

The Impact of Manufacturing Branches on Regional Differentiation of Employment in the Slovak Republic¹

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Abstract

Regional disparities resulting above all in lasting disproportional location of industrial capacities have shaped Slovakia's development in recent years. The goal of the paper is to map regional employment differentiation in SR according high-tech and low-tech manufacturing sectors. To achieve this we worked with recent statistical regional data. We concentrated on a question if there exists a substantial relation between location of high-tech manufacturing and employment growth in selected regions. According our survey high-tech sector did not prove a very strong impact on total employment. However considering the changing structure of manufacturing in the future it will represent one of the most decisive issues of competitive growth.

Keywords: *employment, high-tech and low-tech manufacturing, regional differentiation, regional statistical data, regional econometrics*

JEL Classification: C10, L6, R3, R10

1. Introduction – The Structure of Slovak Manufacturing According its Technology Intensity

Regional differentiation is a very important issue, what influences the entire character of socio-economic processes in the Slovak Republic. After the revolution in 1989 command economy was changed on more open economy. This turnover in the Slovak economy has brought turbulent positive and negative changes. And one of these mostly negative changes was not only very abrupt regional differentiation of the Slovak Republic, but also a very immense increase of regional disparities.

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The question is if the regional differentiation of the Slovak Republic is influenced by industrial agglomerations and industrial districts or by other factors. Since the work of Alfred Marshall (1920) the studies on different industrial clusters wanted to define the dimensions, which help to understand the contexts on which different firms operate and what is behind the industrial concentration of different clusters and industrial districts. Michael Porter (1990) used in this context defining cluster externalities a different heading: competitive advantage. He explained firm's competitive advantage in certain areas as a result of the interaction of factors conditions, demand conditions, related and supporting industries or firm strategy, structure or rivalry.

We will concentrate our ideas on Porters (1990) thinking based on related and supporting industries. Several types of industries are the influential backbone of our new economic development, but on the other hand also the fundamental factors occurring our regional economic disparities. What is necessary to take in account is the change what is observable after transition period in our economy. The change is based on interesting shift changing economic climate from industries supporting low technologies to industries supporting medium low technologies (this problem is solved in the second part of the paper).

Several authors have reported about the importance of high-tech² branches for economic development during recent years (Rausch, 1998). There is a wide range of reasons for the significance of these branches as was quoted in several studies.

The first one is that high-tech firms innovate more and such firms tend to gain market share, create new product markets, and use available resources more productively.

The second reason is that high-tech firms are associated with high value-added production and success in foreign markets, which generally helps to support higher remuneration to the people they employ. And last but not least industrial R&D performed by high-tech industries has other spillover effects. It is also connected with the shift in the type of employment towards high tech employment in industry and a decline of employment in the heavy industry.

² There is no universally accepted definition of *high-tech* nor is there a standard list of industries considered to be high-tech (Hatzichronoglou, 1997). The OECD prepared a classification consisting of two lists: one for manufacturing industries (the sector approach) and another for manufactured goods (the product approach), which was elaborated as a supplement and was more appropriate for analysing international trade. The following four groups in the manufacturing industry were identified according to technology intensity: 1. *high-technology*; 2. *medium-high-technology*; 3. *medium-low-technology*; 4. *low-technology*

Due to available NACE 2digit level data uses this article the Eurostat and OECD breakdown of the manufacturing industry according the technology intensity (EC, 2002; EUROSTAT, 2004), which is specified in methodological notes.

2. Industrial Development in the Slovak Republic with Special Impact on Technology Intensity

The industry in the Slovak Republic has undergone dramatic changes. After 1989, the branch structure of the Slovak economy has been changing fundamentally. At the beginning of the transformation, industry had to adjust their production to market demand and to adapt to the redirection of exports and imports from the Council for Mutual Economic Assistance (CMEA) to European Union markets.³ This period saw the biggest decrease in the Slovak industrial production and employment.⁴

Along with its declining GDP share (25.1% in 1995; 23.6% in 2003) the branch structure of manufacturing as the decisive part of the Slovak industry has been changing considerably. In recent years, the structure of the Slovak industry has begun to show the first signs of convergence with those of developed European countries. In spite of this, the share of labour and energy-intensive branches is significantly higher, while the share of more sophisticated production has remained relatively low. From 1993 to 2003 the share of the transport equipment industry has changed most significantly. Its share of total manufacturing production rose from 4.6% in 1993 to 26.0% in 2003. Due to an expanding automotive industry (Brzica, 2003) this sector has been the largest and most important manufacturing branch in recent years. While the automotive industry is not a high-tech industry, it is a major driver of new technologies and the diffusion of innovation. Its close relationship to other manufacturing branches (chemicals, plastics, electrical and electronic parts, etc.), contributes to rapid diffusion of new technologies (CEC, 2004).

