STUDIA UNIVERSITATIS BABEŞ-BOLYAI, GEOGRAPHIA, LV, 2, 2010

THE STRUCTURE AND QUALITY OF THE HUMAN FACTOR WITHIN THE DEVELOPMENT REGIONS OF ROMANIA

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ABSTRACT. – The Structure and Quality of the Human Factor within the Development Regions of Romania. In 2000, 8.4% of Romania`s population had higher education, 77.4 % medium education and 14.3% primary education. The obvious increase of the population with higher studies, as a result of the establishment of numerous state and private universities, lead to spectacular leaps within this last decade. Meanwhile, there was also a significant increase in the population with medium studies (77.4%), exceeding the European Union average (70%), a trend that will continue in the following years. The decrease of the population with primary studies is caused by the dramatic decrease in the population of school age, within the greater context of the general demographic decline of Romania. One must notice that, at the level of development regions, the former economic system, the economic and cultural legacy generated significant regional availabilities, with an excessive polarisation of the development factor by the Bucureşti-Ilfov region. Likewise, the regional development centres, which are mainly second tier cities in the national hierarchy (Cluj-Napoca, Iaşi, Braşov, Craiova, Timişoara, Galaţi and Constanţa), sustain and concentrate a population with a high degree of education and with an enhanced ability to innovate, but well below the advanced states. The „brain-drain" phenomenon, within this category of population, has reached alarming levels.

Key words: *structure and quality of population, development region, Romania*

1. INTRODUCTION

Alongside the technological and financial capital, the human capital, which is the stock of skills and knowledge embodied in the ability to perform labour as to produce economic value, plays an essential role in the development of a state in general and more specifically of a region. The education of a nation has always been a priority for development policies, next to ensuring health standards for all the inhabitants of a state. Investments in education later become benefits, but it is proven that, the greater the education effort is, the more expressive the population`s participation at the economic progress and at the wellbeing of the country is. Within this context, the general level of education is highly relevant and important, but the percentage of the demographic segment with a higher education out of a swatch of 10,000 people is even more crucial. In similar terms, there are sums of money alocatted by states and regions for research and development. In the following pages, we will present the population`s education degree at a national and development region level, backed by several other indicators refering to the quality of the human factor.

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2. THE QUALITY OF THE HUMAN FACTOR

The school population in 2004/2005 was 4,390,835 people, a decrease of 5% from 1994/1995 (MEC, Starea învățământului 2004/2005). The average educational level of the workforce (15 and over) increased from the middle of the 1990s, but remained low in comparison with the average values of the EU. In 2000, 8.4% of Romania`s population had higher education, 77.4% high school studies and 14.3% elementary studies.

Taking into account the educational levels, in Romania, the 25-64 age group that graduated at least high school increased from 67.9% in 1999 to 70% in 2003, this indicator registering a higher level than other European states. However, even though the percentage of those with higher education from the same age group, 25-64 years, registers an ascending trend (from 8.7% in 1999 to 9.6% in 2003), it still remains below advanced countries (in 1999: USA – 27.7%, France – 16.4%, Germany – 15%, UK – 15.4%; White Paper on Labour Force, DTI/UK).

The competitivenes of the human capital is directly influenced by the education level. For the 20-24 age group, the data delivered by Eurostat indicate that, in the case Romania, in 2004, 75.3% of the population from this age group graduated at least high school, the value of this indicator being close to UE-15 average of 76.6% and superior to the UE-25 average of 73.8%. In the case of the 25-64 age group, the percentage of the population that graduated at least high school is close to the European average, but lower than the average level of the 10 new member states, as well as Europe`s target of 85%, established for 2010 in Lisbon.

The dynamics of the percentage of the population between 25-64 years, that has at least medium studies, shows an accelerated increase in 1999 and 2000, followed by a stabilization between 2000 and 2004, at approximately 70.5%. The data obtained at the 2002 Population Census indicate an increase in the number of higher education graduates, within the 15-29 age group. The number of students increased between 1995 and 2005 by 150%. Moreover, the percentage of graduates in the post high school and technical schools and the percentage of graduates in the elementary cycle also increased in the same age group, between 1992 and 2002.

