BRIDGING THE REGIONAL DEVELOPMENT GAPS OF ROMANIA BY MOVING TOWARDS A KNOWLEDGE-BASED ECONOMY

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I. Introduction

Although Romania has achieved eight consecutive years of economic growth, it still encompasses significant underdeveloped areas or regions. Disparities in terms of foreign investments, structure of the local economy and level of human capital development have determined important gaps with respect to economic growth rate at regional level. Therefore, during transition, some of the Romanian regions didn't have capacities and resources to develop at their full potential. Without proper management and actions, most of the regional disparities from the communist era have deepened during transition.

However, current growth of the Romanian brings new opportunities and incentives for development within all regions of the country. In fact, for a sustainable economic development, Romania needs to reduce its development gaps between regions while moving towards a knowledge-based economy.

One has to remember that, after the communist regime collapsed, Romania inherited an unbalanced and inefficient economic system as industrial and agricultural sectors were artificially overdeveloped to the detriment of the services sector. During transition, Romanian industry declined sharply due to massive lay offs and enterprises' restructuring, while services started to develop. Since 2003, the services sector has been coagulating the highest share of employment, industry displaying constant evolutions.

II. Methodological approach

Our paper aims to assess the role of science, technology and human capital in bridging the regional development gaps by using a sector approach. Our background idea is that all regions need to develop their economies by enhancing technological and human capital, as well as research and innovation activities in order to attain a sustainable development process. As today's economy is a global and knowledge-based one, we aim to assess in what extend Romanian economy displays such important features at regional level.

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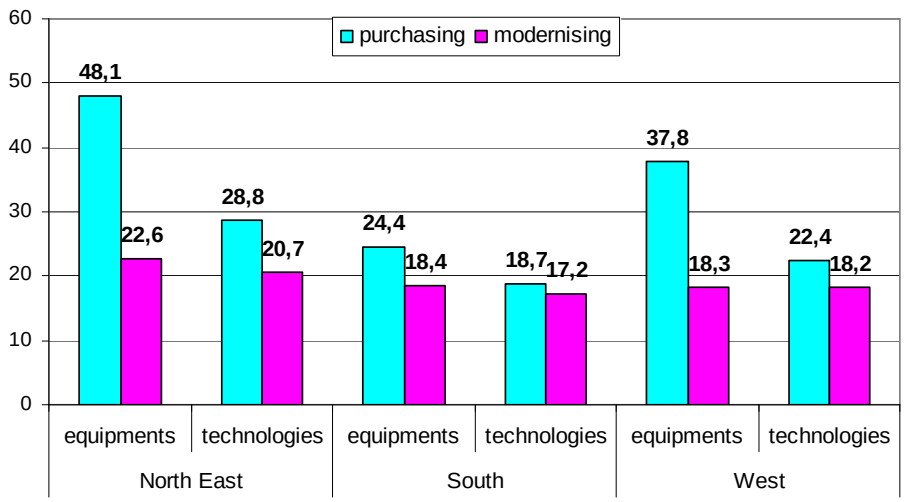
We build our analysis on the findings of a 2007 enterprise survey. Our questionnaire-based research included 800 companies from industry and services, with 10 or more employees. Companies were located in North-East, South and West regions in order to obtain relevant data for three different regions: with low, medium and high economic performances. Survey sample was a random one, stratified by NACE and companies' size while the so-called low technology economic branches were excluded from the research.

III. Romanian industry in regional profile

Analysing data for the three investigated regions, we find out that the highest share of companies with investments during the last three years characterises the North-East region. They targeted their investments in technology, new equipments and ICT. 8.3% of firms located in West region made no investments during the last three years, rest of them investing, mostly, in equipments and new technologies. The highest share of companies with no investments characterises South region which reaches the regional average just when it comes to investments in equipments. Although, investing in new equipments seems to be a priority for more than half of enterprises from all regions, most companies from North-East and West have invested into new technologies in the last three years. Moreover, the larger the company is, the highest the probability to display investment behaviour is.