Compared with the EU average, the Slovak Republic has a smaller proportion of people working in the high-tech and medium high-tech sectors of manufacturing and services (Baláž, 2003). In the Slovak Republic only 0.8% of the total employment sector were employed in high-tech manufacturing. Compared to

³ There was a strong share of industries featuring a lower degree of procession and high raw material, energy and transport intensity. Therefore a shift from a predominantly resource-based manufacturing towards labour and energy less intensive branches was attempted. Structural changes were concentrated on a few important industries, which depended on CMEA markets to a large extent, such as mechanical engineering (above all the arms production), transport equipment, the metal industry, food industry. At the beginning of transition the high above-average share of coke and refineries was most prominent, together with a considerable surplus in mechanical engineering. Being an important place for arms production in the CMEA, the problem of modernizing the mechanical engineering sector was aggravated by the problem of conversion. The majority of substantial problems of less developed regions with high unemployment rates problems could be derived from the conversion.

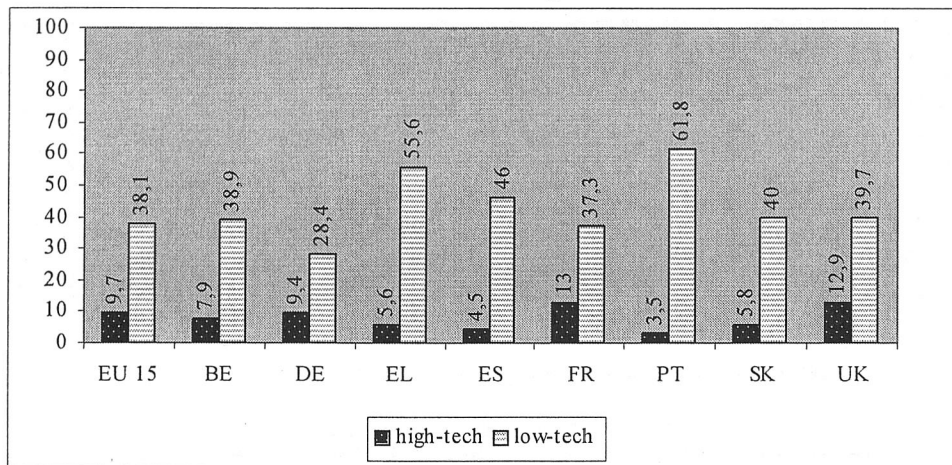
⁴ In percentage terms in 1992 the production of the Slovak industry achieved only 64.9% of its 1989 standard.

total manufacturing in the EU however, the high-tech and medium high-tech industries did marginally better in terms of employment growth (Eurostat, 2003).

Comparing the share of high-tech and low-tech manufacturing on total manufacturing employment in SR with selected more and less developed EU countries in 2000 gives the Graph 1.

Graph 1

Share of High-tech and Low-tech Manufacturing in 2000



Note: In 2000 data for all compared countries were available.

Source: EUROSTAT (2004).

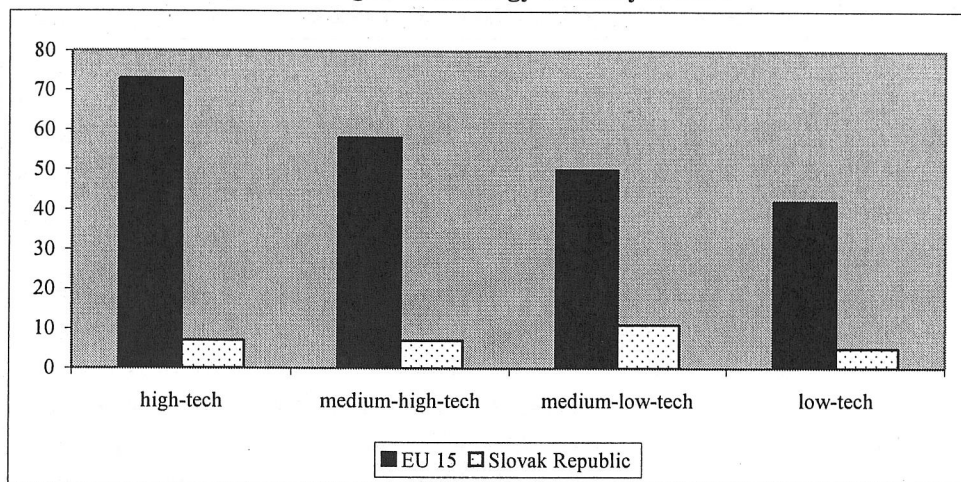
The share of high-tech manufacturing in SR in 2000 was not only lower than in more developed EU countries, but also as EU average. On the other hand, compared with less developed EU countries such as Greece, Spain and Portugal, the Slovak Republic achieved better results.

