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Cohesion Deficiencies in Eastern and Central Europe – Inequalities of Regional Research Area

**by
Gyula HORVÁTH**

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Zoltán GÁL

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Introduction

Regional diversity in the European Union increased sharply with the enlargement. The present EU regions are already characterized by substantial income, employment and productivity disparities reflecting differing resource endowments and innovation performance. These features include physical and social infrastructure, the skills of the work force, an institutional framework and culture conducting to innovation and the efficiency of public institutions (especially managerial capacity) at the regional level. In every fourth region of the enlarged EU, GDP per capita is below 75 per cent of the EU average, which makes these regions eligible for the Convergence objective of the EU Structural Funds. These "Convergence regions" are characterized by low levels of GDP and employment; their share in the EU's total GDP is only 12.5 per cent, compared with a 35 per cent share in the EU's total population. The same can be observed within certain EU countries. In some regions, economic welfare is lower than on average in the country. This applies especially to the "new" EU member states. In recent years, because the disparities among regions prove significantly greater than those among countries, analysis of the causes of the socio-economic differences among the European regions has attracted increasing interest.

One reason for Europe's declining role in the world economy is the fact that the development of research capacity and of the human factor lags behind that of their US counterparts. A programme aiming to correct these deficiencies was formulated in the European Union's Lisbon Strategy.

Europe's further development depends on the way in which growth factors are spread across its regions, and one reason for the lower level of competitiveness is major regional differences in R&D. Weak regional cohesion and an exaggerated spatial concentration of modern regional development factors have a clearly negative effect on European competitiveness today. Activities with high value added are concentrated within the London–Paris–Milan–Berlin–Amsterdam pentagon, but the distribution of innovative industries differs even in the developed countries. The role of national core areas is vital to R&D capacity, high-technology industries and to developed services – but, again, the situation is very similar in the Eastern and Central European countries, where the level of concentration, in fact, increased after the change of régime.

This paper introduces the Central and Eastern European situation of regional disparities. Besides the analyses of the transformation processes in the regions it draws a picture of urban systems influencing improvement of the regions and localities in six medium-sized Central and Eastern European countries.

The second aim of this paper is to identify regional differences in the R&D structure of EU member states in Eastern and Central Europe. The basic hypothesis is that exaggerated intellectual polarisation hampers the strengthening of re-

gional cohesion and that R&D must be given a priority role in economic development strategies.

This notion has not yet been realised in the operative programmes of National Development Plans. The strengthening of R&D featured prominently in the Lisbon criteria, but only a few words were devoted to the regional dissemination of intellectual potential, R&D capacity and knowledge-intensive fields of activity. Conditions suitable for innovative development are simply not yet available in most European regions.

1 Disparities between regions

In the countries of systemic change, depending on their level of urbanisation, the territorial expansion of rural areas and their level of backwardness display significant inequalities. With the exception of Poland, where urban population is growing, outward migration from rural areas has stopped. Moreover, in some countries, due to reverse migration from the towns and cities, rural population is growing These recent demographic trends cannot be considered as unequivocally positive, since the economic bases of these rural areas are weak and most of those who returned there were forced to seek livelihood in agricultural production. The rate of working-age population is the highest in these rural areas and in the traditional industrial areas. In metropolitan areas quite the opposite process is witnessed. In the age structure of the capitals, the weight of the older age groups is growing. In regions of dynamic development (like in Western and Central Transdanubia in Hungary, in the north-western regions of Poland, or in Southern Moravia of the Czech Republic) as well as in the northern and eastern Romanian and eastern Slovakian regions where birth rates are high, a favourable age structure is emerging, although in the latter regions a strong outward migration has negative impact on the rate of working-age population.

The territorial differences of the *labour markets* are the result of the previous economic structure and the structural transformations that have taken place in the emerging market economies. The economic activity rate is high in regions where the structural transformations have not started yet. Several heavy industrial regions in the Czech Republic and in Poland have not been set on a new development track, and there are also many rural areas in Eastern Europe where the high rate of agricultural employees (reaching 42 per cent in Moldavia, Romania) is expected to cause sharp tensions. There are regions where the rapid growth of the previously neglected tertiary sector has counter-balanced the shrinking size of other sectors of the economy. A peculiar paradox of the Central and Eastern European transformation is that, with the exception of Hungary and the Czech Republic, the activity rates are the lowest in the more successful regions. Among the

new CEE member states Hungary has the lowest economic activity rate (50.9 per cent in 2007), while the rates of more developed regions are a few points higher than the national average.

1.1 Losers and winners

The development of the diverse economic potentials of the CEE countries is hindered by cohesion problems. At low levels of economic development, however, the performance gap among the regions within the same country are not greater than in Western Europe (*Table 1*). Yet, the gap between the worst performing region and the best one (Prague and the Romanian and Bulgarian regions) is not greater (5.5-fold) than in Western Europe. On the whole, disregarding national inequalities, the Central and Eastern European economic space is relatively homogenous, with the majority of the regions performing below the European average; in Romania and Bulgaria even the capitals are quite under-developed (*Figures 1–2*).

Summing up, the radical transformation of the economic structure affected the different regions in different ways. The losers of transition, like in the most other European countries, where the areas were dominated by heavy industry and mining and, as a special Eastern European feature, the extensive agricultural areas. The emerging market economy brought about the strengthening of regional inequalities. Comparing the regional data of the member states and the candidate countries we find that the Central and Eastern regions are at the bottom of the European ranking, while the Czech and two Hungarian regions are above the EU average, and one (West Transdanubia) is near at that level (*Tables 2–3*).

Table 1

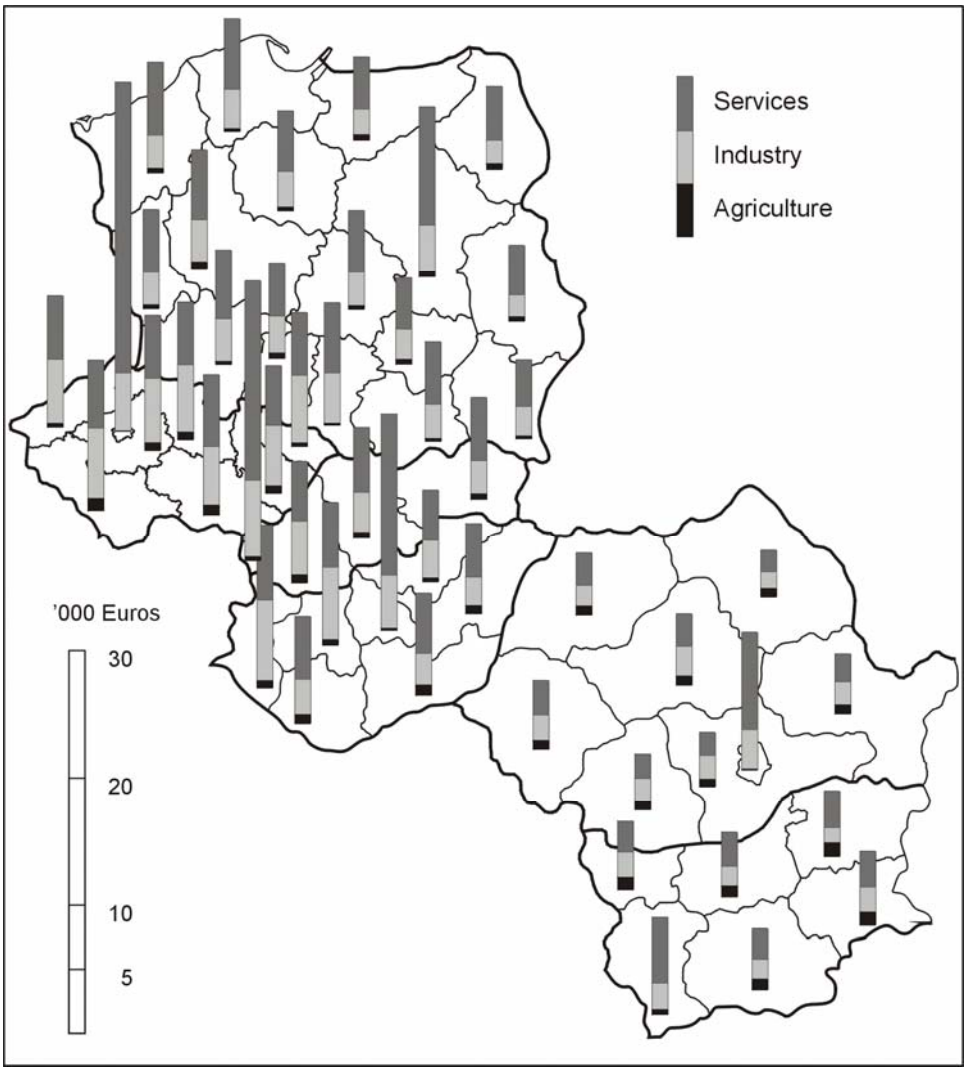
Regional differences in GDP per capita in Central and Eastern European countries, 2005

Country	Least developed region		Most developed region		Difference
	Region's GDP per capita in PPS, EU27 = 100				
Bulgaria	South-Tsentral	27	South-west	52	1.93
Czech Republic	Central-Moravia	60	Prague	160	2.67
Poland	Lubelskie	35	Mazowieckie	81	2.31
Hungary	North Great Plain	41	Central Hungary	105	2.56
Romania	North-east	24	Bucharest	75	3.13
Slovakia	Eastern Slovakia	43	Bratislava	148	3.44
EUR15	Anatoliki Makedonia	47	Inner London	303	6.44

Source: The author's calculations on the basis of the Regions: Statistical Yearbook, 2007.