Although North East region displays the highest share of investing companies, it is also characterised by the highest average age of the technologies within companies. It highlights an important trend of regional gaps reduction. In fact, large firms have the oldest technologies, especially those born in the communist era. Small and medium companies show a superior capacity of change in order to better adapt to an emerging economic market. Analysing expenditures with technological capital, we found out that purchasing new equipments and machines covers 37% of expenditures, while purchasing new technologies accounts for about 23% of expenditures. Also, we need to underline that companies from industry spend more money for equipments and technologies purchasing than for modernising the existing ones which will determine an improvement of the technological capital in industry on medium term.

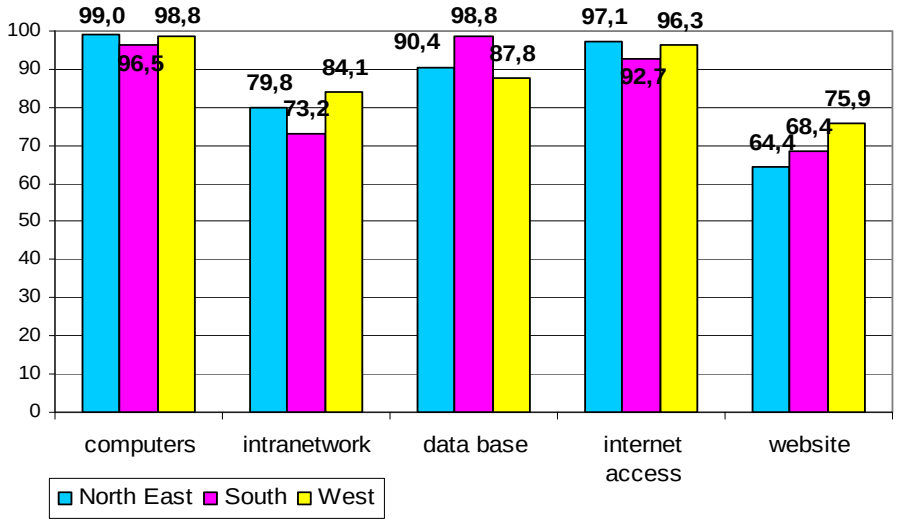
Figure 1 Expenditures with equipments/machines and technologies as share of total investments during the last three years (%)



High share of companies with computers, data bases and internet access shows a pretty high level of endowment with ICT. However, South region register lower levels of endowment,

except when it comes to utilisation of data bases. In fact, Romanian companies from industry invested in computers, in average, 6.3% of total expenditures with investments in the last three years. Unfortunately, companies from South are the ones which invested in ICT in lowest extent which explains its low level of endowment, while West region displays the highest expenditures. It means that current regional gaps with respect to ICT endowment are to remain constant in the years to come.

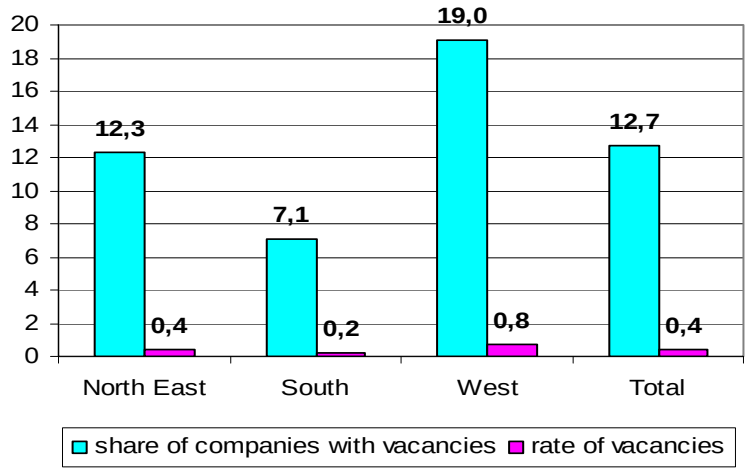
Figure 2. Firms' endowment with ICT (%)



In order to analyse human capital of the industrial enterprises, we will focus on assessing the existing skill shortages measured as number of vacancies for three mounts and more (during previous year). 13% of investigated firms are affected by skill shortages. Therefore, our findings demonstrate that the Romanian labour market is characterised more and more by skill shortages which affect especially certain geographic and economic areas. In fact, West region which displays significant migration flows coupled with low unemployment rates is the one most affected by skill shortages (19% of companies), while South region is characterised by the lowest share of companies with vacancies for three mouths and more (7%). Such important differences highlight significant disparities between regions in terms of available human capital/labour force which can hamper economic development of the firms.

