl

TOMASZ RACHWAŁ, Ph.D.
ECONOMIC GEOGRAPHER

e-mail: T.Rachwal@up.krakow.pl

SUMMARY

The theme of the article is the changing role of industry in the economy of the countries of the Visegrád Group, further referred to as V4. The goal of the research is to delimit the regularities in terms of changes of the importance of industrial activity in the economy of the region in the conditions of moving from the industrial to post-industrial to information phase of the development and building of a knowledge-based economy. The analysis is based on the NUTS-2 regions of the V4 countries against the general changes in the European Union states, based on selected measurements of industrial potential, i.e. employment and gross value added of industry, as well as indicators of spatial concentration, structure and dynamics in industrial activity, with a special focus on those related to the knowledge-based economy, such as employment in technology and knowledge-intensive sectors. The analysis is dynamic and refers to the years 2000-2012. The research is based on the following methods: comparative analysis, explanation, quantitative analysis and cartographic analysis, all with a regional approach.

The analysis indicates the diminishing role of industry in the V4 countries compared to the other EU states. However, the participation of employment in industry is relatively high in comparison with the rest of the EU states. Concentration of industry occurs in the earlier developed areas of concentration, i.e. industrial districts. As a result, there is a need for a new interpretation of the regional policy in the V4 states, where more attention should be paid to the role of industry in shaping the economic structure.

Keywords: industry, regional economy, the Visegrád Group, economic transformation

Journal of Economic Literature (JEL) code: E24, E25, J21, L60, R10, R11, R12

INTRODUCTION

Changes in the socio-economic system in the countries of Central and Eastern Europe, associated with the introduction of a market economy based on a competition mechanism, significantly affect the functioning of companies and different sectors of the economy. This also applies to industrial activities, which were growing in completely different conditions in the centrally controlled economy. As a result, a specific enterprise developed in which economic efficiency was not the main goal. The main aim of its operation was to serve the needs of the national economy and society, through the implementation of tasks planned and defined at the central level, not the company itself (Kozmiński 1998). In addition, these companies were usually characterised by excessive employment, large volume of production, mostly of not very modern products, unadjusted to the existing demand, outdated machinery equipment and the organisational structure adapted to the prescriptive-distributive system (Błaszkiwicz, 1994; Rachwał 2002; Rachwał 2006a). As a result, at the beginning of the economic transformation industrial enterprises found themselves in a difficult situation,

which required them to undertake a restructuring process in order to increase their competitiveness on the domestic and international markets. Raising the competitiveness of these enterprises was carried out through means such as changes in the ownership structure, organisation and management structures, rationalisation of employment levels, adjusting the product portfolio to the expectations of buyers and the consequent modernisation of production assets, as well as the transformation of the sources of supply and, consequently, the sales structure (Rachwał 2002; Rachwał 2006a; Rachwał 2006b).

Today, in the era of the knowledge-based economy, improving competitiveness manifests itself primarily in the implementation of organisational, technological and product innovation: increased capital expenditures on fixed assets and innovative activities as well as intensive research and development (Kilar 2008). These changes reflect the participation of national industrial enterprises in the global economic processes and integration of industries of the countries of Central and Eastern Europe with the global industry, particularly through organisational, capital, technological, information and market links (Kilar 2010; Rachwał 2006a). They lead to the liquidation of the structural gap that occurred in connection with the implementation of fundamentally

different models of industrialisation in the countries of Central and Eastern Europe and the countries of Western Europe, where the functioning of the national economy has been based on market rules. Corporate restructuring processes also affect the change in the role of industry in the national and regional economy.

OBJECTIVES, METHODS AND SOURCES OF STATISTICAL DATA

In the light of the above premises, the theme of the article is the changing role of industry in the economy of the Visegrád Group countries referred to as the V4. The aim of the study is to determine the regularity in terms of changes in the importance of industrial activities in the regional economy, in the conditions of transition from the industrial to post-industrial to information phase of the development and building a knowledge-based economy. The analysis is conducted in the system of the NUTS-2 regions of the V4 countries compared to the general trend of change in the European Union, based on the selected measures of industrial capacity, i.e. employment and gross value added (GAV) of industry, as well as indicators of spatial concentration, structure and dynamics relating to the industrial activities, with particular emphasis on those related to the knowledge-based economy, such as employment in technology- and knowledge-intensive sectors.

Achieving and maintaining a competitive position on the domestic and foreign markets requires considering – in the strategies of the industrial enterprises – the growing role of education and science, research and development and innovation, that is, everything that is the key to achieving a competitive advantage in the knowledge-based economy. Particular attention has been paid to the spatial variability of the phenomena; for this purpose the cartographic method of presentation of the phenomena was used. The analysis is conducted in a dynamic way and covers the period 2000–2012. In these years there was a change in the classification of activities from NACE 1.1 to NACE 2.0. It was considered, however, that due to the extent of aggregation this does not affect significantly the conclusions of the analysis, which was limited to an indication of the important regularity of the analysed phenomenon.

In total, 35 NUTS-2 regions from the Visegrád Group countries were analysed. They include 16 Polish, 8 Czech, 7 Hungarian and 4 Slovak regions. Due to the restrictions on access to data the research period for certain indicators may be shorter. The difficulties in accessing the data on the functioning of the industry, mainly due to the principles of statistical confidentiality and trade secrets of companies, were widely referred to in previous works by Rachwał (2008, 2010a). The study used data from Eurostat and the Central Statistical Office of Poland (GUS).