There are no significant changes in the employment share of technology more intensive industries from 1995 to 2003 in SR. Their share of total manufacturing employment dropped from 39.3 in 1995 to 37.4% in 2003. The share of low-tech industries has been shrinking in favour of medium-low-tech industries. In spite of this, more than 60% of employees in manufacturing were still employed in medium-low-tech and low-tech branches. During the entire period the share of high-tech industries on total manufacturing production has increased very modestly. The most important reason for the most significant expansion of medium-high-tech industries has been the development of the automotive industry. However the technology level of the Slovak industry with a more than 50% share of medium-low-tech and low-tech industries has still remained insufficient. The comparison of labour productivity with the EU average in 2000 also reflects the underdeveloped technological level of the Slovak manufacturing (see Graph 2).

Labour productivity in all four groups of manufacturing in the Slovak Republic was significantly below the EU average. Besides the mentioned these unfavourable conditions can be attributed to low research and development expenditures in the long term.

Graph 2

Labour Productivity According to Technology Intensity in 2000



Source: EUROSTAT (2004).

These explanations help us to see not only the differences among high-tech sectors and low-tech sectors in different countries in the EU, but also in the Slovak Republic. Understanding the situation in the Slovak Republic also requires concentrating on the regional differentiation influencing the recent allocation of industrial enterprises and employment in industry. It reflects also the dominant position of Bratislava district.

Table 1

Selected Indicators in Industry in 2002 (SR)

Regions	Turnover in Current Prices	Labour Productivity for Turnover	Average Number of Employees	Average Monthly Wage per Employee
Bratislava	463 327	4 471 113	103 627	19 074
Trnava	91 067	1 952 337	46 645	13 941
Trenčín	115 038	1 237 847	92 934	12 828
Nitra	85 205	1 511 428	56374	12 468
Žilina	117 315	1 767 147	66 387	13 469
Banská Bystrica	90 380	1 316 648	68 644	12 656
Prešov	64 462	1 182 885	54 496	11 430
Košice	138 342	2 140999	64 616	15 668
Total	1 165 135	22 104 191	553 721	14 303

Source: VEDA (2004), p. 85.

3. Regional Differentiation in Employment

This transitional shift is influenced also by human resources, which are characterised by good educational level, but by insufficient professional skills and knowledge reflecting new market conditions and investors demands. There exist strong differences among qualified structural characteristics of human resources not only between Bratislava and other territories, but also among other individual territories of the Slovak Republic.

Regional differentiation is also deeply influenced by social mobility in the Slovak Republic. Social mobility is not very strong from different reasons – especially as the consequence of typical traditional Central European life style, conservative reality market. Certain flexibility in mobility is recorded in localities, where large cities and towns are located.

What concerns the negatives of regional differentiation we need to speak about total decrease of demographic vitality in the Slovak Republic and increase of regions with insufficient demographic situation. These regions slow down also their social and economic development and dynamics. They have insufficient labour market and especially in small towns is visible this retardation tendency. What concern the positives of regional differentiation we must admit there exist big industrial differentiation and its large territorial and regional diffusion. Labour market is and will be crucial for young people, who move to bigger cities. They do not want to stay in underdeveloped regions from simple reasons; they will not find job possibilities and conditions there. All those negative side effects will influence regional disparities also in future. In these regions is difficult to support also the development of SMEs and their supportive programs, because there is also not very good infrastructure.

The 1989 experienced strong differentiation among regions. The concentration of economic activities and consequently population had an expressive selective character. The consequence of the concentration resulted in the formation of large cities and towns. Regions were polarized according urbanization centre – lines and tracks. Non-urbanized spaces were developed as marginalized regions, and especially neighbouring zones situated in the south and north and in some other regions of the east. In that time an integrated waistline of problematic regions was formed, where the situation gradually deteriorated. On the other pole of regional development were located such towns as Bratislava, Košice, Banská Bystrica and Trnava.

When analysing the influences of regional differentiation we must take in account the question of regional difference in GDP (Falt'an and Pašiak, 2004), especially after revolution, because its definition starts to be important in terms of regional structure, innovation activity, regional vicinity and manpower training.

The foundation and activity of new entrepreneurial subjects, physical and legal entities, had different dynamics among the regions. This fact influences the difference in individual regions. The employment situation on the territory of Slovakia was characterized as conjectural unemployment (Gleave and Palmer, 1980). This unemployment is the result of an insufficient demand for manpower on the territory of Slovakia. The difference in unemployment on the NUTS 3 level reaches more than 25 percentage points in that case. The lowest rate of unemployment is in the Bratislava region (from 2.7 to 3.6%) and the highest is in the Rimavská Sobota region (28.6%) and Revúca (28.4%).