In order to assess the amplitude of the skill shortage phenomenon in Romanian industry, we've computed a rate of vacancies in total number of employees at the end of 2006. We've found out that the vacancies for three mouths and more represented almost 0.4% in total number of employees at the end of the year. South region is characterised by both the lowest share of companies with vacancies, as well as the lowest rate of vacancies, while West region seems to be most affected by skill shortages as it displays both the highest share of companies with vacancies and rate of vacancies in 2006.

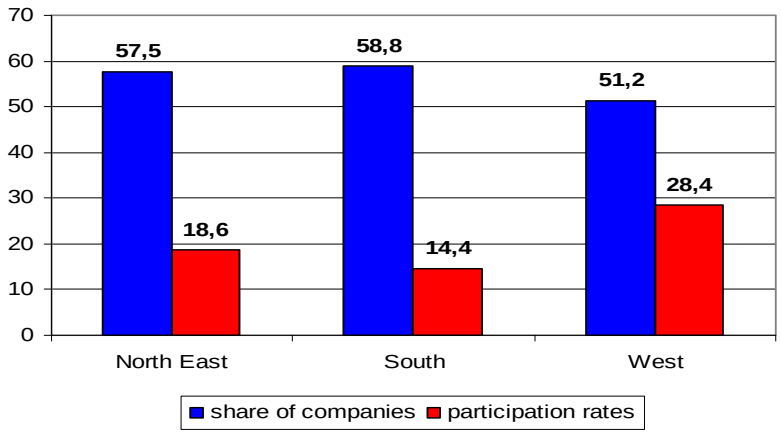
Figure 3. Skill shortages - share of companies with vacancies for three months and more and rate of vacancies* during 2006 (%)



**rate of vacancies = number of vacancies which had remained unfilled for three mouths and more during 2006 / total number of employees at the end of 2006*100*

More than half of enterprises developed vocational training programme for their employees during 2006. In regional profile, there are no major differences between the investigated regions. However, West region displays a lower share of companies which offered training for their employees. In fact, companies which developed vocational training programs from West are characterised by the highest participation rate of their employees to such programs. Thus, even if the share of employers offering vocational training is almost homogenous distributed by regions, the employees' participation rate indicates important differences among regions in accordance with their level of development. Moreover, share of companies which develop training programs varies significantly with the company' size. In fact, during 2006, one third of small companies, almost half of medium ones and more than 80% of large companies invested in vocational training. Still, participation rates decreases with the companies' size.

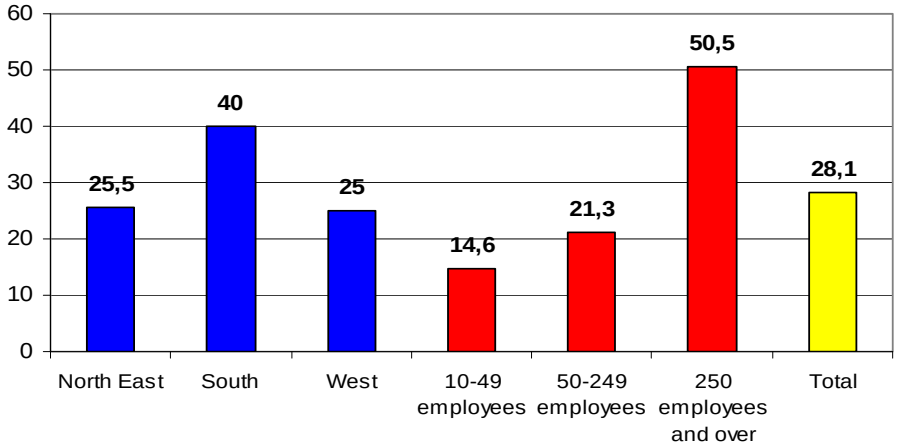
Figure 4. Share of companies which developed vocational training programs and rates of employees' participation to vocational training during 2006, (%)