Figure 1

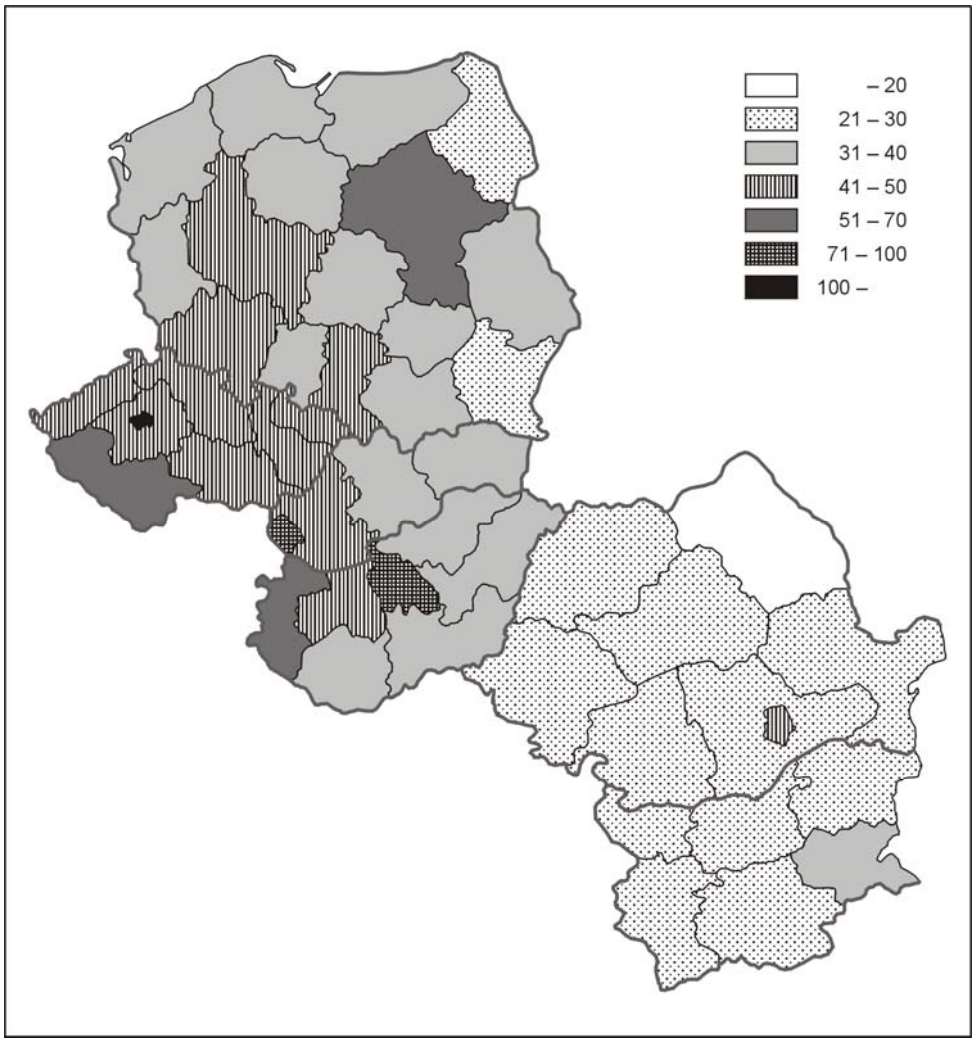
GDP per capita by region and sector in Central and Eastern Europe, 2005



Source: The author's calculations on the basis of the Regions: Statistical Yearbook, 2003.

Figure 2

GDP per capita by region in Central and Eastern Europe, 2005, EU27=100



Source: The author's calculations on the basis of the Regions: Statistical Yearbook, 2007.

Table 2

Level of development of NUTS 2 regions, 2000

Level of GDP as a percentage of EU27 average, in PPP	Number of development region					
	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovakia
Over 100	–	1	1	–	–	1
75 – 100	–	–	–	1	–	–
50 – 75	–	7	2	4	1	1
36 – 49	–	–	4	9	2	2
26 – 35	6	–	–	2	4	–
25 or less	–	–	–	–	1	–

Source: The author's calculations on the basis of the Regions: Statistical Yearbook, 2007.

Table 3

GDP per capita in the ten richest and the ten poorest regions in Central and Eastern Europe, 2005

The richest					The poorest				
Rank	Region	Country	GDP per capita in PPS, Euro	As a percentage of EU27 average	Rank	Region	Country	GDP per capita in PPS, Euro	As a percentage of EU27 average
1	Prague	CZ	35,901	160	1	North-east	RO	5,430	24
2	Bratislava	SK	33,124	148	2	South Central	BG	6,026	27
3	Central Hungary	HU	23,489	105	3	North-west	BG	6,023	27
4	Mazowieckie	PL	18,184	81	4	North Central	BG	6,205	28
5	Bucharest–Ilfov	RO	16,760	75	5	South-west	RO	6,293	28
6	Central-Czechia	CZ	15,792	71	6	South-east	RO	6,527	29
7	South-west	CZ	15,672	70	7	North-east	BG	6,874	31
8	South-east	CZ	15,252	68	8	Southeast	RO	6,921	31
9	Moravian-Silesia	CZ	14,633	65	9	South-east	BG	7,405	33
10	West Transdanubia	HU	14,275	64	10	North-west	RO	7,542	34

Source: The author's calculations on the basis of the Regions: Statistical Yearbook, 2007.

Obviously, economic differences among the smaller territorial units are stronger than those among the regions; interestingly, at the county (NUTS 3) level the development gap is the widest in every country. The GDP per capita figure for Budapest exceeds that of Szabolcs-Szatmár-Bereg county more than threefold, or the GDP gap between Bucharest and Vaslui county in Romania is fourfold.

The impacts of market economy and the economic crisis of recent years are expected to bring about the further strengthening of territorial inequalities. During the territorial restructuring of Eastern and Central European countries, the leading and backward areas have been developing at quite different paces, which indicates that the spatial structuring forces are now more differentiated than they were in the planned economy period. Back then, planned industrialisation was to shape the economic potentials of the various regions; today, their economic development is influenced by the competitive sectors of industry and by adjoining services (*Table 4*).

Table 4

Characteristics of territorial inequalities in the countries of systemic change

	Before 1990	After 1990
The dimension of spatial disparities	Between urban and rural areas Within settlements	Within settlements Between regions
The tendency of disparities	Decreasing inequalities between urban and rural areas Decreasing inequalities between regions Stabile inequalities between settlements	Increasing difference within settlements Increasing difference between regions Stable difference between urban and rural areas
The driving force behind the development of disparities	Industrialisation	Structural changes Services Foreign direct investment
Decision determining disparities	National level	Local level Transnational level
Indicators expressing disparities	Demographic composition Communal and social infrastructure Social incomes connected to the use of communal and social facilities	Unemployment rate Wage level

Source: Vision Planet. p. 48.

1.2 Regional inequalities by countries

The disparities between the individual development regions within *Bulgaria* are relatively small except for the more pronounced lagging of the North-west region in its social-economic development. Considerably more significant, however, are the intra-regional disparities, i.e. those between the municipalities and districts within the same planning region, representing a specific issue that the regional development policy has so far failed to adequately address. Almost all of the country's regions and districts exhibit the typical contrasts of the core–periphery kind. Particularly affected in this respect are the border territories, many of the rural territories, several areas in industrial decline, as well as those with high concentration of ethnic minorities. These are typically Bulgarian disparities that necessitate special attention since they put a lot of territories in critical condition, provoking also many negative social and socio-demographic developments whose long-term effect is still uncertain.

In terms of per capita GDP, however, the differences among the individual statistical regions have not been significant. This indicator was relatively higher in the South-west region (including Sofia), whereas in the rest of the regions were rather evenly distributed. It should be noted that the indicator's value in certain regions (notably the North-west region as well as parts of the North-east and the South-west regions) has been highly dependent on the actual state of the local large enterprises and the population migration.

The structure of the economy in all of the country's regions showed that services had the largest share in overall output, while agriculture and forestry jointly had the lowest relative weight among economic activities. This trend appeared to be the most notable in the region exhibiting the highest GDP figure – the South-west region, – where the service sector accounted for 67.5 per cent of the value added in contrast to the modest 5.7 per cent share of agriculture and forestry. The share of manufacturing in GDP turned to be the highest in the North-west region, reflecting the location of several large enterprises on its territory, whereas the service sector was relatively less developed there, accounting for only 45.1 cent of overall output. Agriculture had the largest share in the North-east region. In nominal terms, the manufacturing sector exhibited the highest GVA figure in the South-west region, while value added in agriculture was most significant in the South-central region.