RESEARCH ISSUES IN THE LIGHT OF THE LITERATURE

The undertaken research problems were the subject of interest of various earlier authors. The themes undertaken in the 1990s mainly referred to the objectives and scope of the economic transition in the countries of Central and Eastern Europe (Bożyk 1999; Balcerowicz 1995; Kołodko 2000; Kornai 1997; Łukawer 1994a, b; Parysek 1998; Rosati 1998) and the privatisation of state enterprises, among which a prominent place was occupied by industrial enterprises (Bałtowski 2002; Karpińska-Mizielińska & Smuga 1995; Miształ 1993, 2000, 2003). A number of researchers undertook the problem of spatial adaptation (Strykiewicz 1999), restructuring (Jakóbiak 1993) and structural changes of the industry in Poland and other countries of Central and Eastern Europe (incl. Abraham & Ese 1999; Domański 2003, 2006; Karpiński 2008; Lux 2010; Macias 2006; Paszkowski 1996; Rachwał 2009; Rochnowski 2001; Vishnevsky et al. 2011). A special place in these considerations is occupied by the issue of restructuring of selected industries (e.g. Czapliński 2011; Lizak 2009; Marszał, 1993; Pakuła 1992; Rydz & Szymańska 2002; Tkocz 2006; Wiedermann 2002), and various industrial enterprises (Pelka 1994; Rachwał 2002, 2006a, 2006b, 2007; Sudół & Karaszewski 1996). Under the conditions of the construction of the knowledge-based economy, researchers undertook the problem of the role of industry in the new conditions of economic development (Rachwał 2013; Ziolo 2009), innovation and industrial competitiveness of Poland and other European countries (Doloreux & Parto 2005; Gierańczyk 2003, 2009, 2010; Gierańczyk & Rachwał 2012; Piras et al. 2012; Rachwał & Boguś 2012; Świadek 2006), as well as changes in the branch structure of the industry of Poland (Rachwał 2010b, 2011a) and the impact of the economic crisis on its functioning (Rachwał 2011b).

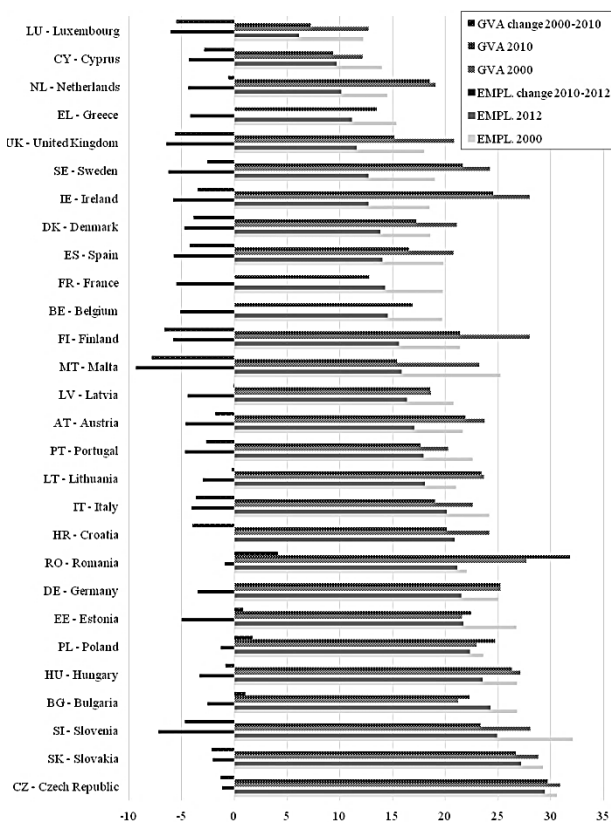
The issue of spatial diversity of industry in the regions of Poland and other European countries has been the subject of interest of, e.g., López-Bazo et al. (1999), Mikołajewicz (1995), Mrozińska (2013), Oort & Bosma (2013) and Rachwał et al. (2008a, 2008b, 2009), as well as other authors, who studied the issue of the transformation of industry in different regions (e.g. Malisiewicz & Ziolo 1994; Pakuła 2003; Rydz & Jazewicz 2001; Tkocz 2001). In these works, however, there is no comparison of industrial regions in the V4 countries in recent years of the economic crisis.

We need to pay attention to the special place occupied by competitiveness and innovativeness of the V4 regional economy in the years 2001 to 2008, as presented in the work of Golejewska (2013). The results show that capital regions tend to develop faster and that there is a significant diversity of regional competitiveness and innovativeness across the V4 countries. The main

conclusion from her cluster analysis is that the development of the regions in the Visegrád Group countries depends on their “nationality”. The author also pointed to the correlation between innovation indicators (R&D expenditures and patent applications to the EPO) and the growth of the regional GDP per capita. She points out the fact that one of the factors affecting the innovativeness of regions is the structure of the industry, although she does not devote much space to the analysis of the role of industrial activity in the process.

CHANGING ROLE OF INDUSTRY IN THE ECONOMY OF THE V4 COUNTRIES COMPARED TO OTHER EU STATES

According to the theory of the three sectors, whose authorship is attributed to A. Fisher, C. Clark and J. Fourastié (Czapliński et al. 2013, p. 176), industry, after a growth phase, loses its share in the structure of employment in favour of services. Today this regularity is observed in virtually all countries in the post-industrial stage of development. Also in the analysed period 2000-2012 in the V4 countries, as in other EU states, there was a decline in the share of industry in employment (see Fig. 1).



Source: own elaboration based on Eurostat data

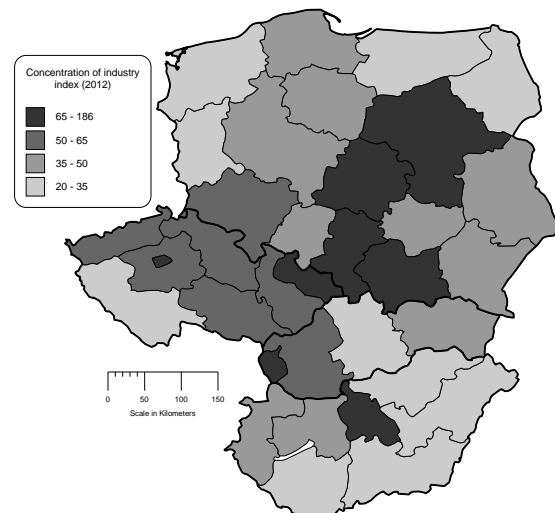
Figure 1 Changes in the share of industry in employment (EMPL) and gross value added (GVA) in the EU states: 2000-2012 (pp).