Share of companies which developed research-development activities in 2006 varies by regions, as well as by companies' size, but the latter seems to be the most important determinant. One quarter of companies from North-East and West regions and 40% from South invested in research. As expected, large companies are the ones most interested in

research activities as they have financial power and potential to develop economy of scale. Moreover, most companies developing research activities are "old" companies, born and developed in the communist era.

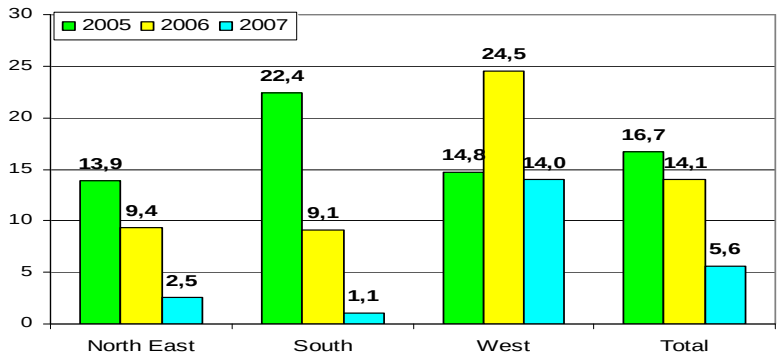
Figure 5. Share of companies which performed research-development activities in 2006, by regions and companies' size (%)



Although, economic performances of the companies have been improving year by year during the last three years, respondents are rather pessimist when estimating economic results at the end of 2007. Regional evolutions highlight an important trend of gaps reduction between the three regions. Surprisingly, South region displays the highest growth rate of its economic performances and, in the same time, the highest rate of non-response for 2007 estimations. One has to remember that South region includes the highest share of companies with no investments during the last three years which means that they still have to develop in order to reach maturity/stability (from an economic point of view) and start to invest. Moreover, during the last three years, over 80% of the investigated companies registered increases of their turnover as against previous year. However, except for the South region, the share of companies which increased their turnover as against previous year doesn't' display a positive growth rate. Enterprises' estimations for 2007 year indicate an unjustified optimism of companies from West as it registered the most contradictory evolutions in 2004-2006 years.

Moreover, most of the investigated companies registered an increase in their number of employees for the period 2005-2006 and estimate an increase for 2007 too. However, we need to point out that the growth rate of the number of employees displays a decreasing trend. Analysing regional trends, we discovered that the decline in the growth rate of the companies from South region is significantly higher than the regional average. Also, companies from West region register a positive trend in their number of employees' growth rate for 2005-2006, but estimations made for 2007 indicate a decline which could be explained by the impact of the skill shortages.

Figure 6. Evolutions of the number of employees for 2004-2005 period and estimations for 2007 (% increases as against previous year)