In the *Czech Republic* economically the Prague region is the most efficient one. It has been creating a quarter of the Czech Republic's gross domestic product for a long time. The other seven NUTS 2 regions account for the remaining 75 per cent of GDP.

With 160 per cent of the EU per capita GDP average, Prague represents a unique region, as compared not only to the other cohesion regions within the

Czech Republic, but also to any other NUTS 2 region in any other new member states. The amount of Prague's per capita GDP is even much higher than that of an overwhelming majority of the current EU regions, or higher than the value of this indicator in thirteen out of the fifteen EU member states. Thus, Prague is the only cohesion region in the Czech Republic that will not ask for support under Objective 1 within the framework of the EU economic and social cohesion policy.

In terms of the interpretation of the aggregate per capita GDP indicator, the other regions represent a relatively homogenous group, fluctuating within a relatively narrow interval of 60 to 71 per cent of the EU per capita GDP average. So they meet the Objective 1 level. From this viewpoint, 99.4 per cent of the area of the Czech Republic and 88.5 per cent of the population represent the regions of which the development is lagging behind. As compared to the other candidate countries, the per capita GDP values in the Czech NUTS 2 regions can be considered relatively high and even close to those of a number of regions in the so-called EU cohesion countries.

Using other indicators, however, it is possible to mark some more problematic regions in the Czech Republic. The cohesion regions that are sensitive in this respect include primarily the North-West and Moravian-Silesia, which show above-average rate of unemployment not only in national terms, but also in relation to the EU. Moreover, these regions are also most affected by structural unemployment, or employability, for the share of the long-term unemployed here approaches 50 per cent of the total number of the unemployed.

The Czech economy as a whole has undergone a sharp structural change in the past ten years. The shares of agriculture and industry in GDP generation have decreased (from 7.7 to 3.4 per cent and from 34.5 to 31.8 per cent, respectively) in favour of the share of the services sector (which increased from 41.8 to 49.7 per cent). A similar process took place at the level of the cohesion regions without exception; however, the intensity was different in particular cases. There has been a considerable decline in the weight of industry within the overall economic activity (a major fall of the share of industry in the individual region's GDP) and simultaneously a sharp increase in the weight of services, or the tertiary sector within the overall economic activity (a growing share of services, or the tertiary sector in the individual region's GDP) in the past ten years.

Structural changes in the individual regions were affected especially by the following factors:

- down-scaling of fuel mining, metallurgy and heavy chemistry in the North-west and Moravian-Silesia regions (nevertheless, the above-mentioned industries still remain dominant in these regions with respect to economic activity and employment);
- the process of restructuring the heavy machinery industry in the South-west region;

- high weight of the leather, textile and food industries in the North-east, Central Moravia and South-east regions;
- declining share of agriculture in the economic activity of the South-east region (mountain and sub-mountain areas).

Hungary can be characterised by significant economic, social and infrastructure differences. These are more noticeable between the capital city and the rest of the country, between individual regions, and also among micro-regions and towns and villages. Compared with the rest of the country, the development of Budapest is striking. 17 per cent of the Hungarian population lives in Budapest, while it contributes 35 per cent to the GDP of the country. Its advantages result from high population density, its function as a centre for business and financial services and as an innovation transfer centre. It has large high value added sectors, mainly business services, research and development and tourism. 28 per cent of the companies are operating in Budapest: over half of the firms with foreign direct investment and 54 per cent of subscribed capital are concentrated here. The significant role of Budapest is further increased by its central geographical location and the hub role in the transport network. However, the large economic and social potential of Budapest has effect only in the agglomeration, but not in the more remote regions of the country.

Considering the level of economic development, household incomes and unemployment in the regions, apart from the favourable indicators of Budapest, the gap between the east and the west is large. The restructuring of the north-western and central parts of the country has been successful when compared to the slowly catching up of the remainder of the country.

The current dynamics of the north-western regions comes primarily from the geographical position of these regions, and from the proximity to western markets. Particularly, with neighbouring Austrian provinces, this has been the dominant factor in economic restructuring. In Central Hungary, Western and Central Transdanubia the well-trained labour force, its low cost compared with the average of European Union, and the favourable transport network helped the influx of foreign capital and innovative, export-oriented industries. As a consequence, unemployment rate is the lowest in these areas, and income conditions are also better than the national average.

Economic performance of the rest of the regions lags far behind the three most advanced regions. The reasons for that were the inherited industrial structure with low efficiency and the low income generating capacity. These areas were dominated by mining, heavy industries, the agro-business, and the loss of the collapsed eastern market had a dramatic impact on them. The industrial restructuring of the 1990's had the most adverse effect in North Hungary, turning the region into a depressed area. Agriculture and food industry concentrated in the regions of Great Hungarian Plain and South Transdanubia. Due to the low income generating

capacity of agriculture, the share of areas lagging behind is significant. In this regions the relatively low level of human resources and the high rate of the inactive limit the economic restructuring.

Diversity of the economic potential of regions in *Poland* is similar to the one occurring in the majority of the EU member states. The principal indicator – GDP per capita – becomes different in the proportion of 1:2.3. In the context of Poland's accession to the EU, the most important problem became not the diversity, but the low economic potential of all regions. Even the best of them does not reach the level of the EU27 average GDP per capita. The weakest Polish regions are classified among the last twenty European regions.

Participation of people employed in the agriculture decides on the average value of the labour efficiency in the region's scale. The highest position in this respect is occupied by voivodships with structures dominated by non-agricultural activities, such as: Mazowieckie, Śląskie, Wielkopolskie, Dolnośląskie, and Pomorskie, and the lowest – Lubelskie (50 per cent of labour resources in agriculture), Podlaskie, Podkarpackie, Warmińsko-mazurskie and Świętokrzyskie.

Interregional diversity of the unemployment rate (according to BAEL) oscillates between the 15.6 per cent index in Małopolskie voivodship and 27.3 per cent in Warmińsko-mazurskie voivodship. These differences do not overlap fully with differences in the GDP per capita level, since in many voivodships agriculture serves as a kind of "storehouse" for hidden unemployment in the situation of agrarian overpopulation. Despite this, in the eastern part of the country, the participation of rural population in the total number of unemployed people was the highest and varied in the 55-65 per cent limits with the country's average of 44 per cent.

The highest unemployment rate was registered in 2006 in the following voivodships: Warminsko-mazurskie (17.3 per cent), Zachodniopomorskie (17.2 per cent), Kujawsko-pomorskie (16.2), Warmińsko-mazurskie (16.0). Such situation has existed for many years as a result of decline in the economic base in small cities and in the state owned farms in this part of the country.

Regions with the highest competitiveness and development level include the following voivodships: Małopolskie, Mazowieckie, Pomorskie, Sląskie and Wielkopolskie. Their competitive advantage results from: high efficiency of the production sector, big human resources potential (including research centres, well prepared cadres), relatively well developed infrastructure. They have the biggest chance to participate in the European development processes (globalisation, construction of information society). Their trump cards are their capitals – big agglomerations with diverse economic structure and high participation of services in the employment sector.

In *Romania* there still are major differences within statistical regions where heavily agricultural counties coexist with more developed areas. The phenomenon

has been even made worse by the concentrated impact of economic restructuring in given areas with mono-industrial towns typically being affected by labour market shocks due to the shutting down unprofitable state enterprises. Other factors with an impact on regional development traditionally include border regions and the Danube with regions bordering Moldova and Ukraine and regions along the Danube more under developed than the others.

One of the most striking features of Romania's economic growth over the last ten years has been the growing importance of the Bucharest area in development terms. This is in line with a well-known trend affecting all transition economies, but it is even more evident here due to the large size of the country in both population and territory terms. With some of 9.0 per cent of the population Bucharest accounts 21 per cent of the country's GDP. 20 per cent of all SMEs are registered there and the capital has attracted 47 per cent of total foreign investment. The quite significant development of Bucharest not had any significant spill-over in neighbouring counties. Some of Romania's most underdeveloped counties are still to be found in the immediate surroundings of the capital city. The second peculiarity of regional development of Romania is the mosaic-like structure of economic development at the sub-national level. In practically all the regions' fairly developed counties co-exist with rather underdeveloped ones.

The main problems of regional development in Romania are as follows:

- The growing importance of Bucharest,
- Unbalanced growth between west and east of the country,
- Economic growth has followed a broad west–east direction with proximity to western markets acting as a growth spurring factor,
- Underdevelopment concentrates in the north-east and in southern regions along the Danube,
- The urban decline of small and medium towns,
- Strong negative impact of industrial restructuring in mono-industrial localities.