It should be noted that the decrease was much smaller in the V4 countries (in the Czech Republic by 1.1 pp, in Poland by 1.3 pp, in Slovakia by 2.1 pp and in Hungary by 3.3 pp) than in the Western EU countries, although the shares of industry in employment in Central and Eastern Europe are far greater, amounting in 2012 from 18.1% in Lithuania to 29.4% in the Czech Republic. The largest drops - by more than 6 pp - were recorded in Malta, the UK, Sweden and Luxembourg.

Somewhat different is the variation in the case of the share of industry in the gross value added. Firstly, it should be noted that this participation is generally higher than in the case of employment, especially in Western countries and Scandinavia, which follows from the structure of the industry in these countries. The dominant role in this structure is not played by the traditional labour-intensive industries, but by more modern, high-value-added industries. Secondly, it should be noted that drops in the share of industry in the countries of Central and Eastern Europe are generally very small, and in some countries (e.g. Poland, Romania, Bulgaria and Estonia) the share of industry in GVA is up by 4.2 pp. In this situation it is difficult to speak of a universal deindustrialisation of Europe, but rather of only the confirmation of the thesis of the decline in the importance of industry in the mobilisation of labour resources and consistent reindustrialisation processes in the countries of Central and Eastern Europe in the context of economic transformation.

INDUSTRY CONCENTRATION IN REGIONS OF V4 COUNTRIES

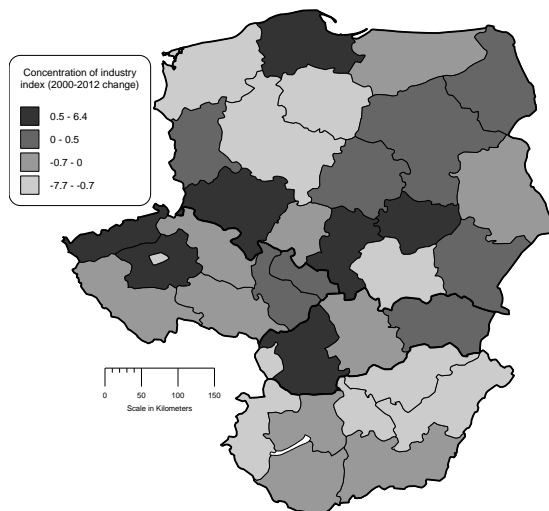
The concentration of industrial activity, measured by the number of employees in industry per 1000 km², shows a high spatial diversity in the V4 regions (Fig. 2).



Source: own elaboration based on Eurostat data

Figure 2 Concentration of industry index in the regions of the V4 in 2012

The V4 regions with a high industrial concentration include the capitals of all countries (Bratislava, Budapest, Prague and Warsaw) as well as the region of Moravian Silesia (Moravskoslezsko) in the Czech Republic and the regions of the Śląskie, Małopolskie and Łódzkie Voivodeships in Poland. In addition, the regions of the Czech Republic have much higher concentration indexes than other regions of Hungary, central Slovakia and north-western and north-eastern Poland. This spatial concentration refers to the traditionally shaped industrial districts in these countries. In the analysed period of 2000-2012, this index, however, underwent significant changes (Fig. 3).



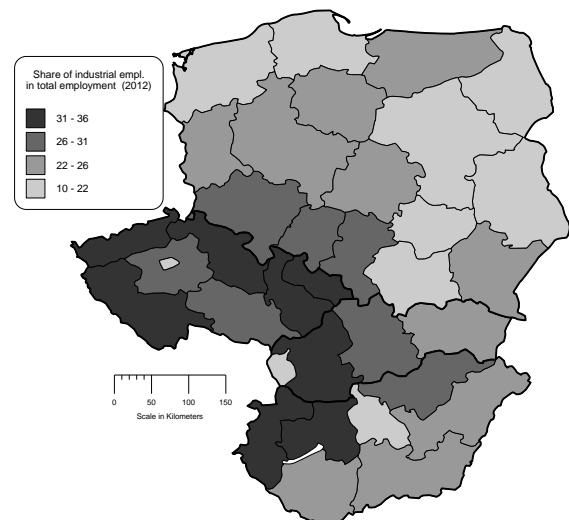
Source: own elaboration based on Eurostat data

Figure 3 Change of concentration of industry index in the V4 region in the years 2000-2012

High increases in the industry index's value were recorded in two north-western regions of the Czech Republic, Zápádne Slovensko in Slovakia and in four Polish regions: Śląskie, Dolnośląskie, Pomorskie and Świętokrzyskie Voivodeships. Noteworthy is the decrease in concentration in the capital regions of Prague, Bratislava and Budapest and other regions of Hungary. It should be noted, however, that this index was based on the number of employees in industry, and in the period considered Hungary witnessed the emergence of new and development of operating industrial enterprises that are far more technologically advanced (mainly in the automotive and consumer electronics), and also less labour intensive, which, as noted by Gierańczyk & Rachwał (2012), is probably one of the causes of dynamic growth in the participation of high-tech products in the export of Hungary in the first decade of the twentieth century. Of great importance among such changes of the spatial concentration are the investments in automotive companies in the regions of the V4 countries, belonging now among the world centres of production of cars and their components (Wójtowicz & Rachwał 2014).