Survey Study

The following survey study intends to be pioneering, in that we wish to explain the different allocation of the high-tech sector industry and the low-tech sector industry and consequently employment in those sectors with regard to special relations among those two branches (if there is a real relation between employment in high tech sectors in different regions and consequently if this relation concerns services). Industrial regional differentiation was not investigated in such a dimension before and from this point of view we embarked on a new and hypothetical investigation.

The database we worked with has several limitations. Most of the data came from the Statistical Office of the Slovak Republic and some data (on unemployment) came from the National Employment Institute of the Slovak Republic. All of the data was quarterly from the first quarter of 1997 to the third quarter of 2004 and were separate for each region (8 regions).⁵

The data from the Statistical Office of the Slovak Republic were based on data from companies with 20 or more employees. The main problem with these data is the fact that companies were put into regions based on the location of headquarters, and not based on the location of each production department. This leads to extremely high employment figures in Bratislava region, where most of the headquarters are located.

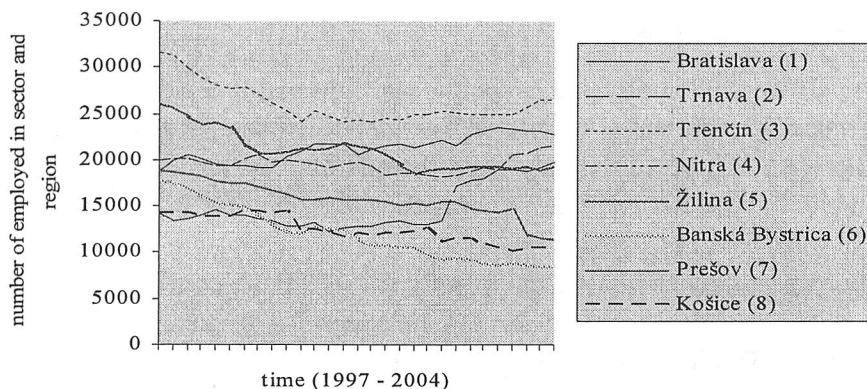
⁵ All of the estimations in this work were done by least squares method. This method was chosen due to status of available data. Data are spatial time series, which cause consequently technical problems with spatial methods. Other factor discriminating spatial methods is number of regions, which is only eight, while time series is 31 units (quarters) long. Also, equations results show very small impact of neighbouring regions by rook matrices. From these reasons, we chose simple linear ordinary least squares model for time series, with variables separate for each region. Explanatory variables are mainly concerning employment in given region and sector, or employment in neighbouring regions. If regions showed similar statistical behaviour, their separate variables were merged into one variable, thus appearing as one region. If a region's variable is not appearing, it is not statistically significant (p-value bigger than 9%, no variables with p-values between 1% and 9% appeared during estimations).

The goal of this study was to explain employment in several sectors of the economy by employment in the high-tech sector. To achieve this and due to the available data, we had to use several new variables. The definitions of high-tech and low-tech sectors are found in the appendix. Both of them are portions of industry.

Explanation of Variables

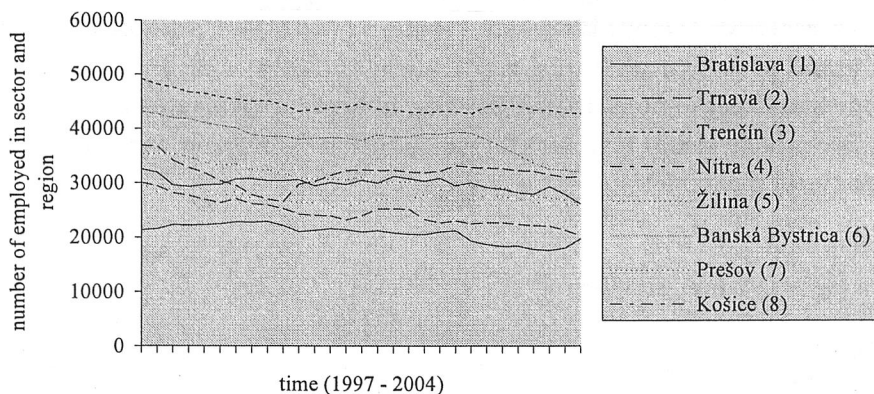
Graph 3

High-tech Employment



Graph 4

Low-tech Employment



The first variables were total employment in all sectors of the economy. The second auxiliary variable: the number of total employment minus high-tech employment was introduced. The third variable deals with employment in services, and was calculated as total employment minus employment in industries. Employment in primary sector (mainly agriculture) has a steady trend with slight decrease over last 10 years and its total is relatively small. Therefore its inclusion

in services does not affect results of the model. The fourth variable is employment in high-tech industry of the region plus half of the employment in high-tech industry in neighbouring regions (emp_high_tech_plus_half_neighbours). This explains effect of high-tech employment on neighbouring regions. These variables proved to be explanatory. As can be seen from the graphs below, low-tech and high-tech employment enjoyed rapid development over recent years (from 1997). While high-tech development was different among regions, low-tech employment simultaneously decreased in all regions.