In *Slovakia* conditions that were created in the process of the transformation of the economy from a completely planned economy to a market economy have further deepened the territorial imbalance. The actual disparities are shown particularly in:

- the share of regions in formation of GDP,
- unemployment rate,
- level of entry of foreign capital in the individual regions,
- level of income of population,
- establishment of new firms in the regions etc.

The evaluation of the level of regional development shows that only the region of Bratislava differs significantly. Among the other regions there are no large differences, in GDP/capita. Most significant differences exist obviously only at the level of counties. The region of Bratislava has a special position in comparison with EU average, too. With the level of around 100 per cent of the EU average it can be classified to the most developed regions of CEE countries. The other regions of Slovakia attained 36 to 44 per cent of EU average.

Districts classified to the category of developed areas include 31.6 per cent of the population of Slovakia. Economically stabilised areas availing of conditions for the future development comprises 25.5 per cent of population. The percentage share of population living in stagnating districts is 17.3 and the share of economically depressed region's population is 25.6 per cent.

1.3. Differentiated urban networks

One of the key issues which influence the regional economic performance is the urban hierarchy of the country. Changes in the *settlement structure* in every countries during the state socialism were primarily quantitative. By the late '90s, the rate of urban population reached 69 per cent in Bulgaria, 70 per cent in the Czech Republic, and 63 per cent in Hungary. The less urbanized country is Romania, where 55 per cent of the population lives in towns and cities.

The weight of capitals, at the peak of the town hierarchies, is remarkable in Bulgaria and in Hungary. Sofia accounts for 14 per cent, Budapest for 18 per cent of the population of the country. Prague, Bratislava and Bucharest have more moderate share (6–10 per cent) in population of respective countries. The role they play in the economy and in cultural life is more dominant than their share in the population. The important elements of the market economy are concentrated in the capitals (*Table 5*). Several elements of a decentralised development policy could be designed to decrease this unfavourable, decades-long territorial concentration.

Since the early 1990s, processes related to the changes that affected the whole society have influenced the settlement structure. One of these processes is suburbanisation, i.e. urban population moving to the countryside, especially into the outskirts of large cities. This trend has emerged gradually, as it is observable in the slight decrease in the population of urban settlements and in the increase in the share of inhabitants living in smaller and/or rural settlements.

In the shaping of a decentralised development policy, the large and medium sized towns of the second level of the town hierarchy play an important role. The endowments of the countries are different in this respect. Bulgaria has three towns with populations over 200,000 (Plovdiv, Varna and Bourgas), and three towns

(Rousse, Stara Zagora and Pleven) between 130,000 and 170,000. Hungary has one town over the population of 200,000 (Debrecen), while three regional centres (Miskolc, Szeged and Pécs) have populations of around 160,000. In Bulgaria's two towns (Sliven and Dobrich) the populations are between 100,000 and 130,000, while in Hungary there are three such towns (Győr, Nyíregyháza and Székesfehérvár). The urban network of Poland and Romania shows a relatively balanced hierarchy and regional pattern (*Figure 3*).

Table 5

The weight of capital cities in some activities, in per cent, 2005

Activity	Sofia[2000]	Prague	Budapest	Warsaw	Bucharest	Bratislava
GDP	24.6	24.5	35.0	n.d.	16.5[1998]	24.2
Industrial output	15.9	13.0	17.6	11.8	17.0	37.3
Foreign direct investment	49.9	25.7	56.5	33.0	46.7	71.2
Tertiary education students	43.3	31.4	49.2	16.7	32.4	83.0
Employees in R&D	72.7[1995]	48.0	55.8	30.0	39.0	40.2

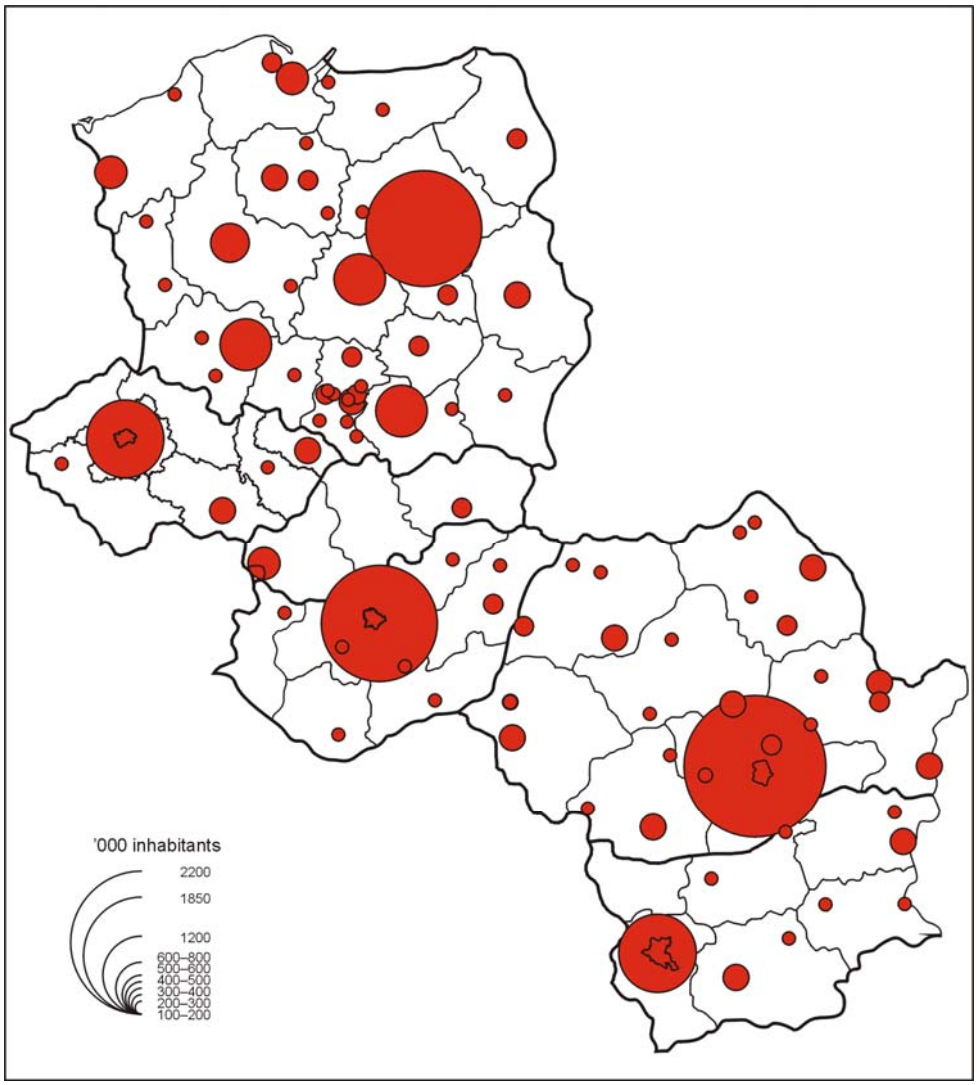
Source: Own calculations based on national statistical yearbooks.

The second level includes 2–8 cities with over 300,000 inhabitants (e.g. Lódz, Krakow, Poznan, Katowice, Gdansk in Poland, Cluj-Napoca, Timisoara, Craiova, Iasi, Conştanca in Romania, Brno, Ostrava in the Czech Republic). This figure has to be compared with more than 20–30 similar towns in western European countries. These towns exert significant influence over wide area, this is why they are called effective or potential regional centres. They have relatively good amenities to prevent their inhabitants from going to capital cities. They have academic tradition and cultural history. But they are often too weak, from an international point of view, to compete successfully with other large European cities.

The settlement structure of the Czech Republic is characterised by high density and disintegrated nature of settlements. A large portion of the population lives in urban settlements. Towns with over 50,000 inhabitants were among those most severely affected by the process of urbanisation; between 1993 and 2000 they posted a migration decrease of over 25,000 inhabitants. To the contrary, in terms of migration the largest increases were posted by settlements with over 10,000 inhabitants.

Figure 3

Large urban centres in Central and Eastern Europe



Source: Designed by the author.

The settlement structure in Poland is characterised by:

- Moderate, polycentric concentration of population and economic activity in less than twenty medium size centres, relatively homogeneously localized over the country's territory,
- Relatively low share of the capital metropolis in the total of the country's population (Warsaw – 4.2 per cent),
- Low position of Polish metropolis type cities in European rankings (Warsaw – in groups V and VI in 8-group classifications),
- Low urbanization degree, below 62 per cent, that has been remaining at the same level for the last 12 years,
- Highly dispersed settlements in rural areas, where as much as 38 per cent of the Poland's population lives.

The medium town network, with populations between 50,000 and 100,000, includes 15 towns in Bulgaria and 12 in Hungary. The small town network, with towns of less than 20,000 inhabitants is dense in both countries: it includes 152 towns in Bulgaria and 160 in Hungary. The spatial organising functions of most of the small towns are weak. They can only provide low quality services to the rural settlements in their sphere of gravity, and they do not play an important role in the employment of the inhabitants of these settlements. In most of these towns, the majority of jobs were terminated with the closing down the former industrial sites after the change of regime.