PARTICIPATION OF INDUSTRY IN EMPLOYMENT AND GVA IN THE REGIONS OF THE V4 COUNTRIES

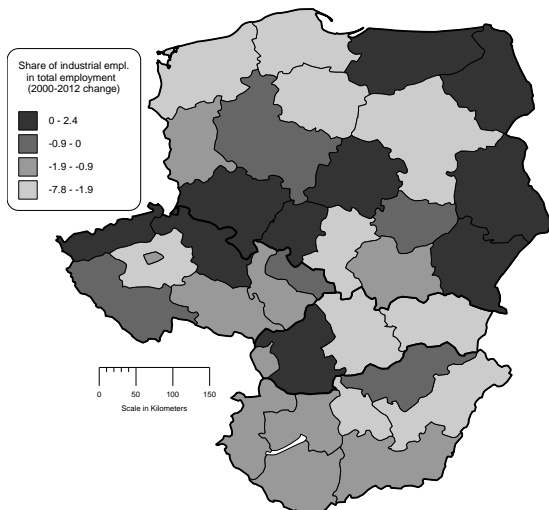
In order to capture the role of industry in the regional economy of the V4 countries indicators of industry participation in employment and GVA were used. They exhibit a large spatial diversity. The rate of participation of industry in employment in 2012 ranged from 10.6% in the region of Prague to 35.2% in the Moravian Silesia in the Czech Republic (Fig. 4).



Source: own elaboration based on Eurostat data

Figure 4 Share of industry in total employment in the V4 regions in 2012 (%)

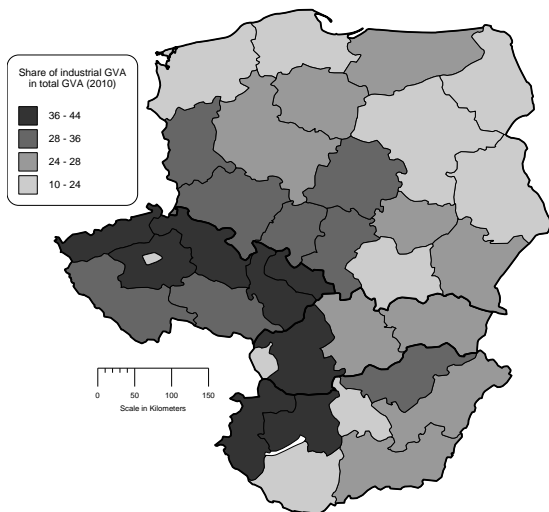
A high share of industry in employment, over 31%, is also seen in other regions of the Czech Republic, Zápádne Slovensko in Slovakia and the western regions of Hungary. The lowest rates, below 22%, are characteristic for the capital regions (besides the already mentioned Prague, also Bratislava, Budapest and Warsaw - the Mazowieckie Voivodeship) as well as the eastern (especially the Lubelskie and Podlaskie Voivodeships) and north-western regions of Poland. Although in the analysed period (2000-2012) in most regions of the V4 a drop was recorded in the share of industry in employment, even by almost 8 pp in the Śląskie Voivodeship (Fig. 5), it is worth noting that in 15 of the 35 regions an increase in employment in this sector was recorded. Assuming the base year as 100, the calculated index of dynamics ranged from 85.5 to 115.4. As a result, in some regions, mainly of eastern, central and south-western Poland, as well as the northern regions of the Czech Republic and in Zápádne Slovensko in Slovakia, a slight increase in the share of employment in industry was noted. In all the regions of Hungary there was a decline in the share of the industry in employment.



Source: own elaboration based on Eurostat data

Figure 5 Change in the share of industry in total employment in the regions of the V4 in the years 2000-2012 (pp)

The situation is somewhat different in the case of gross value added in the industry. The area with a large proportion, over 36%, includes the northern regions of the Czech Republic as well as Western Slovakia and Hungary (Fig. 6). The low shares are recorded in the capital regions, where service activities normally dominate, and in the southern and eastern regions of Hungary, eastern Slovakia and eastern Poland.

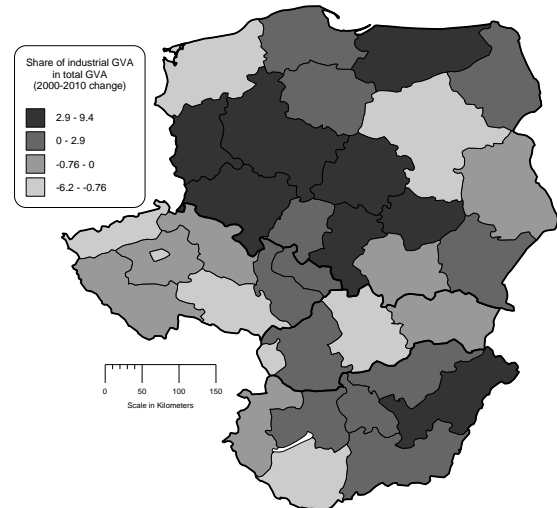


Source: own elaboration based on the Eurostat data

Figure 6 Share of industry in GVA in the V4 regions in 2010 (%)

In the period 2000-2010 in all the regions, growth was recorded in gross value added of industry at current prices, up to 3-fold. Large differences in the dynamics mean that the increase in the share of industry in GVA also applied to the regions where the share was low at the beginning of the study period (Fig. 7). Increases were

recorded in 20 of 35 regions, and so twice as many as than the increases in the share of industry in employment. The highest increases in this share were recorded in the south-western provinces of Poland (including the Dolnośląskie Voivodeship, up by 9.4 pp), the Warmińsko-Mazurskie Voivodeship (PL) and the region of Észak-Alföld (HU).