Regional Differentiation

The differentiation of variable coefficients appeared in most of the 8 regions in Slovakia. Region No. 1, Bratislava, is widely considered the most developed and therefore behaves differently from the rest of Slovakia. Another region is region No. 8 – it is Košice. The city of Košice leads the way in some production activities and services. Trnava, region No. 2, is also interesting. It is the only region bordering with Bratislava and therefore is sometimes considered its suburb. Some of the statistical results of Trnava are somewhat surprising. Other regions are Trenčín (3), Nitra (4), Žilina (5), Banská Bystrica (6) and Prešov (7). The behaviour of these regions cannot be described as easily as the others.

Summarization

Due to this regional differentiation, some coefficients of the model differ between regions. Overall, Bratislava (1) has very positive coefficients; Košice (8) also has positive coefficients, and Trnava (2) has both positive and negative coefficients. Other regions differ from time to time. In the analysis below, number after variable names represent for which region the value is applicable.

Results of the model:

Equation 1

Estimating: emp_minus_high_tech	Estimate	T value	pr(> t)
(Intercept)	63224	9,2	0
emp_high_tech_region1	13	35,9	0
emp_high_tech_region8	3,5	8,8	0
emp_high_tech_plus_half_neighbors2345678	1,1	8,3	0

Residual standard error: 20614 on 244 df. R2: 0,93 R2 adj: 0,93

This equation 1 explains total employment minus employment in high-tech industries by employment in high-tech industry. As can be seen, the rise of employment in high-tech in Bratislava leads to an increase in total employment by 13 people. Increase in Košice increases employment in region of Košice by 4.6

people (3.5 "special" Košice effect plus 1.1 Slovakia wide effect). In other regions, the coefficient is 1.1. Also if high-tech employment in a neighbouring region rises by 2 people, employment in that region rises by 1.1 people. By this simple equation, 93% of the total employment is accounted for.

Equation 2

Estimating: emp_low_tech	Estimate	T value	pr(> t)
(Intercept)	13177	19,1	0
emp_high_tech_region1	0,8	20,9	0
emp_high_tech_region2	-0,49	-14,4	0
emp_high_tech_region3	0,5	26,6	0
emp_high_tech_region5	0,17	7,1	0
emp_high_tech_region8	0,92	18,5	0
emp_high_tech_neighbors2345678	0,27	26,9	0

Residual standard error: 2506 on 241 df.

R2: 0,90 R2 adj: 0,90

This equation 2 explains employment in the low-tech sector by employment in the high-tech sector. Overall, this equation caused many problems and there was no possibility of grouping regions together. The direct impact of high-tech employment on low-tech employment was 0.8 in Bratislava (1), 0.9 in Košice (8), 0.5 in Trenčín (3), 0.2 in Žilina (5). In Trnava (2) the coefficient is -0.5. This negative value is influenced by the special status of Trnava as the only neighbouring region of Bratislava (1). The impact in Nitra (4), Banská Bystrica (6) and Prešov (7) proved to be zero statistically. Also the rise in high-tech employment in neighbouring regions by 1 results in the rise of low-tech employment in the region by 0.3. This equation accounts for 90% of low-tech employment.

Equation 3

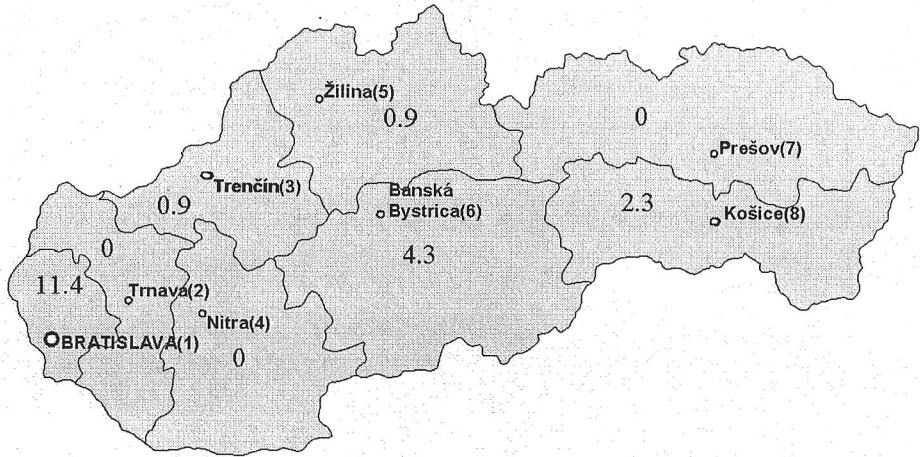
Estimating: emp_total	Estimate	T value	pr(> t)
(Intercept)	121660	81,6	0
emp_high_tech_region1	11,4	79,7	0
emp_high_tech_region8	2,3	9,5	0
emp_high_tech_35	0,88	9,1	0
emp_high_tech_region6	4,3	18,4	0

Residual standard error: 14770 on 243 df.