In the case of the 15-29 age group, within the same period, there was a decrease in the percentage of high school graduates (from 43.2% in 1992 to 38% in 2002). On the whole, in 2002, approximately 8% of the 15-29 age group, graduated a form of higher education, 82% high school, 8% elementary education and 3% did not graduate any form of education.

In order to develop a competitive human capital, high-quality education is the main objective. High-quality education is an essential condition, that ensures the necessary framework to cater the knowledge, abilities, qualifications and attitudes that support competitiveness and the steady development of the human capital. The universities represent the „key players", being the main provider of highly qualified workforce and knowledge. Considering the fact that universities are at the „crossroads" between education, research and innovation, one can state that they represent the key answer for a knowledge economy and society. They should be helped in their quest to develop the ability to create qualified students, therefore contributing to the increase in economic competitiveness. However, Romania, when it comes to qualified university staff, has a 40% deficit. From all the major problems confronted by universities, we can mention poor teaching conditions, poor study and living conditions for students, the lack of laboratories and equipment.

Although we can notice a continuous increase in the number of students in large cities/university centres, the Romanian higher educational system has a relatively reduced ability to adapt its qualifications and professional education to the demands of the labour market. The high unemployment rate among young men sustains this conclusion. Within this

context, the investments in education (of all levels) must be chanelled towards ensuring an offer of adequate qualifications, both quantitively and structurally, according to the forever changing demands of the labour market. Regarding lifelong education and professional formation, the educational offer tends to concentrate on programmes for general knowledge and skills (PC usage, foreign languages, accounting, company management, etc.) and less on specific skills.

The percentage of school population (high school, post high scool, university) by development regions (2007)

Table 1

Region	High school	Post high school	University
North-West	13.52	12.48	11
Centre	11.47	15.12	10.65
North-East	16.14	14.73	9.21
South-East	12.38	12.97	6.92
South Muntenia	13.79	12.99	4.11
South-West	11.48	12.51	5.78
West	9.78	8.59	9.40
Bucureşti-Ilfov	11.59	10.63	42.96

Source: Anuarul Statistic al României 2008.

The structure of the working population, by education level, 2006 (%)

Table 2

Region	Low level	Medium level	High level	Other categories
North-East	35.8	27.5	9.4	27.3
South-East	28.3	34.2	10.4	27.1
South Muntenia	29.7	35.9	8.9	25.5
South-West	32.6	34.4	11.2	21.9
West	21.9	39.6	13.2	25.3
North-West	25.9	36.1	10.7	26.4
Centre	17.1	39.3	12.1	31.1
Bucureşti-Ilfov	10.0	42.4	30.1	17.5

Source: Anuarul Statistic al României 2008.

As shown in table 1, it is obvious that most of the school population can be found in Moldova and in the South Muntenia region, but if we take a look at the upper category we can see that the human force, from an educational point of view, is below that of Transilvania and Banat (Centre, North-West, West). The quality of the workforce can be represented through the structure of the working population. Therefore, the higher the percentage of the population with a higher education, the higher the workforce`s quality in that region. In the following table, we will point out these regional disparities.

The low level population comprises people with no education or with an elementary education, the medium level means the people that graduated high school or a post high school form of education, while the high level includes the population that graduated university. We must point out that the working population, with a more advanced level of education, has greater possibilities in finding a job. The occupation rate, at the national level, of the population that graduated at least one university is more than 80% (fig. 1). By comparing 2000 with 2006, regarding the occupational rate of different categories of population, in terms of educational level, we noticed that the occupational rate of the last few years increased only in the case of the population that graduated at least one university.

