

## CLUSTERS AND CONCENTRATION OF BUSINESSES IN REGIONS OF SOME EUROPEAN COUNTRIES AS TOOLS FOR ECONOMIC DEVELOPMENT

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**Abstract.** In our paper we made an overview on the literature about the creation and role of clusters and concentration of economic activities in the development of regions in Europe. Based on data available, we tried to find the correlation between the welfare, the quality of life and the clusters (especially in the knowledge-intensive sectors). In our research we assumed that the concentration of a sector in a region can have influence on the quality of life and that higher knowledge-intensive sectors of manufacturing and services have greater contribution to welfare. During research two main questions may arise: After how many years can we see beneficial effects on quality of life if a region starts to specialize. And: Can quality of life react flexibly to the changes in economy? After our research we got to the conclusion that there is a time shift in this phenomenon, the correlation is not linear and the changes are not elastic. We assumed that knowledge-driven economy has greater effect on quality of life than traditional economy but this cannot be proven generally. Moreover, regional specialties in labor market and industrial traditions seem to have great impact. We collected the data from the Eurostat database. The sample data give the opportunity to calculate the labor based location quotient (LQ), Herfindahl index and Dissimilarity index as well. All the three indices can show us the same effects that we are interested, but we have chosen LQ for our research. Eurostat has a so called high-tech industry and knowledge-intensive service database, which was used and filtered to the employment data in order to calculate the labor based LQ. The database lasts from 1994 to 2008 and shows the employment in the different knowledge intensive sectors on regional levels in 33 countries. The aim of our research was to find out how much the clusters/economic concentrations affect the development of regions and to try to define possible development ways for the future.

**Keywords:** specialization of industries, location quotient, quality of life, labor market change.

### Introduction

The goal of the paper is to measure the impact of the actions of economic policy on the quality of life, especially the relationship between regional specialization and welfare. The contribution of these factors to quality of life is difficult for several reasons, as observed in our parallel studies about quality of life. Therefore, we compared the most common index of welfare the per capita GDP with the index of regional and sectoral specialization measured by the labor based location quotient. We can easily accept that among scarce resources not every initiative can be supported, which can elevate welfare, so we should define the sectors with the greatest contribution to the quality of life. Through our investigation we examined which sector's concentration brings the greatest effect on local per capita GDP. The literature specifies those branches and sectors (traded, basic, export branches) [1] that can lead a region into success. Porter [2] names all the 41 sectors that are able to cluster in the United States. Ketels and Sölvell [3] defined 38 traded clusters, which used the four-digit NACE rev 2. (Statistical classification of economic activities in the European Union) classification, where 302 subsectors have been considered as traded subsectors from all 615. Ketels and Protsiv [4] provided there summary on cluster mapping methodology where 51 traded clusters have been declared, which overlaps 70 % of the subsectors and 80 % of the employees of these sectors within the previous studies. Beside these sectors Eurostat also separates different branches according to their knowledge intensity, which are the following ones with one example for the different sectors.