R2: 0,96 R2 adj: 0,96

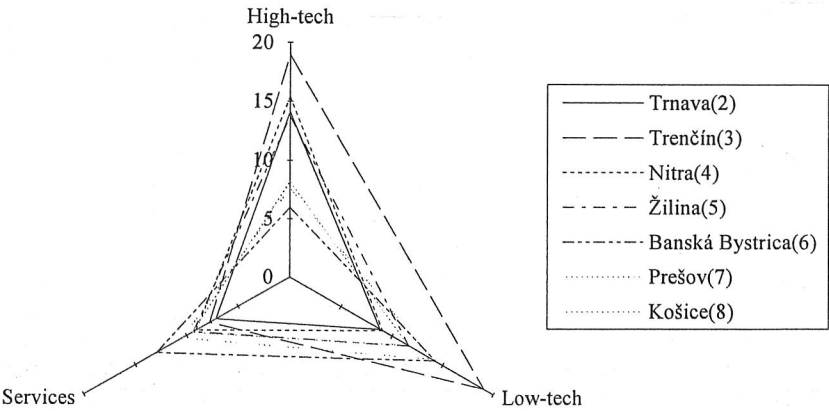
This equation 3 explains total employment by high-tech employment. As can be seen, if high-tech employment increases by 1 person, total employment increases by 11 people in Bratislava (1). In Košice (8) it is 2.3 and in Banská Bystrica (6) it is 4.3. Trenčín and Žilina proved to be statistically homogenic and have common value of 0.9. Other regions did not prove to be statistically different from zero. Employment in neighbouring regions did not prove to be non-zero. Overall, this equation accounts for 96% of total employment.

Picture 1
Influence of High-tech Sector Employment on Total Employment



As was shown, all equations explain more than 90% of employment in the sectors. Overall, this model simply describes employment in Slovakia by employment in the high-tech sector. This study has proved that the high-tech sector needs to be considered when modelling employment development in various sectors.

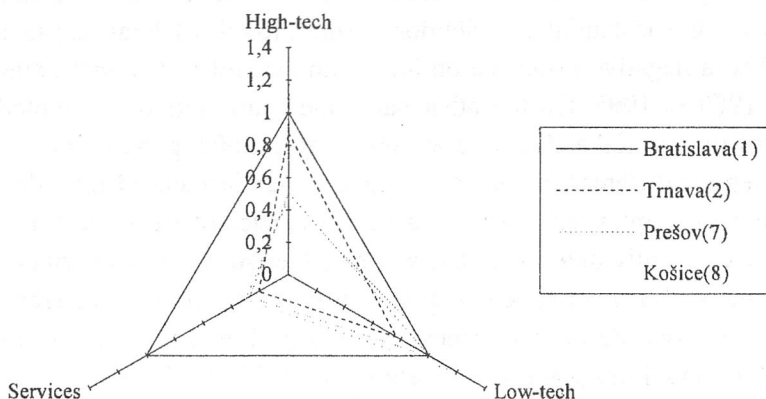
Graph 5
Differentiation of Employment by Sector and Region



Graph 5 shows employment in all regions except for the Bratislava region. While differences in high-tech are relatively high, differences in employment in services are much smaller.

Graph 6

Employment Differentiation by Sectors and Regions



Graph 6 shows employment differentiation in four regions (Bratislava (1), Trnava (2), Prešov (7) and Košice (8)). As can be seen, the largest differences are in employment in services. Low-tech employment is almost the same, while high-tech employment slightly differs.

Following Consequences Resulting from the Survey

One of the very important factors influencing the situation in employment is migration. Speaking about migration 928 000 people commuted to work in 1991. The growth of population in large centres also represented a new tendency in finding new jobs. Only 13% of economically active people commuted from 77 centres. On the other hand, 60% of economically active people commuted from rural centres in 1991. In some of these regions the number of commuters was more than 70%. The migration to the Czech Republic was very high. The opposite was true for the eastern part of the Slovak Republic (2 000 people yearly).