At regional level, we notice a relatively large difference concerning the populations with high and medium levels of education. There are relatively high values in in the case of Region West and low values in North-East and South, concerning the percentage of those with higher education, as well as those who graduated a secondary school. A very high value, more than the EU average, can be found in Bucureşti-Ilfov region, characterised by a high degree of concentration of higher educational institutions.

3. OCCUPATION OF THE WORKFORCE

In 1990, the working population numbered 10.84 million people. The decline started in 1992 and continued during the 1990s, reaching 8.42 million people in 1999 (22% less than in 1991). Since then, it has increased by 3%, reaching in 2001 a percentage of 8.68%. Since 1990, the working population has decreased by 2.16 million (20%).

The economic sectors with significant drops in employees – thousands persons

Table 3

Sector/ Year	1999	2000	2001	2002	2003	2004
Metalurgy	194	163	168	146	144	138
Transport industry	146	132	126	121	110	102
Chemical industry	142	128	122	108	108	106
Machine and equipment industry	182	150	144	149	135	133

Source: Institutul Național de Statistică, 2006.

The occupational rate for 15-64 age group reached 63,6% in 1994 and went up to 67.7% in 1996. Since then, it has decreased, while in 2001 it reached 1994 level, slightly under the EU average of 64%. The decline that started in 1996 can be partially explained by the decrease of employment among men as a result of the restructuring of those economic sectors typical for men. The rate of male occupation dropped from 74.3% in 1996 to 68.9% in 2001, 4% under the the EU average of 73%. The average number of employees in the manufacturing industry (based on data from Camera de Comerț și Industrie a României and Municipiul Bucureşti) continuously dropped during 1999-2003, from 1,628 thousand people in 1999 to 1,511 thousand people in 2003 and 1,491 thousand people in 2004.

The decrease in personnel in the previous presented sectors was caused by the restructuring of companies, externalisation of sideline activities, modernisation of manufacturing and a better management imposed to multinational companies. On the other hand, in the textile, shoemaking, clothes, machines and electrical appliances industries, the number of employees remained the same as in 1999.

There are some industries where the percentage of working population increased, such as services (6.6%) and constructions (3.6%). In agricultural activities however, the percentage continued to be over 30%. There is still a drop of 10% compared to 1998 (POS Competitivitate, 2006).

The working population, the main indicators in 2004 compared to EU 25

Table 4

Indicator	Romania	EU 25
Total active population (thousand persons)	9,957	-
Activity rate for 15-64 age group (%)	63.2	69.3
Totalworking population (thousand persons)	9.158	-
Occupational rate for 15-64 age group (%)	57.9	63.3
BIM unemployment rate	8.0	9.1

Source: Planul Național de Dezvoltare 2007-2013.

We can emphasize the fact that the activity rate as well as the employment rate are lower than those in EU, the objective set in Lisbon for activitity rates being 70% by the year 2010. For the states of Central and Eastern Europe, it is almost impossible to reach this objective within the present context of the general economic crisis and the internal political factor.

The occupational rate per development regions (%)

Table 5

Year/Region	2000	2001	2002	2003	2004	2005	2006	2007
North-East	67.1	66.4	60.1	59.9	62.4	61.5	60.1	61.3
South-East	60.8	59.9	55.3	55.8	54.7	54.7	56.4	54.7
South Muntenia	64.7	64.0	58.2	58.1	58.1	58.1	59.6	60.5
South-West	69.1	69.5	61.8	62.0	59.9	60.1	60.1	59.3
West	62.2	61.2	57.6	57.1	56.9	56.6	58.7	59.6
North-West	63.4	64.0	57.8	57.2	56.1	56.0	57.1	57.0
Centre	59.8	59.6	55.9	55.2	53.9	54.2	56.0	55.1
Bucureşti-Ilfov	60.0	56.7	56.9	56.5	59.7	59.4	62.9	62.4

Source: INS, Statistici regionale, 2007.