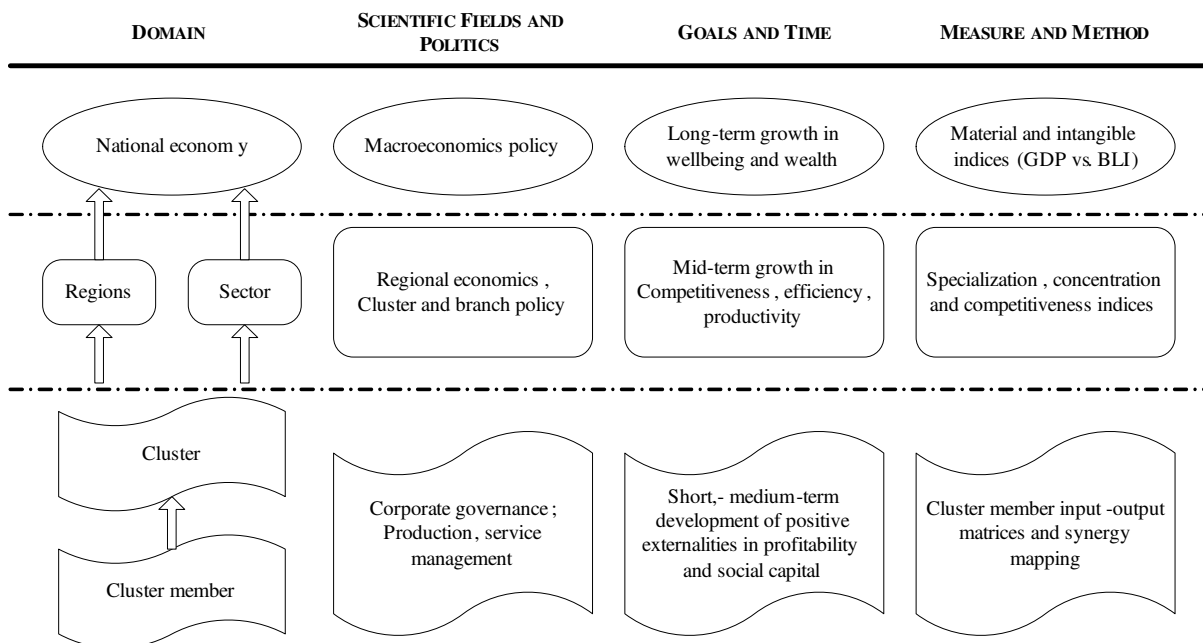
If we accept the theory of innovation driven development and the statements of Porter [2] about traded cluster, then we should only focus on the impact of these branches on the quality of life. Ketels and Sölvell [3] have made already these kinds of studies about the regional economic performance and clusters. In a broader perspective it is conceivable that small local clusters with non-traded activities (such as craftsmanship or culinary products) can connect local suppliers and producers and these clusters can have impact on their surrounding region as it was observed by tourism by Szanyi et al [5]. In this paper these kinds of non-traded clusters are not investigated. When selecting and standardizing the data we seek to observe sectors that are able to create traded clusters and through their concentration they can contribute to regional development.

Table 1

**Summary of investigated manufacturing and service sectors**

<b>Manufacturing</b>	<b>Services</b>
High-technology manufacturing <i>(for e.g. Pharmacy)</i>	Knowledge-intensive high-technology services <i>(for e.g. ITC)</i>
Medium high-technology manufacturing <i>(for e.g. Automotive industry)</i>	Knowledge-intensive market services <i>(for e.g. Marketing, logistics)</i>
Medium low-technology manufacturing <i>(for e.g. Metal manufacturing, steel industry)</i>	Financial intermediation <i>(for e.g. Banking)</i>
Low-technology manufacturing <i>(for e.g. Food industry)</i>	Other knowledge-intensive services <i>(for e.g. Education)</i>
-	Less knowledge-intensive market services <i>(for e.g. Retail)</i>
-	Other less knowledge-intensive services <i>(for e.g. Postal activities)</i>

As the first step we would like to show our deductive model, which consists of the different levels of the topic we were focusing on and the different methods that could be used for the study. Observation and modelling of clusters can be performed in different size ranges [1]. It can be interpreted on the cluster member level (micro level), on a regional level (regional or mezzo level), on the level of the sector where the cluster is working (regional – branch level), on a national scale (macro level), or in the whole branch as well (macro – branch level). The observation and the effect of the cluster can be interpreted also on these different levels, which is represented in the next figure.