The adverse balance of commuters in the central part of Slovakia was approximately half of that balance of the eastern part of Slovakia and twice as much as that of the western part of Slovak Republic (Falt'an and Pašiak, 2003, p. 11).

We see also an important connection between the high-tech sector, the low-tech sector and services. In one of the studies the author explicitly concentrates on this problem (Zajac, 2004). The shift to services and sectors of sophisticated technologies in manufacturing is obvious from different employment trends in different sectors. For highly developed economies it is observable, that employment in services is growing, especially in different segments: social, financial, insurance and entrepreneurial services. Jobs gradually increased in sectors of high technologies especially in the 1980s, but their gradual movement has a very

cyclical character. A certain revival in the second half of the 90s cannot hide the reality that these jobs form only a very small part of a unity and that it is not possible to expect its substantial contribution to the growth of total employment. These jobs had a negative influence on total employment in the entrepreneurial sector from 1980 to 1995. On the other hand, they substantially promoted employment growth in social and private services (Zajac, 2004, p. 82 – 83).

Employment in different industrial enterprises was influenced by a decrease in the number of employees. There is a very insufficient structure for unemployed people especially in terms of education and length of unemployment. The unemployment rate also influences regional differentiation. The differences in these regions are possible to solve especially through infrastructure construction in given regions and through the strengthening of local institutions.

Conclusion

The Slovak Republic, as a constituent part of the European Union must participate in the fulfilling of the Lisbon strategy. One of the most wishful priorities of this strategy is the strengthening of the competitiveness of the European economy by 2010, by which time we expect transformation incorporated into an information society. New modern technologies will play an important role in this development.

According to our survey, most significant was the impact of high-tech in Bratislava, where the highest point capital, qualified labour force, perspective industrial branches and constructed infrastructure (especially traffic connections with EU industrial centres) are located. Domestic capital is concentrated on development of medium-high-tech and medium-low-tech especially in accord with its investment possibilities. Foreign investors also concentrate on this field of interest, because high-tech units are located in their mother countries and they do not want to invest this capital as risk capital. It is also explanation for situation, why in Bratislava and other cities is not a massive application of high-tech industrial branches.

Changes in the field of medium-high-tech employment and medium-low-tech employment influence low-tech employment in the Slovak Republic. This phenomenon is linked with gradual employment upgrading in the field of services, which especially absorbs labour forces dissolved from the manufacturing industry.

In spite of the fact that high-tech did not have a very strong impact on total employment, it indisputably represents one of the most decisive issues of competitive growth. This growth must be the most important factor shaping the form of future industrial policy. It is important to create the propositions that all of the abovementioned factors (as infrastructure, qualified labour force, capital) are potentially developed in all of the regions in the Slovak Republic and potentially contribute to the equalization of all regional differences.

Our survey has shown large regional disparities in the Slovak Republic and their very slow equalisation process in all regions in recent years. In spite of very slow, but observable shift in development in medium-low-tech and medium-high-tech industries there is no observable significant shift in employment in these industries and services. From this point of view the industrial policy in SR cannot assume that the concentration on development of successful regions automatically means development in less advanced regions (in accordance with the thesis that successful regions will gradually upgrade the development in less developed regions). In reality the successful regions as for instance Bratislava region has not accelerated the economic growth in less developed region in Slovakia. The causes of this not very positive trend are influenced also by other very important factors (technical and traffic infrastructure, regional structure of qualified workforce etc.).

METHODOLOGICAL NOTES

High-tech manufacturing

- NACE 30 manufacturing of office machinery and computers
- 32 manufacturing of radio, television and communication equipment and apparatus
- 33 manufacturing of medical precision and optical instruments, watches and clocks

Medium-high-tech manufacturing

- 24 manufacturing of chemicals and chemical products
- 29 manufacture of machinery and equipment n.e.c.
- 31 manufacture of electrical machinery and apparatus n.e.c.
- 34 manufacture of motor vehicles, trailers and semi-trailers
- 35 manufacturing of other transport equipment

Medium-low-tech manufacturing

- 23 manufacture of coke, refined petroleum products and nuclear fuel
- 25 manufacture of rubber and plastic products
- 26 manufacture of other non-metallic mineral products
- 27 manufacture of basic metals
- 28 manufacture of fabricated metal products
- 35.1. shipbuilding

Low-tech manufacturing

- 15 manufacture of food products and beverages
- 16 manufacture of tobacco products
- 17 manufacture of textiles
- 18 manufacture of wearing apparel
- 19 tanning and dressing of leather
- 20 manufacture of wood and of products of wood
- 21 manufacture of pulp, paper and paper products
- 22 publishing, printing and reproduction
- 36 manufacture of furniture; manufacturing n.e.c.