On the basis of regional data, we are able to remark a insignificant decrease of the occupational rate (the working population based on the population of active age 15-64 years), with some oscillations. Compared to 2000, the biggest drop was experienced by the North-West region due to the restructuring of mining activities and areas. A similar phenomenon took place in the South-West region, while in the North-East region the drop was caused by the fact that many laid-off people left the labour market, going back to subsistence farming. If we analyse the absolute values data, we will notice that in many regions, the working population decreased from 2002 onwards, although this decrease was not as sharp in the last few years and even started to go back up, due to the fact that the Romanian economy is no longer in decline and registers significant increases, higher than the EU average.

Despite the fact that the working population did not significantly increase in the last three years, the number of employees went up in all regions after 2004, because all the economic sectors prospered and due to the fact that the labour market took in a lot of young men. However, the inactive population increased, due to the population`s ageing process. At the national level, the unemployment rate is between 4% and 7%, while in some regions it dropped under 4%. In 2008, unemployment had very different values within the development

regions. There are counties where unemployment is almost non-existent (Timiş – 1.4%, Bucureşti – 1.7%, Satu Mare – 2.4%, Arad – 2.7%), but there are also counties with structural problems, where the unemployment is still high (Mehedinţi – 8.7%, Vaslui – 8.4%, Teleorman – 7.8%, Gorj – 7.1%, Harghita – 7.1% in 2006).

The BIM unemployment rate per development regions during 2002-2006 (%)

Table 6

Year/region	2002	2004	2006	2007
Romania	8.4	8.0	7.3	6.4
North-East	7.6	6.2	5.9	5.0
South-East	10.4	9.8	9.0	8.5
South Muntenia	9.8	9.5	9.4	8.2
South-West	6.8	7.5	7.1	6.8
West	7.1	8.0	6.4	5.6
North-West	7.6	6.5	5.9	4.3
Centre	8.4	9.6	9.0	8.5
Bucureşti-Ilfov	8.8	7.5	4.7	4.1

Source: Anuarul Statistic al României, INS, 2008.

The percentage of activity sectors within the working population, 2006 (%)

Table 7

Region	Agriculture, silviculture, pisciculture	Industry and constructions	Commercial services	Social services
ROMANIA	32.0	30.0	23.6	14.4
North-East	42.4	25.1	18.1	14.4
South-East	35.3	28.3	22.7	13.7
South Muntenia	39.4	29.5	19.2	11.9
South-West	42.1	26.9	18.1	12.9
West	26.5	34.7	24.1	14.7
North-West	35.1	30.3	21.1	14.5
Centre	26.4	35.0	24.1	14.5
Bucureşti-Ilfov	4.7	31.9	43.2	20.2

Source: INS, Anuarul Statistic al României, 2006.

In 2008, the unemployment rate per regions dropped, Bucureşti-Ilfov having 2.2%, the North-West region 3.8%, West remained at 5%, while the decrease is not significant in the other regions. In the western regions and in Bucharest, the BIM unemployment rate substantially dropped, reaching very low values in 2007. The highest unemployment rate is registered for the medium and low educated population. The highest BIM unemployment rate can be found in the Centre and South-East regions. High percentages are registered in the case of the population with medium education (6.8% and 8.7% in the more industrialised regions). In Bucureşti-Ilfov, the highest unemployment rate can be found at the poorly educated population (13.1%, and 8.6% in the West region).

There is a relation between the unemployment rate of the population with a lowlevel of education and the regional degree of urbanisation. In those regions with high percentage of rural population, the unemployment rate is lower for the poorly educated population. In the regions with a high degree of urbanisation, the population with a medium level of education has a higher occupational rate (63% in the Centre region) and a lower BIM unemployment rate (Centre with 7% compared to the population with low level of education - 15%).

In the first months of 2009, due to a decrease in demand on the European and especially American markets, unemployment began to rise. The global economy is calibrated to a rotation to great when it comes to the consumption and production of goods, and the financial crisis also created instability on the market of consumption goods. Therefore, demand decreased and production went down as well, which

means that most companies no longer need employees, thus an increase in unemployment, especially in those cities that host export companies, companies with full or partial foreign capital.