Source: own elaboration based on Eurostat data

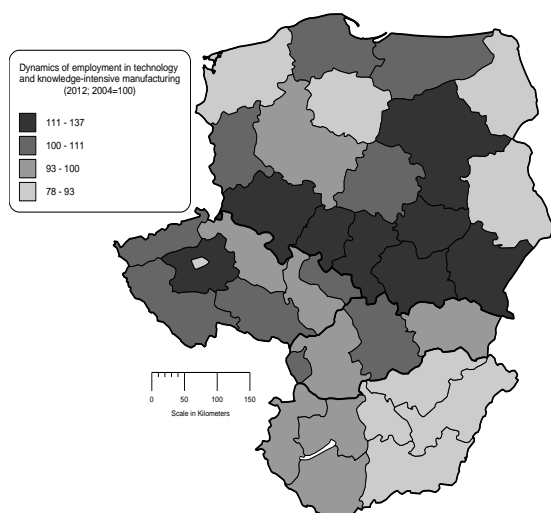
Figure 7 Change in the share of industry in GVA in the regions of the V4 in the years 2000-2010 (pp)

DYNAMICS OF THE GROSS FORMATION CAPITAL AND HTEC¹ EMPLOYMENT IN THE V4 REGIONS

An expression of changes in industry associated with the construction of the knowledge-based economy is the employment in technology- and knowledge-intensive manufacturing. In the years 2004-2012 (for which the data is available), there was a significant increase in employment in this sector in the voivodeships of central and south Poland and the region Strední Čechy (CZ). The drop in employment mainly referred to the regions of Hungary and Slovakia, as well as certain voivodeships of Poland (Fig. 8).

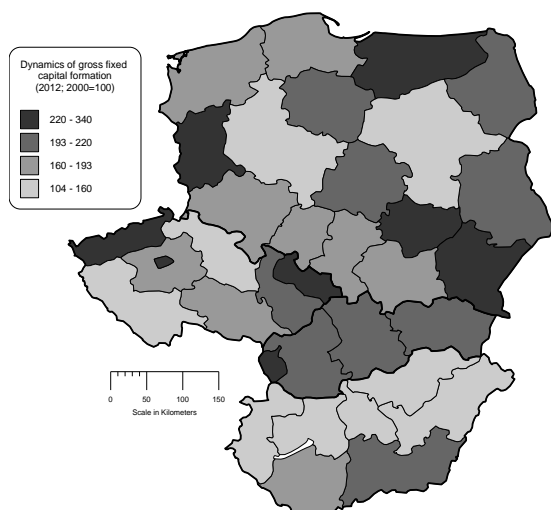
Competitiveness of industry is also affected by the level of capital investment. The analysis of the gross fixed capital formation indicates that in the years 2000-2012 the largest increases in expenditures were recorded in some regions of Poland and the Czech Republic (including the region of Prague) and in the Bratislava region (Fig. 9). Low increases were observed in the regions of Hungary, two regions of the Czech Republic and two largest voivodeships of Poland, the Mazowieckie and Wielkopolskie Voivodeships.

¹ HTEC: high-tech industry and knowledge-intensive manufacturing



Source: own elaboration based on Eurostat data

Figure 8 Growth of employment in technology- and knowledge-intensive manufacturing in the regions V4 in the years 2004-2012 (2004=100)



Source: own elaboration based on Eurostat data

Figure 9 Dynamics of gross fixed capital formation in the regions V4 in the years 2000-2012 (2000=100)

CONCLUSIONS AND RECOMMENDATIONS

The analysis points to the declining role of industry in the total employment in the V4 countries against other European countries, although the rate of decline of the participation of industry is much lower than in the countries of Western Europe. Still, the share of industry in employment is relatively high compared to other EU countries. In contrast, the shares of industry in gross value added are higher than in the case of employment, because of the increased importance of modern industries in the structure of GVA, generating high added value tax. Importantly, the regions with a high concentration of industry still include the capital regions of all the Visegrád countries and regions of the Moravian Silesia (Moravskoslezsko) in the Czech Republic as well as the Śląskie, Małopolskie and Łódzkie Voivodeships in Poland. Concentration of industry, therefore, refers to the pre-shaped areas of concentration (industrial districts).

It seems, therefore, that the traditional industrialised regions occurring in the area of the Visegrád countries, being subject to intense changes as a result of the increasing globalisation in terms of shaping the knowledge-based economy, should seek to strengthen the role of modern industries. Both employment and gross value added indicate that in the study area there are regions which have significant industrial potential, which is often the driving force behind their socio-economic development as a result of the occurrence of the multiplier effect. Conclusions from the analysis indicate the need for continued research on the changes of the regional economy in these countries because their development path differs from that of the regions of Western Europe. The results of the research can be used in the formulation of goals and objectives of regional policy in the V4 countries, in which a significant place should be taken by the goals related to industrial activities, the importance of which is still large in the economic structure.

REFERENCES

- ABRAHAM, T. & ESE, T.W. 1999. Regional development in Central and Eastern Europe: Between transformation and integration. The example of Poland. *Raumforschung und Raumordnung*, 57(2-3), 83 – 95.
- BALCEROWICZ, L 1995, *Socialism, capitalism, transformation* Central European University Press, Budapest.
- BALTOWSKI, M 2002, *Przekształcenia własnościowe przedsiębiorstw państwowych w Polsce (Ownership transformation of state enterprises in Poland)*, WN PWN, Warszawa.
- BŁASZKIEWICZ, K 1994, 'Przeobrażenia strukturalne w przemyśle polskim' ('Structural changes in Polish industry'), *Rzeszowskie Zeszyty Naukowe Prawo-Ekonomia*, vol. 16, pp. 203-211.
- BOŻYK, P 1999, *24 kraje Europy Środkowej i Wschodniej. Transformacja (24 countries of Central and Eastern Europe. Transformation)*, SGH, Warszawa.