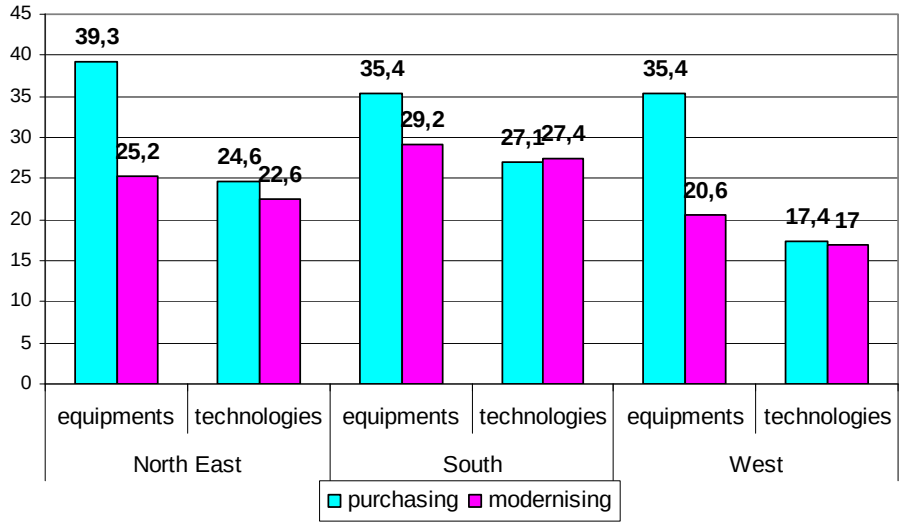


IV. Romanian services in regional profile

Most companies in services sector made investments during the last three years both for purchasing new equipments/technologies and modernising the existing ones, as well as for training their personnel in order to work with the new equipments/technologies. In fact, North East region is characterised by the highest share of companies with investments in technological and human capital, West region displays the highest share of firms investing in ICT, while firms from South invested in research activities in highest extent. Still, investments in equipments and technologies haven't determined important changes at the level of the existing personnel with respect to restructuring or training it which means that they haven't brought a significant improvement at the level of the technological capital.

The high share of firms with investments in technologies, irrespective of economic branch, explains the low average age of the existing equipments within firms from services (5.3 years). In fact, average age of the technologies varies significantly by regions. The more developed the region is, the lower the average age of the existing equipments is.

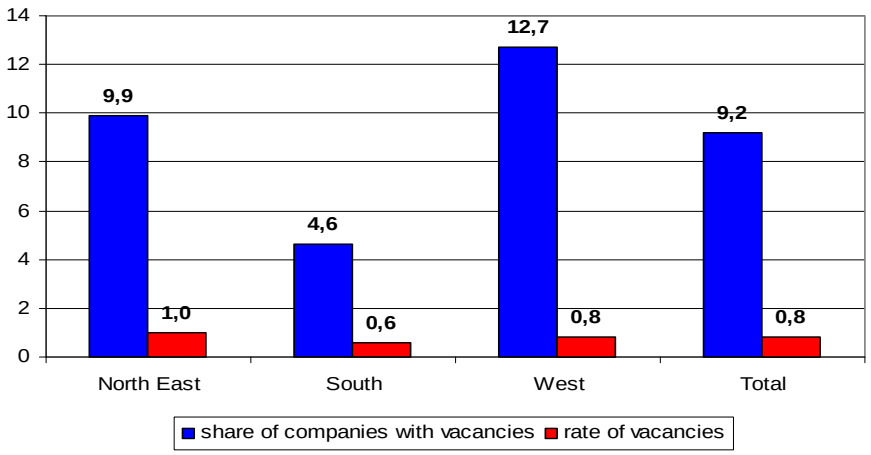
Figure 7. Expenditures with equipments and technologies as share of total investments during the last three years (%)



More 95% of companies declares that they have computers, but variations by region and companies' size show that firms endowment with computers is poorer in South region and small companies (10-49 employees). Regional variations of the endowment with intra-networks follow the same pattern displayed by the computers endowment. Thus, West region registers the highest share of companies with computers connected by an intra-network, while companies from South are characterised by poorest endowment with computers and intra-networks. Moreover, the more developed the region is, the highest the incidence of companies which use data bases is. 88.4% of investigated firms have internet access, South region registering the highest gap in this view.

With respect to the existing skill shortages, we found out that 9.2% of companies from services sector are affected by vacancies which had remained unfilled for three mouths and more during 2006. Moreover, there are important regional differences in this respect. If in South region only 4.6% of companies declared that they had vacancies during 2006, 12.7% of the firms from West region was in a similar situation. It shows that high skill shortage from West has the potential to become a chronicle problem and affect the development process. Moreover, important migration flows from North East region which is an underdeveloped region coupled with the existence of skill shortages can postpone the "catching up" process and reduction of the development gaps.