A very important indicator, at regional as well as national level, is the percentage of population engaged in economic sectors and branches, which can lead to the highlighting of the importance of each sector. If we take a look at the statistical data regarding the number of employees, we are able to see that the greatest percentage among employees goes to industry, especially manufacturing, textile, food, machines and electronic appliances, furniture, metalic constructions and metal goods, shoe making, wood processing, etc.. In second place there are retail and bulk trade, constructions, then the public sector, with education, healthcare and social assistance as the main employers. Many industries experienced drops in terms of employees, such as manufacturing, textiles, clothes, leather, shoemaking, wood processing, construction materials. But there have been increases in metalic constructions, metal goods, machines and electric/electronic appliances, radio and TV equipment, means of transport. In the construction sector there were significant increases. An increase in employees also took place in all services, like transportation, tourism, telecommunications, insurance and research & development (R&D), the largest being in retail. At regional level, when it comes to economic sectors, there is a great diversity. Based on these regional facts, we can establish the economic profile of the region, the specific economic signs, its development and competitive strongpoints.

The national average is made up of different values and the disparity between the percentages of the economic sectors within the work force at regional level is relatively large. Regarding industry and constructions, the Centre, West, Bucureşti-Ilfov and North-West are above national average. The capital, the Centre and West regions also register higher values in the commercial services.

It is obvious that the population working in industry is higher in industrialised counties or in counties with a higher urban population (Braşov, Timiş, Prahova, Arad, Argeş, etc.), but strangely also in counties where the population working in the third economic sector (services) is low (Covasna, Alba, Hunedoara, Vâlcea, etc.). The population working in agriculture is high in every region, values over 40% being registered in the North-East and South-West, while the most significant percentage is found in the North-East region. The problem of agriculture is that it appears in our data as a statistical category, but we must admit the fact that in very few households there are actually farmers that grow crops for the local markets or for the national and European commercial systems.

4. TECHNOLOGICAL INDICATORS

In the following pages, we will analyse the technological indicators, crucial from the regional competitiveness point of view. The technological factor is relevant since it expresses a region`s ability to adapt and create technological innovations. Research & development (R&D) activities can be found in developed regions, which do not take, adopt technologies from the outside, but create new goods and technologies on their own. That is why, we will present data regarding three indicators, with innovating potential: **1)** *spending in R&D as % of GDP*; **2)** *the population working in R&D (quaternary or quinary sector)* and **3)** *number of patents registered per region.*

In Romania, the research, development and innovation activities cover over 50 specific scientific and technological fields, maintaining a relatively stable annual level for activities and results. R&D continue to take place, mostly, in the public sector (over 60%). In 2003, the percentage of Romanian researchers was 3.13 to 1,000 persons from the working population, twice as low as EU 15. A factor that can determine the increase in activity competitiveness is the large percentage of researchers in technical sciences. Unfortunately, low wages, substandard equipment as well as great research opportunities from slowly lead to a decrease in the number of researchers. The main problems are: insufficient funding from public sources (almost 0.4% in 2004 and 0.46% in 2006 from GDP); obsolete infrastructure; lack of adaptation to market conditions; decrease in the number and average age of researchers. Another major issue is the poor link between R&D and economy as well as relatively low ability to capitalize the research results. The interest and involvement of economic agents in research and development is also still low.