**Fig. 1. Cluster hierarchy of objectives and methods (source: authors' edit)**

We define clusters as a bunch of directly or indirectly interrelated companies concentrated in a region. Therefore, our primary criteria for clusterization are spatial proximity and relational proximity as a secondary factor, although we fully accept both approaches. According to our approach relational proximity can be guaranteed directly with cluster broker systems and activities while site selection is based on a more complex cooperation on financial factors and strategy. So, we think that it is much easier to create relationship between the companies co-located in a region then attracting the interrelated companies into the same region, although both activities are needed for a good cluster policy. The definition used in our study for clusters considers spatial proximity as hard constraint because we accept that the goal of the clusters is the development of the region. Regional economics and management studies together provide us a wide range of knowledge but only the two approaches together can define clusters absolutely properly. Micro-level research can use business economics

models, management theories or tools of microeconomics, but a regional study must focus on spatial economic approaches while the cluster policy itself will be connected to mostly macro economical disciplines. During our research we will focus on the regional approach while at the proposals and methodological recommendation we will suggest some possible future research topics for a new management base approach.

Patik [6] decided to research the link between the actors of clusterization where she used input-output matrices, graph analysis, labor based concentration indices and also qualitative case studies. If we would like to measure spatial concentration of companies all kinds of location quotients (labor based location quotient (LQ), entrepreneurial quotient), Herfindahl Index, Dissimilarity Index [7], Hoover- and Krugman index, Entropy and Redundancy measures (Theil-index), Lorenz-curve, Gini-coefficient, and finally the Ellison-Glaeser concentration index [8] could be used. The Herfindahl index and Dissimilarity Index are primarily used for the measuring of sectoral concentration and specialization [8] calculated on different basis [9] but the formula can be used also to measure regional concentration. The Dissimilarity Index can be easily converted to differential specialization index or to Hoover spatial inequality measure [9]. The basis for the Herfindahl can be the market share of business, the number of employees, the distribution of turnover, or some natural objects are the result of the test, which concentration is the projection basis of our study. The greatest difference between the common LQ used and the labor-based LQ is that the projection basis is not the number of employees but the size of the territory. The agglomeration index can be also considered as a special type of LQ (named as AQ Porter [2]), but it is more similar to the differential specialization index and the sectoral corrected specialization index.

The sample data that were used for the paper give the opportunity to calculate the labor based LQ, Herfindahl index and the Dissimilarity index as well. All the three indices can show us the same effects that we are interested in, in our study we have chosen LQ for our researches. The critical observation of the usage of LQ is not represented in the paper, but was observed by different researchers [10].

Our main findings can be summarized in two different categories. First of all we examined the change of the employment structure in the investigated countries and as a general result we found that the role of industry decreased in the 14 years of the research period while the services gained territory on the labor market. The biggest lag in industry was by low technology manufacturing, which is one effect of the spreading automatization and the attraction of services. The highest gain by the services has been experience by knowledge intensive market services, which we consider one of the key elements of regional development just as well as the knowledge intensive high-technology services. The expansion of services has been seen after the research period and we think that the trend will not change in the near future.

Table 2

### Employment changes in sectors distinguished by knowledge intensity

Change of the weight of total employment from 1994 to 2008, %					
High-technology manufacturing		Medium high-technology manufacturing	Medium low-technology manufacturing	Low technology manufacturing	
-0.34		-1.33	-1.59	-3.67	
Knowledge-intensive high-technology services	Knowledge-intensive market services	Financial intermediation	Other knowledge-intensive services	Less knowledge-intensive market services	Other less knowledge-intensive services
0.78	3.98	-0.26	3.40	-0.09	-0.89

Besides the examination of the labor structure change our other result was the investigation of the correlation between the labor based LQ and per capita GDP on power purchasing parity. The average correlation rates cannot give a general overview about the findings on regional level but it is enough just to have a quick understanding on our findings. No high correlation has been found with any of the knowledge intensity distinguished sectors, but the highest among the low correlation rates were in medium-low and high technology manufacturing and in the field of knowledge intensive market

services. If we compare the data with the findings about labor market restructuring we could say that industry has still a significant effect on regional welfare although its results will not be based on human factors but more on technical development. In the field of knowledge intensive market services such as marketing, logistics, different consultancy activities we can see that they have effect on welfare and also on labor market, therefore we think that they can be a good focus for further studies.