The *rural settlement structure* is also rather differentiated. Bulgaria has a large number of villages (5100), whereas in Hungary there are much fewer of them (2,900). Although in European comparison both countries have a high proportion of villages, this type of settlement is far more typical of Bulgaria. There, 83 per cent of all villages have fewer than 1,000 inhabitants; this figure in Hungary is 59 per cent. While in Bulgaria villages of over 5,000 inhabitants are rare (there were only 8 such settlements at the mid 1990s), in Hungary 38 settlements belonged to this category in 2001.

In countries having several economic centres, like most Western European countries, the difference between the population of the primary city and that of the regional centres is at most five-fold; in the case of countries dominated by the capital, this difference is ten to twelve-fold. In Poland and Romania, for instance, the capitals are followed by six to eight major cities with populations between 300 and 700 thousand, which have an impact on the spatial structure of the entire regions. Contrary to this, in Hungary, there are only four regional centres, whose population exceeds 150 thousand (*Table 6*).

At the same time, a particular Central and Eastern European characteristic is that the medium cities play important role in the organisation of the settlement structure. Many such cities function as territorial administrative centres, and the

structure and scope of their institutional system and administrative organisations do not differ significantly from those of major cities. The unitary administrative and political system of the planned economies has worked towards homogeneity: the major cities could not assert their natural and traditional power in organising the spatial structure. It is not surprising therefore that after the first steps towards regionalisation and a decentralised development policy, sharp competition emerged among the territorial centres, different in size but of similar institution structure, to control the new functions of regional organisation.

Table 6

Population of the largest urban centres, 2001

Country	Capital city		The seven largest regional centres	
	’000	Per cent, country = 100	’000	Per cent, country = 100
Bulgaria	1,190	14.4	1,154	16.7
Czech Republic	1,193	11.7	1,288	12.5
Hungary	1,812	18.0	1,036	10.3
Poland	1,615	4.1	4,064	10.5
Romania	2,027	9.0	2,156	9.6
Slovakia	449	8.3	806	14.9

Source: National statistical yearbooks. Calculations by the author.

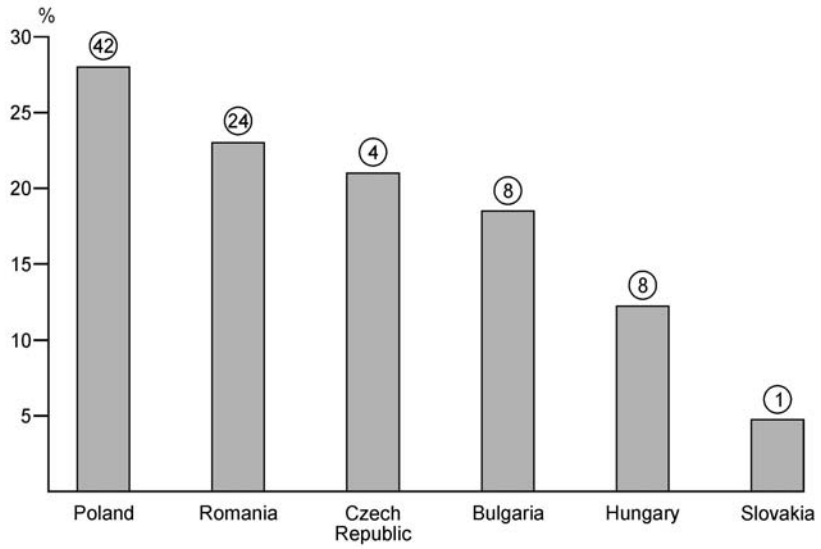
The large city network in Eastern and Central Europe – except for Romania and Poland – is thin (*Figure 4*). In the whole area, 97 towns or cities are above 100,000 in population terms, and two-thirds of these are found in Poland and Romania. Slovakia has, apart from the capital, a total of one major city. In these two countries the number of regions is much lower than the number of cities but the largest of the latter are evenly distributed over the whole area and can be become potential regional centres.

For this reason, therefore, designating a regional centre could be much more convenient. In most of the Eastern and Central European countries the debates over the designation of regional centres became more intensive as the EU Accession process progressed. In Poland, after the introduction of the new voivodship public administration, the leading major cities became the centres of the new regions. The only exception is the Kujawsko-pomorske voivodship where the regional centre is not Bydgoszcz, the industrial centre with 368,000 inhabitants, but Torun, with its historical traditions and a population of 208,000. In the other countries the competition among towns or cities goes on almost exclusively in respect of the setting-up of the labour organisations of the development agencies

and of changing the number of the NUTS 2 regions. The latter is especially at the centre of debate in Romania. Several cities with traditionally strong regional organising functions in the country, such as Arad, Oradea, Sibiu, and Targu-Mures lost their potential regional centre role. These demand a change of the national regional system. The dissatisfaction in the counties belonging to the planning-statistical regions is shown by the fact that the headquarters of the regional development councils in several cases in Romania were set up in smaller county centres. There were also examples of neglect of the role of the leading cities in Bulgaria. As a result of the public administration reform undertaken in the '70s, in which, instead of small spatial units, six large "oblasts" were created, the leading major city was replaced, and a smaller-sized town in the geographical centre of the region became the regional centre.

Figure 4

Number of towns or cities with over 100,000 inhabitants in Eastern and Central European countries (excluding the capital) and their proportion of national population, 2006



Source: Author's own construction based on data from national statistical yearbooks.

2 Regional inequalities in Eastern and Central European research area

2.1 Intellectual potential and regional development

The establishment and distribution of institutions of economic and social innovation have played an important role in European development since mediaeval times, and the first universities on the continent had close contact with the actors in both their nearer and more distant regions. The "universities" in the early Christian Irish monasteries were the innovation centres of their time. They gathered and codified cultural, technological and professional information from all over Europe and disseminated this through their networks to what was tantamount to the production level. Due to this, Ireland was Europe's most important innovation centre in the 2nd and 3rd centuries, in spite of its peripheral position (*Joyce*, 1907; *Ó Drisceoil*, 1993; *Pounds*, 1990).

The geographical deconcentration of the development of universities was typical of the Middle Ages. The central areas of the Italian Peninsula became the principal development centre in the 12–14th centuries, and, by the 1400's, 13 of Europe's 30 universities were based there. At that time universities were quite common in Western Europe, and, at the beginning of the 16th century, Europe's total of 70 universities were spread evenly across Spain, Germany, France and Italy. The regional contacts of these universities were limited to financial matters, and one prominent responsibility of these institutions, maintained as they were, by urban capital was the spread of humanist culture across the regions. Economic contacts were of less importance, although the hugely significant role of German universities in the development of the printing industry is unquestionable.

In the 18–19th centuries the centralised states deliberately – through financing and by exercising foundation and endowment rights – attempted to draw universities away from regional influences. The Prussian and French education systems were able to achieve this, but Switzerland has, even today, still not managed to establish a federally operated university. Moreover, in (both unitary and centralised) Great Britain, regional influence remained strong due to the traditional state-university conflict. Only in extreme cases did some universities manage to extricate themselves from centralisation, and, following the French annexation of the Netherlands in 1802, the University of Groningen was able to survive, but only because the northern region was geographically isolated. Meanwhile, most Dutch universities had either been closed or reorganised into a lower level institution (*Florax*, 1992).

With the passage of some 150 years, the growing importance of geographical decentralisation and of regional stimuli had become a major motivation force in

European academic development, and, in the meantime, the social role of the university and of the economic and political environment had also changed. The demand for innovation in economic development was growing fast and this inspired the development of new institutions which focused only on research and development. The Kaiser Wilhelm Institute – established in Germany in 1911 – was the name given to 29 institutes between WWI and WWII – mainly in the German provinces, Berlin being home to 12 (*Macrakis*, 1993).

After WWII, institutions of higher education (HE) were characterised by strong centralisation. In the first place, education and research were concentrated in relatively few institutions, with central government having direct control over universities, whilst, in the second place, in almost every country the universities were located in the most developed cities, some of these, especially the capitals, having an overwhelming position.

The 1950s, however, were a period of extensive development in HE, in that its higher levels were largely replaced by forms of mass education – which met the needs of society and the economy as a whole. Between 1960 and 1970 the number of university students rose from 1.8m to 4.8m. For example, the number of Norwegian students quintupled, whilst those of British, Italian and Swedish students quadrupled. In the European ranking the order of the leading countries also changed.

Around the beginning of the 1960s, institutions of higher education diversified as a result of decentralisation and the monopoly of the universities ended in many countries. Specialised colleges were founded, the independence of individual institutions grew and education became much broader.

Functional decentralisation not only meant the establishment of new institutions (comprehensive universities in Germany, polytechnics in the UK, high schools in the Netherlands and regional institutes of technology in Ireland), but also the reorganisation of the fragmented HE structure targeting economies of scale. In Sweden 100 smaller colleges were reorganised into 33 new units and the 385 (newly established) colleges in the Netherlands were consolidated into 85 institutions (*Neave*, 1979).