R&D activities continue to take place with a rate of 60% in the public sector, while the rest of 40% in the private sector, including non-governamental organisations. In 2003, the number of institutions and units that took part in R&D activities, including universities, was 719, among which: 120 were public institutions subordinated to the Education and Research Ministry and also other ministries, to the Romanian Academy and to the Academy for Agricultural and Forestry Sciences (out of which 37 are national research and development institutions), 86 higher education institutions, 25 private non-profit organisations and 488 trade companies (out of which 276 are R&D units and 212 are economic agents that deal with research and development). The research potential of 2003 meant a total of active personnel working in R&D of 39,985 people, out of which 25,968 are researchers. Out of all the researchers, approximately 9,200 were confirmed researchers and around 8,400 PhDs. Regarding the increase in average age of the highly qualified research and development personnel, those over 45 years represent, at the present moment, around 50%. However, there is a significant human potential, working in research and development institutions in all fields of science and technology, in all the regions of the country, with a higher percentage (approximately 53%) in technical sciences and engineering, which is a favourable starting point in order to adapt to the economic demand.

Number of R&D units and researchers per scientific field* (2003)

Table 8

Field	Number of units	Number of researchers
TOTAL out of which:	719	25,968
Natural and exact sciences	85	4,403
Engineering and technological sciences	405	13,971
Medical sciences	66	2,268
Agricultural sciences	103	1,311
Social sciences	37	2,590
Humanist sciences	23	1,425

Source: INS, Anuarul Statistic al României 2004

Note: * The framing was done by taking into account the main scientific field of each unit with R&D activities in 2003.

The regional distribution of R&D units and personnel (2004)

Table 9

	Number of units	Percentage	R&D personnel (full time)	Percentage
TOTAL out of which:	719	100	33,077	100
North-East	-	11	2,503	8
South-East	34	5	1,227	4
South Muntenia	67	9	3,689	11
South-West	40	6	1,715	5
West	52	7	2,222	7
North-West	73	10	1,937	6
Centre	80	11	2,850	9
Bucureşti-Ilfov	292	41	16,934	51

Source: INS, Anuarul Statistic al României 2004.

The personnel of research institutions in 2007 per development region

Table 10

Region	Number of employees	Percentage
North-East	4,156	9.79
South-East	2,201	5.18
South Muntenia	4,376	10.30
South-West	2,506	5.90
West	2,321	5.47
North-West	3,923	9.24
Centre	2,641	6.22
Bucureşti-Ilfov	20,360	47.93

Source: INSSE, TEMPO Data Base, 2008.

It is clear that the capital city concentrates most of the research centres, which also reflects the centralisation policy in the case of R&D financing. One must also recognise the high number of research centres in the North-East region. We emphasize the fact that these units are primarily situated in university centres, with the exception of the research institutions that are active in agricultural sciences.

Regarding the evolution of the number of persons that work in this sector, it has continously grown, exceeding 40,000 in 2006, while in 2007 the total number of persons working in R&D was 42,484. The number of researchers only dropped in the West (by over 300 persons) and in the Centre regions, while in all other regions and mainly in those that have large university centres of great tradition, the number of researchers increased. The biggest increase was in Bucureşti-Ilfov, the North-West and in the North-East regions. Regional data can be however misleading as in every region we have large urban centres, with well defined research and development capabilities, considered to be „R&D centres" such as Cluj-Napoca, Iaşi, Ploieşti, Piteşti, Braşov.

When it comes to research staff, most of them are state university professors or collaborators of universities and few are full time confirmed researchers from outside the higher educational system. Poor condition in the R&D sector (lack of equipment, lack of funds, low wages) caused many specialists to leave abroad or go into the private sector. From 1993 to 2002 there was a continuous decrease regarding the population working in research and development. In 1993, there were 40,210 employees, in 1995 only 36.761, and in 2000 their number dropped to 24.214 persons. After 2002, the trend changed, registering an increase, so that in 2003 there were 29,268 and 42,220 persons working in R&D in 2006. In 2006 and in 2007, there were a series of documents at regional level concerning innovation and development activities, all strategies recognising the fact that R&D are the most important factors of competitiveness through which one can create and develop new technologies, that will ensure a competitive advantage in the global market.

Romania has the advantage of being able to access funds for different programmes and research projects. In 2007, these sums, though quite small, still represent 0.42% of the national GDP. The expenditures for research and development activities have an increasing trend, but for now we are far from reaching 1% in the public sector and 2% in the private sector, especially because many local companies do not have an adequate human capital for these activities, while foreign companies do not have plans for Romania regarding research and development (foreign investors come here hoping for some substantial advantages like a cheap and skilled labour force and also cheap natural resources, etc.).