- CZAPLIŃSKI, P 2011, 'Funkcjonowanie przemysłu przetwórstwa rybnego w Polsce w okresie kryzysu gospodarczego' ('Functioning of the fish processing industry in the period of economic crisis'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 17, pp. 114-128
- DOMAŃSKI, B 2003, 'Industrial change and foreign direct investment in the postsocialist economy: the case of Poland', *European and Regional Studies*, no. 10 (2), pp. 99-118.
- DOMAŃSKI, B 2006, 'Polski przemysł na tle przemysłu Europy Środkowej i Wschodniej' ('Polish industry against that of Central and Eastern Europe'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no 8, pp. 27-36.
- DOLOREUX, D & PARTO, S 2005, 'Regional innovation systems: Current discourse and unresolved issues', *Technology in Society*, vol.27, issue: 2, pp. 133-153
- GIERAŃCZYK, W 2003, 'Wybrane aspekty konkurencyjności polskiego przemysłu w dobie globalnych wyzwań rozwoju' ('Selected aspects of competitiveness of Polish industry in the age of global development challenges'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 6, pp.77-86.
- GIERAŃCZYK, W 2009, 'Przemysł zaawansowanej technologii a konkurencyjność przemysłowa krajów UE' ('High-tech industry and the industrial competitiveness of the EU states'), [w:] Ziolo Z & Borowiec M (eds), *Problematyka XXV Międzynarodowej Konferencji Naukowej nt. Procesy transformacji przemysłu i usług w regionalnych i krajowych układach przestrzennych*, pp. 36-37.
- GIERAŃCZYK, W 2010, 'Development of High Technologies as an Indicator of Modern Industry in the EU', *Bulletin of Geography. Socio-economic Series*, no. 14, pp. 23-35.
- GIERAŃCZYK, W & RACHWAŁ, T 2012, 'Structural changes in the industry of Poland against the background of eastern European Union states', *Quaestiones Geographicae*, no. 31(2), pp. 83–93.
- GOLEJEWSKA, A 2012, 'Innowacyjność a konkurencyjność regionalna krajów Grupy Wyszehradzkiej w latach 1999–2008' ('Innovation and regional competitiveness in the Visegrad Group, 1999–2008'). *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 19, pp. 93-115.
- GOLEJEWSKA, A 2013, 'Competitiveness, Innovation and Regional Development. The Case of the Visegrad Group Countries', *Gospodarka Narodowa*, no. 7-8, pp. 87-112.
- JAKÓBIK, W 1993, *Restrukturyzacja przemysłu w okresie transformacji* (The restructuring of industry during the transition period), Friedrich Ebert Stiftung, Warszawa.
- KARPIŃSKA-MIZIELIŃSKA, W & SMUGA, T 1995, 'Proces przekształceń własnościowych w Polsce – próba oceny' ('The process of privatization in Poland - an attempt to assess'), *Raporty Instytut Rozwoju i Studiów Strategicznych*, no. 41, pp. 189-205.
- KARPIŃSKI, A 2008, *Przemiany strukturalne w procesie transformacji Polski 1989-2003-2025* (Structural changes in the Polish transformation process 1989-2003-2025, SGH, Warszawa.
- KILAR, W 2008, 'Zatrudnienie w działalności badawczej i rozwojowej jako czynnik rozwoju gospodarki opartej o wiedzę' ('Employment in research and development as a factor influencing the growth of knowledge-based economy'), *Przedsiębiorczość – Edukacja*, no. 4, pp. 60-69.
- KILAR, W 2010, 'Zmiany potencjału korporacji informatycznych w Unii Europejskiej w latach 2004–2008' ('Changes in the potential of IT corporations in the European Union: years 2004–2008'), *Przedsiębiorczość-Edukacja*, no. 6, pp. 49-66.
- KOŁODKO, G 2000, *From Shock to Therapy: The Political Economy of Postsocialist Transformation*, Oxford University Press, Oxford and New York.
- KORNAL, J 1997, *Struggle and Hope: Essays on Stabilization and Reform in a Postsocialist Economy*, Edward Elgar, Cheltenham.
- KOŹMIŃSKI, AK 1998, *Odrabianie zaległości. Zmiany w organizacji i zarządzania w byłym bloku socjalistycznym* (Catching up. Organizational and management change in the ex-socialist block), WN PWN, Warszawa.
- LIZAK, P 2009, 'Kształtowanie się przemysłu samochodów osobowych w krajach Europy Środkowej w latach 1997–2007' ('Development of the automotive industry in the Central European countries in years 1997–2007'). *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 14, pp. 50-56.
- LÓPEZ-BAZO, E & VAYÁ, E & MORA, AJ & SURIÑACH, J 1999, 'Regional economic dynamics and convergence in the European Union', *The Annals of Regional Science*, vol. 33, issue: 3, pp. 343-370.
- LUX, G 2010, 'Location differences of services and industry: A Central European dichotomy', *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 16, pp. 29-37.
- ŁUKAWER, E 1994a, 'Transformacja systemowa w Polsce w oczach ekonomistów, cz. I' ('Systemic transformation in Poland in the eyes of economists. Part 1'), *Gospodarka Narodowa*, no. 1 (48), pp. 18-23.
- ŁUKAWER, E 1994b, 'Transformacja systemowa w Polsce w oczach ekonomistów, cz. II' ('Systemic transformation in Poland in the eyes of economists. Part 2'), *Gospodarka Narodowa*, no. 2 (49), pp. 17-21.
- MACIAS, J 2006, 'Structural Changes in Polish Industry', *Ekonomika i Organizacja Przedsiębiorstwa*, no. 7 (678), pp. 25-32.