Figure 8 Skill shortages - share of companies with vacancies for three months and more and rate of vacancies* during 2006 (%)

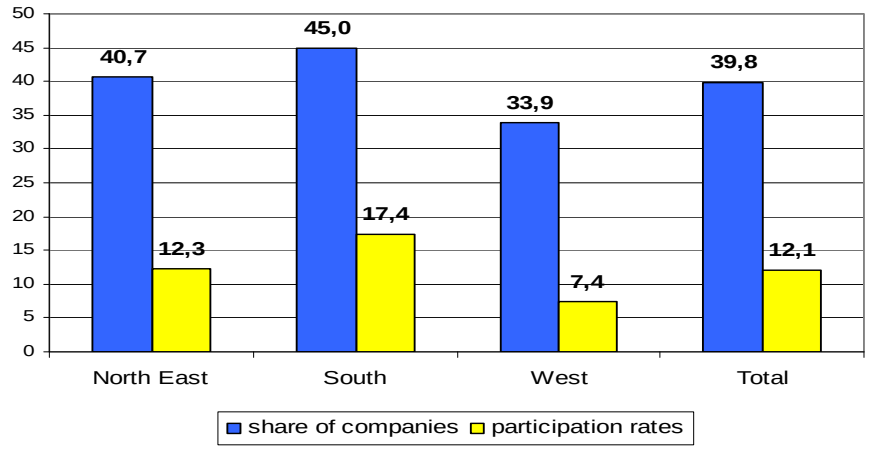


**rate of vacancies = number of vacancies which had remained unfilled for three mouths and more during 2006 / total number of employees at the end of 2006*100*

Analysing the amplitude of this phenomenon within the investigated companies, we found out that skill shortages in services sector is insignificant (0.8% of vacancies in total number of employees at the end of the 2006). Still, most affected by the skill shortages are companies from North East and West regions, as well as companies from hotels and restaurants. Although companies from hotels and restaurants declaring vacancies for three mouths and more during 2006 represent a low share in total companies from services sector, they are characterised by significant amplitude of the phenomenon determined by important difficulties of recruiting skilled personnel. So, although a low share of companies complains about the existence of vacancies, high rate of vacancies can affect the development of the sector. Also, small firms display the highest rate of vacancies which means that they are the most vulnerable category in front of the skill shortages.

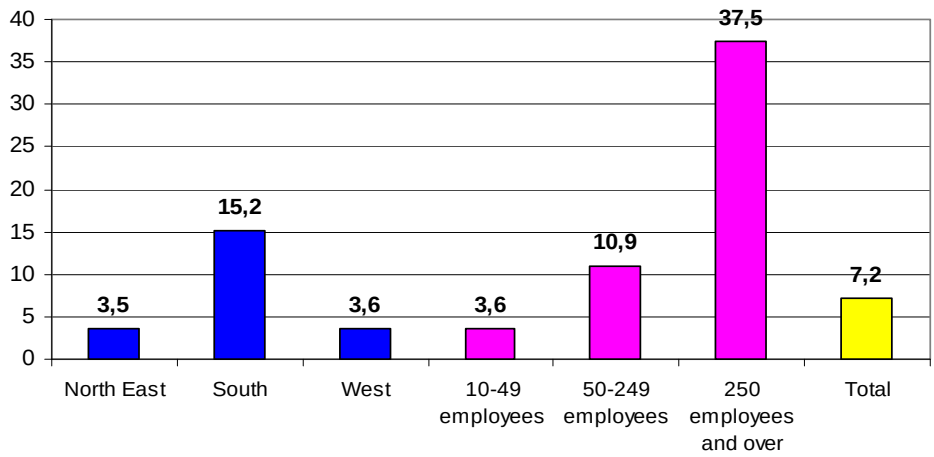
Almost 40% of the investigated companies declared that they had organised vocational training programs during 2006. 12% of the total number of employees (at the end of the same year) has been participated in such vocational training. Regional distributions indicate a worrisome fact. West region which is the most developed region of our sample displays the lowest share of companies investing in vocational training, as well as the lowest rate of employees' participation in such programs. A possible explanation is that high migration flows discourage employers to invest in vocational training.