Concerning the total expenditures for research and development activities, in 2003 it was over 762,064 million RON, with an increasing trend in the following years. In 2004, these funds topped 962,827 thousand RON, while in 2005 it reached over 1,183,659 thousand RON. In 2006, the total values of research and development expenditures was over 1,565,802 thousand RON. In terms of allocation, we notice some disparities, like the overwhelming dominance of the capital. However, there are some regions that allocated relatively substantial sums of money for R&D, like the South, North-West and North-East. The West region has a very favourable status on many levels (GDP, unemployment rate, etc.), but on a lower position regarding the number of employees and R&D expenditures.

R&D employees and R&D expenditures per region (2006)

Tabel 11

Region	Number of employess in R&D/ 10,000 inhabitants	Confirmed researchers	Total R&D expenditures – thousand lei	Percentage of the regional GDP*
TOTAL	49.9	30.122	1.565.802	0.42*
North-East	31.9	3.205	107.503	0.31
South-East	20.1	1.570	54.303	0.16
South Muntenia	32.0	2.444	145.750	0.40
South-Vest	29.2	2.102	53.961	0.22
West	18.9	1.116	69.434	0.24
North-West	30.2	2.517	116.664	0.33
Centre	28.0	2.280	60.920	0.17
Bucureşti-Ilfov	194.1	14.888	957.267	1.53

***** Value that was obtained from regional averages, calculated by the authors from statistical data (Anuarul Statistic al României editat de INSSE, 2007)

The previous statistics reflect first of all the activities of large university centres in research and development. The largest is Bucureşti, followed by Cluj-Napoca and Iaşi. In Argeş and Prahova counties there are two industrial centres, which are also university centres, Piteşti and Ploieşti, conducting research in petrochemistry and machine manufacturing. A relevant indicator is the number of confirmed researchers. The disparities concerning the working personnel in research and development become less significant, with the North-East region coming first and the North-West region second.

Regarding expenditures for research and development, we can identify an indicator that puts forward a relation between the regional GDP and research and development expenditures. The largest value was registered in the capital region, while the smallest in the Centre and South-East. The issue of this indicator is that, in case a region has a low GDP as well as low research and development expenditures, it has the same percentage (the Centre region for example) as regions with a much higher GDP, but with less research and development spending, but a higher absolute value that the previous case.

Therefore, this indicator actually expresses the ability of the regions to absorb research funds, which depends on the existing structures and human resources. The research and development personnel and expenditures are „input" indicators, resources that are introduced in the research process, while „output" indicators are research results, more exactly patents, licences, inventions and trademarks.

Invention patents submitted by Romanian researchers during 2003-2007

Table 12

Region /Year	2003	2004	2005	2006	2007
TOTAL	881	996	1032	965	867
North-East	142	134	232	195	187
South-East	49	75	72	93	83
South Muntenia	83	98	94	62	55
South-West	65	69	56	47	56
West	42	40	64	62	69
North-West	89	130	106	99	83
Centre	48	101	77	62	62
Bucureşti-Ilfov	363	349	331	345	272

Source: Anuarul Statistic al României 2008.

5. CONCLUSIONS

The number of patent submissions registered at OSIM (State Office for Inventions and Trademarks) is an indicator regarding research efficiency. It is therefore clear that most patents have been submitted by institutions from Bucureşti-Ilfov and North-East regions (Iaşi). We can conclude that there is a relation between the invested resources and results, which mean that the North-East region can overcome its disadvantaged situation and implement a strategy based on innovation. The issue of the North-East region is a very complex one, as it has a powerful development centre, with high economic and technological innovation potential, but also many rural, peripheral, areas, whose integration becomes more and more difficult, the inter-regional gap widening each day.

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