- MALISIEWICZ, E & ZIOŁO, Z 1994, 'Zarys procesów restrukturyzacji przemysłu w województwie rzeszowskim' ('The outline of the processes of industrial restructuring in the rzeszowskie voivodship), [in:] Ziolo Z (ed), *Zachowania przestrzenne przemysłu w zmieniających się warunkach gospodarowania*, COMSN, Komisja Geografii Przemysłu PTG, Kraków-Warszawa, pp. 126-131.
- MARSZAŁ, T 1993, 'Some remarks on the Polish textile and clothing industries – prospects and policy recommendations', *Problems in Textile Geography*, no. 7, pp. 33-50.
- MIKOŁAJEWICZ, Z 1995, 'Procesy restrukturyzacji przemysłu w regionach' ('The processes of industrial restructuring in the regions'), *Studia i monografie Uniwersytetu Opolskiego*, nr 222, Opole.
- MISZTAŁ, S 1993, 'Regionalne zróżnicowanie procesu prywatyzacji przemysłu w Polsce' ('Regional differentiation of the privatization process of the industry in Poland'), *Przegląd Geograficzny*, vol. LXV, no. 3-4, pp.255-277.
- MISZTAŁ, S 2000, 'Regionalne efekty procesu prywatyzacji przemysłu w Polsce w latach 1989-1995' ('Regional effects of the privatization of the industry in the years 1989-1995'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 1, pp. 23-34.
- MISZTAŁ, S 2003, 'Transformacja własnościowa działalności przemysłowej w Polsce według województw' (The ownership transformation of industrial activity in Poland by voivodship'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 5, pp. 9-30.
- MROZIŃSKA, A 2013, 'Zmiany strukturalne w przemyśle przetwórczym według województw w latach 1999–2010' (The structural changes in the manufacturing by voivodeship in the years 1999–2010), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 21, pp. 157-172.
- OORT, FG & BOSMA, NS 2013, 'Agglomeration economies, inventors and entrepreneurs as engines of European regional economic development', *The Annals of Regional Science*, vol. 51, issue: 1, pp. 213 – 244.
- PAKUŁA, L 1992, 'Postępy restrukturyzacji przemysłu w wybranych gałęziach przemysłu w okręgach Górnośląskim, Częstochowskim i Bielskim' (Advances in industrial restructuring in some industrial branches in the districts of Upper Silesia, Częstochowa and Bielsko), *Folia Geographica, Series Geographica-Oeconomica*, vol. XXIV, pp. 37-49.
- PAKUŁA, L 2003, 'Tendencje restrukturyzacji przemysłu Górnośląskiego Okręgu Przemysłowego w dobie transformacji' ('Trends in industrial restructuring of Upper Silesian Industrial District in the era of transformation'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 6, pp. 59-66.
- PARYSEK, JJ 1998, 'Efekty procesu transformacji społeczno-gospodarczej w Polsce. Bilans okresu 1989-1996' ('The effects of the socio-economic transformation process in Poland. The balance of the period 1989-1996'), [in:] Parysek, JJ & Rogacki H (eds), *Przemiany społeczno-gospodarcze Polski lat dziewięćdziesiątych*, Bogucki Wydawnictwo Naukowe, Poznań, pp. 25-45.
- PASZKOWSKI, M 1996, *Zmiany strukturalne przemysłu. Metody badania i tendencje światowe a transformacje w krajach Europy Środkowo-Wschodniej* (Structural changes in the industry. Research methods and global trends and transformations in the countries of Central and Eastern Europe), Wyd. UJ, Kraków.
- PEŁKA, B 1994, *Restrukturyzacja przedsiębiorstwa przemysłowego, cz. I i II* (The restructuring of industrial company. Part 1 & 2), Instytut Organizacji i Zarządzania w Przemysle „Orgmasz”, Warszawa.
- PIRAS, G & POSTIGLIONE, P & AROCA, P 2012, 'Specialization, R&D and productivity growth: evidence from EU regions', *The Annals of Regional Science*, vol. 49, issue: 1, pp. 35 – 51.
- RACHWAŁ, T 2002, 'Proces restrukturyzacji przedsiębiorstw przemysłowych Polski Południowo-Wschodniej (na wybranych przykładach)' ('The process of industrial enterprises restructuring in south-east Poland (based on selected examples)'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 4, pp. 79-88.
- RACHWAŁ, T 2006a, 'Efekty restrukturyzacji wybranych przedsiębiorstw przemysłowych Polski Południowo-Wschodniej' (Effects of industrial enterprises restructuring in south-east Poland), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 9, pp. 98-115.
- RACHWAŁ, T 2006b, 'Restrukturyzacja technologiczna przedsiębiorstw przemysłowych Polski Południowo-Wschodniej jako czynnik podnoszenia ich konkurencyjności na rynku międzynarodowym' ('Technological restructuring of industrial enterprises in south-east Poland as a factor improving their competitiveness on the international market'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 8, pp. 192-203.
- RACHWAŁ, T 2007, 'Zmiany powiązań przestrzennych przedsiębiorstw przemysłowych Polski Południowo-Wschodniej w latach transformacji systemu gospodarowania' ('Changes in spatial links of industrial enterprises of south-east Poland in the transformation of economic system'), [in:] Lach, J & Borowiec, M & Rachwał, T, *Procesy transformacji społeczno-ekonomicznych i przyrodniczych struktur przestrzennych*, Wydawnictwo Naukowe, Kraków, pp. 325-351.
- RACHWAŁ, T 2008, 'Problematyka badawcza funkcjonowania przedsiębiorstw przemysłowych' ('Research problems concerning the operation of industrial enterprises'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 11, pp. 53-85.