Figure 9. Share of companies which developed vocational training programs and rates of employees' participation to vocational training during 2006, (%)



Only 7.2% of companies from the services sector carried out research-development activities during the last three years. As a matter of fact, this low share correlates with employers' poor knowledge on the research' benefits and all its potential gains in business development. During the last three years, companies from South developed research activities in the highest share (15%), while North East and West regions register about one fifth of this share.

Figure 10. Share of companies which performed research-development activities in 2006, by regions and companies' size (%)

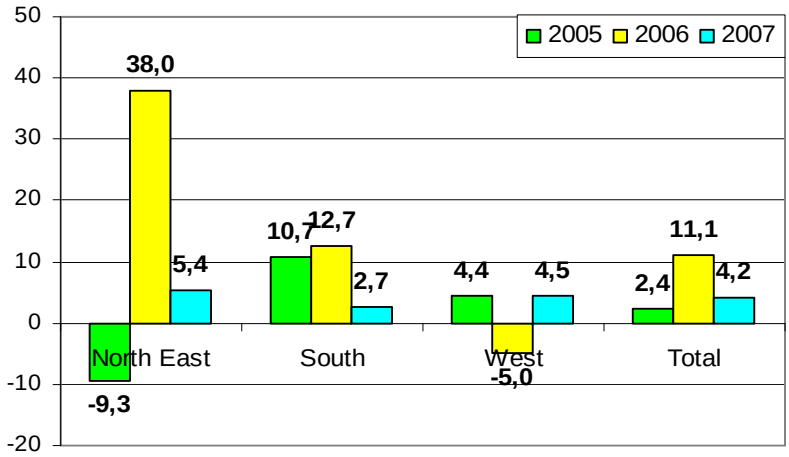


Analysing economic performances of companies from services sector, we found out that share of companies having profit at the end of the year is increasing year by year during 2004-2006 period. However, share of companies estimating the same thing at the end of 2007 is lower which indicate a certain amount of uncertainty at the level of the sector. Both North East and South regions display a positive trend of the growth rate in terms of companies obtaining

profit, while West region is the only one which has remained at a constant level. In fact, West is characterised by higher shares of companies which registered losses in 2005 and 2006. It is obvious that, although more developed, West region has a slower development rhythm than the rest of the investigated regions. Moreover, evolutions of the companies' turnover indicate a rather constant development rhythm of the services sector, in regional profile. Only South region displays a positive trend of the share of companies which increased their turnover during 2004-2006.

With respect to the number of employees' evolution, services sector registered important increases, year by year, during 2004-2007 period close connected with the expansion of the sector. North East region proves to have a "catching up" potential due to the fact that after a negative performance in 2005, it registers a significant increase in its number of employees in 2006. Although more developed, West region displays the poorest performances in terms of number of employees' growth.

Figure 11. Growth rate of the number of employees for 2004-2005 period and estimations for 2007 (% as against previous year)



V. Conclusions

After investigating economic performances of the companies close connected with their performances in terms of human and technological capital development at regional level, we find out that gaps between regions tend to reduce their dimensions. Although West is the most developed region of our sample, it seems to be characterised by a slower development rhythm as against the other investigated regions which means that we assist to a process of gaps reduction between regions.

Also, human capital seems to play a key role in the economic development of the regions. In fact, West region suffers most by skill shortages which can hamper their economic performances in high extent.

A low share of companies develops research activities, mostly large companies from industry. However, we have concluded that Romanian firms do invest in technology and equipments,

including ICT and, in a lower extent, in human capital development. Small and medium companies and especially firms from the third sector are the most emerging ones.

Finally, we conclude that, while moving towards knowledge-based economy, Romanian regions display a more homogenous pattern of economic growth. This means that, nowadays, regions can develop and reduce economic gaps between them only by enhancing their human and technologic capital.

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