The academic network broadened and regional economic development came to play a decisive role in the funding of new universities. In the UK the development concept had been elaborated by the British Higher Education Commission, which was founded in 1961. This gave priority to enlarging student numbers and eradicating regional differences. In the UK the 1960s saw the founding of 22 new universities, mainly by combining existing colleges, in the northern parts of the country and in rural regions. Nowadays one third of British university students study at newly established universities (Commonwealth Universities Yearbook, 2005). This was to mention simply that in 1992–95 in the UK a total of 41 new universities were created – almost all in 92 with 2 or 3 stragglers in ’93, ’94 and

'95, 38 were built around polytechnics. The previous total was 47, although this did include London University as a single entity even though this federal institution comprises around 10 or more "colleges" which are universities in their own right both in terms of quality and size.

In 1970 the West German Federal Parliament (the Bundestag) enacted a law to improve the structure of higher education in West Germany. The law specified new areas for university improvement but did not initiate any significant expansion in the traditional historical university centres. Regional development issues featured prominently in relation to location, with the Ruhr Area (in a state of structural crisis) and the rural areas of Bavaria being allocated more new institutions in the field (*Lömker*, 1986). Regional considerations also prevailed in the operation of the Max Planck Society – which had been built on the institutional base of the Kaiser Wilhelm Society but which had been compromised during the National Socialist era. Today, there are 12,000 researchers and 9,000 PhD students and research fellows working in no fewer than 80 institutions. Berlin and Bonn (the former capital) do not feature very strongly. The similar multidisciplinary Fraunhofer Society is research organization with 58 institutes spread throughout Germany, each focusing on different fields of applied science. It employs over 12,500 researchers, with an annual research budget of about €1.2 billion.

In Sweden, universities in the 1960s were concentrated in five southern cities. The regional concept, drawn up to develop the northern regions, brought about the founding of Uppsala and Umeå universities at the end of the 1960s, with the first northern university being established in 1971 in Luleå. Regional concerns also had priority in the expansion of the Swedish HE system. The training structure of the new universities and colleges were geared to the needs of regional economies, and so faculties of technology, economics and administration were given priority. Faculties and colleges of technology became regional innovation centres and developed strong connections with regional authorities and local economies. The increasing international competitiveness of Swedish industry was due (among other factors) to the new regional HE system (*Hjern*, 1990). Similar regional structural anomalies were eliminated by the Finnish government in roughly the same way as the Swedish. 14 new universities were established in the '60s, consistent with the country's regional development policy principles, alongside the traditional university cities of Helsinki, Turku and Tampere.

As a result of geographical decentralisation, the importance of the central regions and capitals of countries declined. Even though these were still able to preserve their leading position in many places, the general tendency was for some of the larger regional centres of HE and research to strengthen gradually.

Higher education has an effect on internal regional development – not only due to its role in the R&D sector, but also because of its dominant position in the

training of specialists who organise, produce and sell technologically developed products and competitive services. In parallel with technological change, industries and companies who produce competitive products choose their location according to quality criteria. HE has an important role among these, its power to attract capital being influenced not only by any advantages of the labour market generated by itself, but also by the innovation capacity concentrated there. Throughout Europe, influence on major technological systems was primarily in the hands of the R&D organisations of metropolitan or agglomeration-based companies. However, HE institutions were dominant in the technological renewal of SMEs and in organising local and regional technological clusters. The driving force of such regional institutions can be shown by the growth of industrial areas in Central and Northeast Italy and the regional development of Bavaria, Northeast France, the Netherlands etc. (*Bennett – Krebs,* 1991; *Ciciotti,* 1993).

A higher education network must meet at least four criteria in order to fulfil its function and to be able to carry out *integration tasks* as part of the innovation system:

1. Research has to be qualified as a core function of HE, and this has to be taken into account financially and in the operation of universities and colleges;
2. National technology policy and regional institutions must support organised cooperation between HE and the economy with appropriate stimuli;
3. The structure of HE must be able to generate technological and economic innovation;
4. HE must be geographically decentralised, and its institutional measures must reach the critical mass needed to fulfil these functions. This produces equality with the institutions of the central region concerning research funding and distribution of international research and development.

2.2 The organisation of scientific institutions in Central and Eastern Europe, 1950–1990

The different levels of development of the two sides of Europe are particularly evident in relation to science, and the roots of this reach back several centuries. The university foundation period of the Middle Ages, in fact, had its influence on only a very small part of Eastern Europe. In this region were founded four universities (which play a prominent role until today). These are the universities of Prague (1347), Krakow (1364), Vienna (1365) and Pécs (1367). Higher education appeared in other parts of Europe only several centuries later. For example, Bulgaria's first university was founded in Sofia in 1888 (after many years of Turkish rule) but newer universities in the country appeared only after 1970. The

first universities of Romania were founded in Bucharest in the 1850s and in Iaşi (Moldavia) in the 1860s. In some major cities a university network – primarily in Transylvania – developed between the two World Wars, and in the communist era many new universities were founded in major cities or industrial centres, including the underdeveloped parts of the country.

Developments in many Eastern European countries were relatively uniform. The basis of higher education and research appeared only after the Great War and the number of institutions was very small. Only four universities were operating in Hungary between the two World Wars, the number of students being 14,000 out of a population of 9 million in 1938

Due to regional development issues, and from the viewpoint of sectoral education, few adjustments were made after the Second World War. The University of Heavy Industry in Miskolc and the University of the Chemical Industry in Veszprém were founded in 1949, at the beginning of the communist era.

The foundation of *national academies of sciences* was crucial for the scientific systems of the countries of Eastern Europe, and all had organised their academies by the beginning of the 1950s. The academies were not only the coordinating institutions for science in their respective country, but had an extensive research network, typically embracing some 40–70 institutions. The consequence of centralised government was that these academic research institutions were, with few exceptions, organised in the capital cities.

The modest changes in over-centralisation introduced in some countries have some influence in the deconcentration of the institutions. For example, the government in Hungary issued a decree reforming science policy within the economic reform programme started in 1968, and the communist party document issued in 1969 also asserted the need for science to be decentralised. The decree declared the negative sides of the excessive concentration of research in Budapest and proposed to decrease the differences between the disciplines and to develop the social sciences. The enactment of the decree, however, was only partially successful. At the beginning of the 1970s science developed noticeably in the regional centres, and the Hungarian Academy of Sciences organised a Biological Research Centre in Szeged, which was the most highly developed in Central Europe. The Faculty of Business and Economics began to operate at the University of Pécs – only the second institution of education in economics in the country – and the academic research institutions of Pécs acquired a new profile – that of regional science. However, the resettlement of research institutions or HE institution from Budapest was not successful. A decision had been made to move the Faculty of Veterinary Science from Budapest to Debrecen in the east of Hungary – the centre of Hungarian agriculture, but, due to obdurate opposition (for personal interests) by the leaders of the university, the plan failed.

Although the Communist Party's policy for science had different characteristics in individual countries – as in other spheres of the economy and society, we can detect some characteristics common to all:

1. Science enjoyed a privileged position in the socialist era – a typical feature of the Soviet model. The favoured groups of people in the sciences (academicians, principal researchers) received higher incomes and enjoyed a variety of social benefits;
2. Intensive state intervention and government control were accompanied by continuous and adequate budgetary resources, although these varied in the different branches of science. Of the national income, 2– per cent was spent on R&D in the Eastern European countries in the 1970–80s. This high rate was due in part to research in the armaments industry, and a further explanation is that many industrial products (in telecommunications and computer technology) were produced on the basis of domestic research because of the boycott on exports of Western European technology;
3. The state established research institutes in technology and the natural sciences in the 1950s, a period of extensive development and promotion of science, but the social sciences remained in an inferior position for decades, due to the dominance of Marxist ideology. The new branches of science (sociology, political and regional sciences) developed relatively late, and they were only embedded in the HE system with difficulty. The ratio of researchers employed in the social sciences amounted to less than one-fifth of that in several countries;
4. Academic research networks, sectoral research institutes controlled by the ministries and corporate research units were dominant in the institutional structure of research. For example, in Hungary in 1985, corporate research units absorbed 48 per cent of all R&D expenditure. Universities were primarily institutions of education and research expenditure within universities was marginal. In Hungary, in 1985, HE institutions accounted for no more than 12 per cent.

2.3 The impact of the change of régime on the regional structure of Eastern and Central European R&D

The change of régime at the beginning of the 1990s produced a significant restructuring of the scientific potential of Eastern and Central European countries. One characteristic common to all was a considerable reduction in scientific capacity. Two fields of research capacity shrank dramatically, one of these being the sectoral research institute network. The majority of research institutes funded by national bodies (such as ministries) were closed and the number of employees in

academic research institutes declined equally dramatically. As a direct consequence, the percentage of GDP allocated to R&D was greatly reduced – to one-third or even one-fifth. In *Table 7* we show this in terms of GERD/GDP (Gross expenditure on research and development as a percentage of Gross domestic product).