- RACHWAŁ, T 2009, 'Changes of Industry in the Countries of Central and Eastern Europe Under Conditions of Economic Transformation and European Integration', *Geopolitical Studies*, vol. 15, pp. 133-164.
- RACHWAŁ, T 2010a, 'Problematyka badawcza zmian powiązań przestrzennych przedsiębiorstw przemysłowych' ('Research problems concerning the changes in spatial links of industrial enterprises'), *Studia i Prace Uniwersytetu Ekonomicznego w Krakowie*, no. 8, Kraków, pp.157-176.
- RACHWAŁ, T 2010b, 'Struktura przestrzenna i działowa przemysłu Polski na tle Unii Europejskiej w dwudziestolecie rozpoczęcia procesów transformacji systemowej' (Spatial and division structure of Polish industry against the European Union in the twentieth anniversary of the start of the transformation processes'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 16, pp. 105-124.
- RACHWAŁ, T 2011a, 'Transformations of the Employment Structure as an Expression of the Transformation of Polish Industry Against the Background of the European Union', *Bulletin of Geography. Socio-economic Series*, no. 15 / 2011, pp. 5-25.
- RACHWAŁ, T 2011b, 'Wpływ kryzysu na zmiany produkcji przemysłowej w Polsce' ('The impact of crisis on changes in industrial production in Poland'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 17, pp. 99-113.
- RACHWAŁ, T 2013, 'Rola przedsiębiorstw przemysłowych w rozwoju gospodarki opartej na wiedzy' (The role of industrial enterprises in the development of the knowledge-based economy'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 21, pp. 189-211.
- RACHWAŁ, T & BOGUŚ, M 2012, 'The Competitiveness of Industrial Enterprises in European Union Countries' [in:] Krstić, B & Chodyński, A (eds.), *Current problems of Competitiveness Improvement in National Economies and Enterprises*, Faculty of Economics, University of Niš, Serbia, Niš, pp. 133-156
- RACHWAŁ, T, WIEDERMANN, K & KILAR, W 2008a, 'Wydajność i koszty pracy jako czynniki konkurencyjności przemysłu regionów Polski w Unii Europejskiej w ujęciu regionalnym' ('Productivity and labour costs as competitiveness factors of the Polish regions in the European Union in a regional approach'), *Rozprawy Naukowe Instytutu Geografii i Rozwoju Regionalnego Uniwersytetu Wrocławskiego*, no. 3, pp. 79-89.
- RACHWAŁ, T & WIEDERMANN, K & KILAR, W 2008b, 'Zmiany potencjału przemysłowego województw Polski wschodniej na tle regionów Unii Europejskiej' (Changes in the industrial potential of eastern Poland voivodships against the regions of the European Union), [w:] Fedan R., Makiela Z. (red.), *Przyrodniczo-ekonomiczny potencjał regionów na pograniczu polsko-ukraińskim*, PWSZ w Jarosławiu, Stowarzyszenie Instytut Polsko-Ukraiński, Jarosław, pp. 287-306.
- RACHWAŁ, T & WIEDERMANN, K & KILAR, W 2009, 'Rola przemysłu w gospodarce układów regionalnych Unii Europejskiej' ('The role of industry in the economies of the European Union regional systems'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 14, pp. 31-42.
- ROCHNOWSKI, H 2001, 'Zmiany strukturalne w przemyśle Polski w procesie integracji z Unią Europejską' ('Structural changes in the Polish industry in the process of integration with the European Union'), [in:] Rajman J (ed), *Polska – Europa. Gospodarka, przemysł*, Wydawnictwo Naukowe AP, Kraków, pp. 87-108.
- ROSATI, DK 1998, *Polska droga do rynku* ('Polish path to the market'), PWE, Warszawa.
- Rydz, E & Jażewicz, I 2001, 'Przemiany strukturalne przemysłu na przykładzie małych miast Pomorza Środkowego' ('Structural changes in the industry on the example of the small towns of the Central Pomerania'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 3, pp. 71-86.
- RYDZ, E & SZYMAŃSKA, W 2002, 'Funkcjonowanie zakładów przemysłu obuwniczego regionu śląskiego w zmieniających się warunkach gospodarowania' (The functioning of the footwear industry plants in the Śląsk region in changing economic conditions', *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 4, pp. 43-56.
- SUDOŁ, S & KARASZEWSKI, W (eds.), 1996, *Proces transformacji rynkowej przedsiębiorstw (w świetle badań empirycznych)* (The process of market transformation of enterprises (in the light of empirical research)), Wyd. UMK, Toruń.
- STRYJAKIEWICZ, T 1999, *Adaptacja przestrzenna przemysłu w Polsce w warunkach transformacji* (The spatial adaptation of industry in Poland in the conditions of a transformation). Wydawnictwo Naukowe UAM, Poznań.
- ŚWIĄDEK, A 2006, 'Przestrzeń a innowacyjność przemysłu w polskich regionach' (Area and innovative industry in the Polish regions), *Przegląd Organizacji*, no. 12, pp. 18-21.
- TKOCZ, M 2001, *Restrukturyzacja przemysłu regionu tradycyjnego* (The restructuring of industry of the traditional region, Wydawnictwo Uniwersytetu Śląskiego, Katowice.
- TKOCZ, M 2006, 'Efekty restrukturyzacji górnictwa węgla kamiennego w Polsce' ('The effects of the coal mining restructuring in Poland'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 9, pp. 28-39.
- VISHNEVSKY, V, ALEKSANDROV, I & POLOVYAN, A 2011, 'Scenarios of the old industrial regions' development: selecting the methodology', *Environment, Development and Sustainability*, vol. 13, issue: 1, pp. 65 – 78.

- WIEDERMANN, K 2002, 'Restrukturyzacja i modernizacja hutnictwa żelaza GOP po 1989 r.' ('Restructuring and modernization of the steel industry of Upper Silesian Industrial District after 1989'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 4, pp. 115-128.
- WÓJTOWICZ, M & RACHWAŁ, T 2014, 'Globalization and new centers of automotive manufacturing – the case of Brazil, Mexico, and Central Europe', *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 25 (in print).
- ZIOŁO, Z 2009, 'Rola przemysłu w procesie kształtowania społeczeństwa informacyjnego' ('Role of industry in the formation of an information society'), *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, no. 13, pp. 11-20.