References

- [1] BALÁŽ, V. (2003): Knowledge Intensive Business Services in a Transition Economy. *Ekonomický časopis/Journal of Economics*, 51, 2003, No. 4, pp. 475 – 488.
- [2] BRZICA, D. (2003): Budovanie väzieb medzi veľkými a malými podnikmi v podmienkach regionálnej heterogenity: príklad SR. [Working paper, No. 18.] Bratislava: Institute for Forecasting of SAS.
- [3] Commission of the European Communities (2004): European Competitiveness Report 2004. [Commission staff working document.] Luxemburg: European Communities.
- [4] European Communities (2002): Science and Technology in Europe. [Statistical pocketbook, Data 1991 – 2001.] Luxemburg: Office for Official Publications of the European Communities.
- [5] EUROSTAT (2004): Statistics in Focus. Science and Technology. Theme 9 – 2/2004.
- [6] EUROSTAT (2003): Share of Employment in Knowledge-intensive Services in the Acceding Countries Still below EU Average. Eurostat News Release, STAT/03/127.
- [7] FALŤAN, L. – PAŠIAK, J. (eds.) (2004): Regionálny rozvoj Slovenska. Východiská a súčasný stav. Bratislava: Interlingua.
- [8] GEYER, A. et al. (2003): The Future of Manufacturing in Europe 2015 – 2020: The Challenge for Sustainability. Scenario Report. Brussels: European Commission Joint Research Centre.
- [9] GLEAVE, D. – PALMER, D. (1980): Spatial Variations in Unemployment Problems: a Typology. *Papers of the Regional Science Association*, 44, p. 57 – 1.
- [10] HATZICHRONOGLOU, Th. (1997): Revision of the High-technology Sector and Product Classification. [STI Working papers 1997/2.] Paris: OECD.
- [11] IN the Spotlight, High-tech: A Product, a Process or Both? IN Context, Vol. 1, 2000, pp. 1 – 4.
- [12] KASK, Ch. – SIEBER, E. (2002): Productivity Growth in 'High-tech' Manufacturing Industries. *Monthly Labor Review*, Vol. 125, No. 3, pp. 16 – 31.
- [13] LUKER, W. Jr. – LYONS, D. (1997): Employment Shifts in High-technology Industries. *Monthly Labor Review*, Vol. 120, No 6, pp. 12 – 25.
- [14] MARSHALL, A. (1920): *Principles in Economics*. London: The Macmillan Press Ltd.
- [15] Ministry of Economy of SR (2000): Elaboration of the Principles of the European Union's Industrial Policy for Conditions of the Slovak Republic (Strategy for Slovak Industry Development for the 21st Century). Bratislava: Ministry of Economy of SR.
- [16] OECD (1997): OECD Science and Technology Indicators, No 2: R&D, Innovation and Competitiveness. Paris: OECD, pp. 58 – 61.
- [17] OÚTRATA, R. (2002) Konkurenčná schopnosť ekonomiky. Vízia vývoja Slovenskej republiky do roku 2020. [Štúdiá.] Bratislava: Institute of Forecasting, SAS.
- [18] PORTER, M. E. (1990): *The Competitive Advantage of Nations*. London: The Macmillan Press Ltd.
- [19] RAUSCH, L. M. (1998): High-tech Industries Drive Global Economic Activity. Issue Brief. Washington, DC: Division of Science Resources Studies, National Science Foundation.
- [20] Slovak Chamber of Trade and Commerce (2005): Základné makroekonomické proporcie vývoja ekonomiky Slovenska v roku 2005 z pohľadu podnikov. Bratislava.
- [21] SMITH, K. (2002): What is the "Knowledge Economy"? Knowledge Intensity and Distributed Knowledge Bases. [INTECH, Discussion paper series, 2002-6.] Maastricht: United Nations University.
- [22] Statistical Office of SR (2003): Statistical Report on Basic Developmental Tendencies in the SR 2002. Bratislava: Statistical Office of the Slovak Republic.
- [23] Statistical Office of SR (1999): Yearbook of Industry of the SR 1999. Bratislava: Statistical Office of the Slovak Republic.
- [24] Statistical Office of SR (2003): Yearbook of Industry of the SR 2003. Bratislava: Statistical Office of the Slovak Republic.
- [25] Statistical Office of SR (2004): Yearbook of Industry of the SR 2004. Bratislava: Statistical Office of the Slovak Republic.
- [26] VEDA (2004): *Regions of Slovakia*. Bratislava: VEDA, Publishing House of the Slovak Academy of Sciences.
- [27] ZAJAC, Š. (2004): Niektoré problémy vplyvu inovácií na zamestnanosť. [Some Problems of Employment Effect of Innovation.] *Ekonomický časopis/Journal of Economics*, 52, 2004, No. 1, pp. 74 – 90.