After the change of régime R&D underwent a substantial restructuring. The reorganisation of the HE system was the starting-point of a range of positive changes. In East European countries the number of undergraduates doubled or tripled, new colleges and universities were established and R&D was given an important role. One part of the major, state-owned research institutes closed (apart from the academic networks) and the other part was privatised. Certain groups of companies started to increase their R&D activity, including several multinational companies settled in Eastern Europe. The structure of expenditure changed perceptibly, with spending on state- or community-financed research continuously decreasing and that on corporate research rising.

Table 7

Changes in R&D main indicators in Eastern and Central Europe, 1980–2005

Name	Bulgaria		Czechoslovakia		Poland		Hungary		Romania	
	1980	2005	1980	2005	1980	2005	1980	2005	1980	2005
GERD/GDP	2.5	0.5	3.9	1.41 0.52	2.2	0.6	3.2	1.0	n.d.	0.4
Number of researchers, ‘000s	31.6	21.6	39.6	37.51 17.52	96.3	55.0	31.4	23.0	71.1	33.4

Note: [1] Czech Republic, [2] Slovakia.
Source: Author’s compilation based on national statistical database 1980, and Europe in Figures. Eurostat Yearbook 2008.

There are, however, considerable differences between the countries of Eastern Europe. In the Czech Republic, expenditure in business research locations accounts for nearly two third of all GERD – data similar to the EU-27 average. The ratio of company-financed research is the lowest in Bulgaria where government finance is still of great importance. In two countries, Hungary and Poland, the influence of HE institutions in financing research exceeds the EU average, and in all countries government-supported research institutes have a notably higher share of GERD than the EU average due to the maintenance of a network of Academies of Sciences (*Table 8*).

Table 8

Distribution of GERD by sectors, 2005, per cent

Name	Business sector	Budgetary institutions	Higher education
Bulgaria	22.2	67.3	10.5
Czech Republic	64.7	19.0	16.3
Hungary	45.0	28.6	26.4
Poland	31.6	36.8	31.6
Romania	48.0	34.1	17.9
Slovakia	50.0	30.0	20.0
EU-27	64.0	13.4	22.6

Sources: Europe in Figures. Eurostat Yearbook, 2008; Statistical Yearbook Romania, 2007.

The sectoral transformation of research institutions was followed in none of the countries by a positive change in regional structure, and it remained typical of the spatial structure of research centres that they were still mainly concentrated in the capitals. In the 1990s, however, the spatial structure of R&D changed in several countries. The central or core areas declined in importance, and the major results of decentralisation are evident in the regionalised and federalised countries. The relative weight in Austria of Vienna decreased by 15 percentage points and, in Spain, that of Madrid by 12. There was a slight decrease – or even no movement at all – in the unitary states of Hungary and Greece. In the latter, the Attica region even increased its share in the GERD of the country (*Figure 5*).

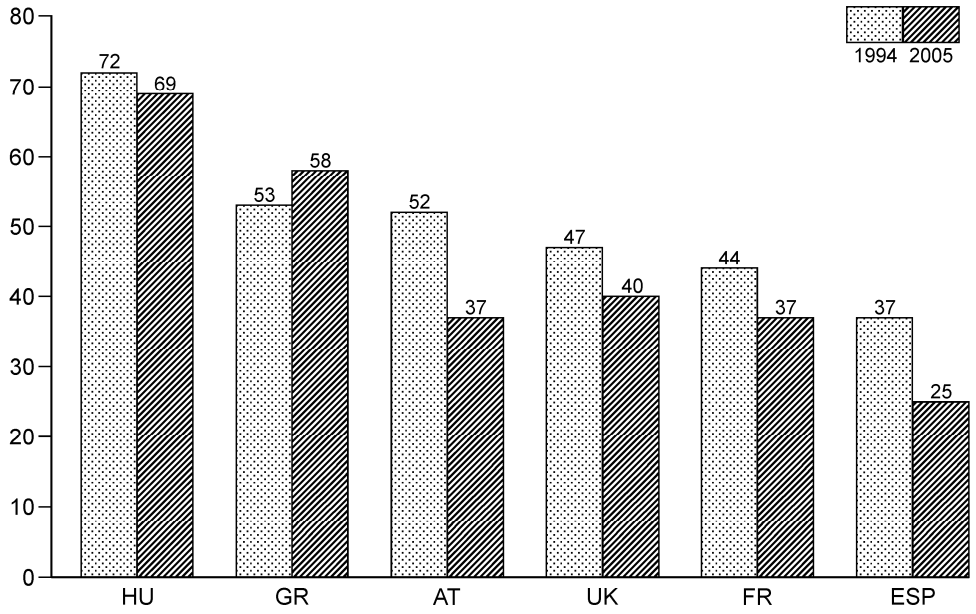
In Eastern and Central Europe the capitals and metropolitan regions are the bastions of research and science, the weight of the metropolitan region being greatest in Bulgaria. Four-fifths of the country's research potential is concentrated in Sofia and its vicinity, and two-thirds of Hungary's GERD is found in the Central Hungary (NUTS2) region which consists of Budapest and Pest county). The research capacities of the Czech Republic, Poland, and Slovakia reveal a slightly more balanced picture – the metropolitan proportion in these countries being under 50 per cent (*Table 9*).

Most of the important R&D indicators in the core areas of CEE countries are below the EU average, and in no more than 2 (Czech) regions of the 49 NUTS2 regions of the 6 do CEE countries exceed the EU average for the GERD/GDP ratio. In 8 regions the GERD/GDP level is between 1.0 and 1.9 per cent, and in 39 the level does not reach 1 per cent. In 20 regions it is even below 0.3 per cent (*Figure 6*).

If we look at the regional spread of R&D activity, we would draw a similar conclusion. In most countries the most highly concentrated R&D activity is corporate-financed, and foreign joint ventures' target locations for establishing R&D units in CEECs were almost solely capital cities.

Figure 5

Share of the core areas in GERD, 1994–2005, per cent



Source: Author, based on Europe in Figures. Eurostat Yearbook, 2003, 2008.

Table 9

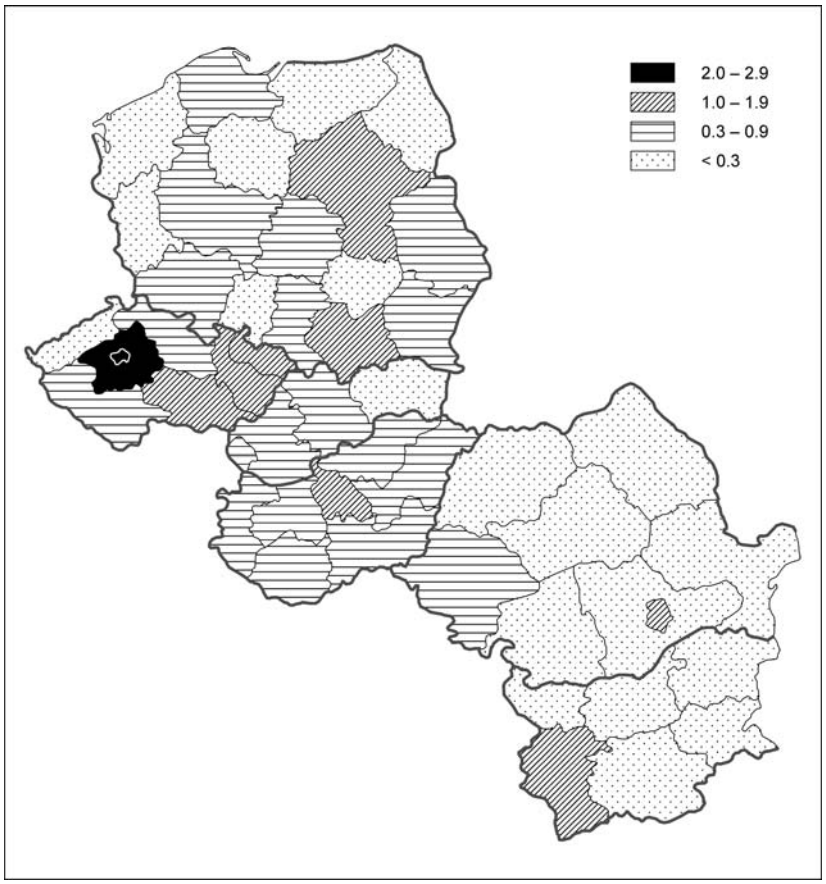
Weight of capital regions in national R&D

Country	Region	Percentage share in R&D expenditure	Percentage share in R&D employees
Bulgaria	South-west	83.4	71.6
Czech Republic	Praha	37.5	40.4
Hungary	Central Hungary	68.8	63.4
Poland	Mazowieckie	42.5	32.6
Romania	Bucureşti–Ilfov	59.3	60.9
Slovakia	Bratislavský kraj	47.6	49.8

Source: Compiled by the author on the basis of http://epp.eurostat.ec.europa.eu.

Figure 6

GERD as per cent of GDP in CEE regions, 2005

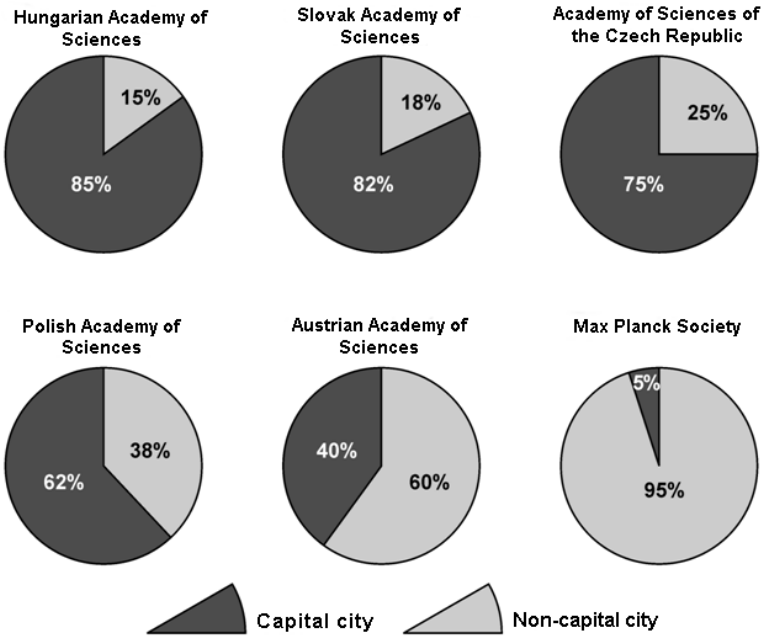


Source: Compiled and edited by the author based on http://epp.eurostat.ec.europa.eu.

The location of the academic institutions, the leading basic researchers, is no more positive. Most of the institutes of academies of sciences are located in national capitals and no more than 7 (19 per cent) of the 37 research institutes of the Hungarian Academy of Sciences operate outside Budapest. This means that only 15 per cent of the Academy's employees, some 4,000 in number, work in these institutes. By contrast, thirty-eight percent of the Polish Academy's employees work in institutes outside Warsaw. It is important to emphasise that, in federal states, the spread of Academy institutions is very different from the above. There are a remarkable number of research centres in the federal states of Austria and Germany (*Figure 7*).

Figure 7

Employers of institutes of Academies of sciences outside capital city in specific European countries, 2007



Source: Compiled and edited by the author.

Great expectations followed the change of régime in terms of the modernisation of the regional structure of higher education. In almost every country the total number of students tripled or quadrupled, although this increase was spatially unbalanced. The dynamic of HE in the capital is as strong as the increase in the number of students outside the capital. The developments were discursive in that no regional policy concepts were applied and, moreover, spatial development planning was undeveloped. The unfavourable spatial structure of HE was preserved, with some 30–40 per cent of students still concentrated in the capital (*Table 10*). A further characteristic of rapid change was the significant increase in the incidence of the social sciences in the HE system of most countries – important in terms of establishing the economic bases of regional development. The weight of social sciences in HE is higher in CEE countries than in other member states of the EU, but at the same time the importance of natural sciences and technology in HE is lower (*Table 11*).

Table 10

The distribution of students in HE in central areas, 2006

Country	Number of students, '000s	As national per cent
Bulgaria	114	47.1
Czech Republic	125	37.0
Poland	445	20.7
Hungary	187	42.6
Romania	294	35.2
Slovakia	65	32.8

Source: Compiled by the author based on http://epp.eurostat.ec.europa.eu data.

Table 11

Students in HE by field, 2006, per cent

Country	Students – '000s	Social sciences[1]	Technology and natural sciences[2]	Other fields [3]
Bulgaria	243	43.5	35.2	21.3
Czech Republic	337	27.6	38.7	33.7
Poland	2,145	40.9	30.1	29.0
Hungary	439	41.5	28.6	29.9
Romania	835	50.0	31.5	18.5
Slovakia	198	28.3	43.9	28.3
Austria	253	34.9	35.1	30.0
Finland	309	22.4	52.8	24.8
Netherlands	572	38.0	32.1	29.9
Ireland	186	23.1	36.0	40.9

Note: [1] Business, behaviour, law and other social sciences; [2] Biological and physical natural sciences; [3] Teacher training, liberal arts, personal and security services, environmental protection.
Source: Compiled by the author based on http://epp.eurostat.ec.europa.eu data.

At the beginning of the 1990s a faculty of social sciences was founded in many cities by the former political élite. The establishment of university faculties or colleges in regional public administration centres was a result of political change, and the, now unused, official buildings and education centres of the Communist Party offered an adequate infrastructure for HE. The Ministry of Education accepted implicitly the relatively cheap and extensive developments in social science education. As a result of the demand for specialists required to

work in the market economy, the growth in numbers in economics education can be understood.

The slight decrease in the regional distribution of R&D was generated by the fact that research and development was given an important role in university functions. In the analysis of the R&D investment structure, we have already mentioned the different distribution of HE in different CEE countries, and we saw that in Poland and Hungary HE represents a higher weight than the EU average in terms of R&D expenditure, There is no other type of research organisation outside higher education to be seen in any CEE country: the role of corporate research is well-nigh invisible and the number of regional development planning institutions and research centres of many West European countries can rarely be found.

3 Conclusions

In this paper the relationship between within-country regional disparities has been examined. Disparities are lower in the early stages of development, peak in the middle-income stages, but diminish again as a country becomes wealthy. Among country-specific factors, the date of EU accession plays an outstanding role, being responsible for more than one-half of the differences in regional disparities between the EU member states. It is argued that four main factors connected to EU membership are possible driving forces behind the disparities. The transition process in the new member states completely changed their economic structure, and some regions recovered faster than others. The radical transformation of the economic structure affected the different regions in different ways. The losers of transition, like in the most other European countries, where the areas were dominated by heavy industry and mining and, as a special Eastern European feature, the extensive agricultural areas. The emerging market economy brought about the strengthening of regional inequalities.

What is more important, they have learned how to use these funds efficiently and how to build effective institutions which might also allow for more decentralized regional development policy and planning. For the new EU member states, the above implies that disparities will not decrease just because a country is catching up to the more developed EU countries. Development policies must not focus extensively on the country as a whole, but have to take into account the preferences and possibilities of their peripheral regions as well.

Reducing backwardness and the development of regions are among the most important strategic objectives of the Community, receiving almost forty percent of its budget. Member states and their regions, depending on their level of development, receive substantial support for cohesion. But we must also recognise that despite the high payouts, changes in regional development rankings

within individual member states only occur when consistent structural policy is followed for multiple decades in the use of EU subsidies. These regions did not concentrate on the creation of traditional infrastructure, but rather on the modern impulses of regional development: innovation, business services, modern industrial organisation solutions and human resource development. Those regions which expected to get along simply on the basis of the European Union's support policies, were unable to improve their relative positions.

If we examine the spatial location of R&D activity, which should be one of the factors supporting the dynamic of European regional development, we can see that the change of régime and the transition have had the effect of preserving the "*status quo ante*" in the new member-states in Central and Eastern Europe. Major regional inequalities are still evident in the regional structure of developed innovation institutions, and the core areas and capital cities still have their privileged position. The regional and structural policies based on EU norms have not stimulated the development of R&D in the new member states, as the operational programmes for 2007–2013 demonstrate. There is no Central or Eastern European country with a regional or competitiveness-related operational programme targeting a comprehensive transformation of human resource development in respect of research.

Changes in the factors influencing regional development require the regional policy system of objectives, together with the related instruments and institutions, to be transformed. The long-term trends of European spatial development require the widest range of institutionalised forms of decentralisation to be established in the countries of Europe in the face of their different traditions. The new, Central and Eastern European member states can only meet EU cohesion requirements with the help of decentralised institutions. This is not only a public administration issue, but also a prerequisite for the success of R&D in helping to improve competitiveness. If regionalism progresses, it can bring about the modernisation of regional structures and the need for multi-polar regional development may change the hierarchies of power in those countries still in transition quite profoundly. The sub-national level of the power structure, the region, is a territorial entity which supports the sustainable development of the economy and the modernisation of the spatial structure – with its own financial resources and having at its disposal an autonomous development policy based upon local governmental rights. The regions are becoming the stage for innovative development, and the degree of embeddedness at regional level of the fundamental institutions of innovation output is becoming stronger.

The decentralisation of science and R&D has a number of positive effects on the improvement of the regions. The formation of research-intensive sectors increases the number of quality jobs and the business development effects of the setting up of spin-off companies are clearly evident. Innovative business develops

the region's export capacity and helps the region to integrate into the European and international research area. Companies which demand or rely on research contribute to the re-industrialisation of the region and to the spread of modern services. All of these improve the income-generating ability of the regions and contribute to the enhancement of regional cohesion. The Lisbon criteria cannot be met without decentralisation.

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