Table 3

### Correlation between welfare and specialization

Average correlation indices of the different sectors between regional per capita GDP and LQ (between 1994 and 2008)					
High-technology manufacturing		Medium high- technology manufacturing	Medium low- technology manufacturing	Low technology manufacturing	
0.16		0.08	0.17	-0.01	
Knowledge- intensive high- technology services	Knowledge- intensive market services	Financial intermediation	Other knowledge- intensive services	Less knowledge- intensive market services	Other less knowledge- intensive services
-0.12	0.14	0.11	0.03	0.00	0.08

In order to have specified insight on our results we picked the result of Austria, Hungary, Slovakia and Slovenia.

In the region of Burgenland in Austria three different sectors of medium-high technology manufacturing (0.73), knowledge-intensive high-technology services (0.95) and financial intermediation (0.85) showed high correlation by significance rate of 95 %. If an economic policy would focus on these sectors likely increase of welfare could be also observed. In Niederosterreich we only found a significant result for the financial intermediation with the value of 0.73. Steiermark high technology manufacturing and knowledge intensive market services had high correlation rates. In Voralberg other knowledge intensive market services (0.70) and other less knowledge intensive services (0.69) showed high correlation with the per capita GDP. To summarize all these in the regions of Burgenland and Steiermark we found the most sectors with positive correlation and in Burgenland three sectors of medium-high technology manufacturing, knowledge-intensive high-technology services and financial intermediation had the highest values. The steepness of the GDP increase was steady in the period, but the location quotient changed rapidly in different ways in the other regions. The best fit with the change of GDP has been found for high technology manufacturing and for knowledge intensive market services on an average basis.

In the Hungarian data range medium-high technology manufacturing the sector, which includes automotive industry as well, showed the most interesting results According to the labor data in this sector the employment enlarged from 221.000 to 263.000, while in high technology manufacturing 145.000 to 233.000. The LQ of high technology manufacturing in Central Hungary and Central Transdanubia was the highest and the employment rate in this sector was 30 % higher than the country average. In 1997 and 1998 in Central Transdanubia labor concentration was twice as high as the national average and this concentration has affected the regional welfare as well. Just to test the phenomena for Hungary we extended our study until 2012 where the same trend has been observed, but next to the high technology manufacturing the sector of medium-high technology manufacturing has strengthened in this period. Medium-high technology manufacturing (0.68) and less knowledge intensive market services (0.77) showed higher correlation in Western Transdanubia, which coincides with the economic policy used for this region to develop the area as a central for automotive industry. The most significance result came from the less knowledge intensive market services sector where positive correlation has been found in Central Transdanubia and Western Transdanubia. As the region of the capitol the weight of Central Hungary region is significant in the whole sample, on an average basis 31 % of the employees were working in this region. Mainly services (knowledge-intensive high-technology services, knowledge intensive market services, financial intermediation) had high LQ value in this region, the average value was between 1.5 and 1.7, so they are overrepresented in this

region. Unfortunately, only knowledge-intensive high-technology services provided positive correlation data with the value of 0.77.

In the western region of Slovakia high technology manufacturing showed the highest rate of 0.957, so we assume that the role of this sector was really important in the region and the contribution to welfare was also high. The region of Bratislava is the most populous and has the most employees in the country employing almost 36 % of all employees in the investigated period. Financial intermediation showed medium high correlation (0.66) in this region. The eastern region of Východné Slovensko showed correlation of 0.61 in medium-low technology manufacturing, which has been seen in the labor data as well, this manufacturing sector enlarged itself in the research period.

Slovenia as an example is interesting because of the methodology of LQ. The LQ in countries with only two regions leads us to extremities where one region will provide extremely high results because of the higher amount of labor while the other will give us extreme negative signs. For instance in medium-low technology manufacturing we will see very good results from the western region because they have 1.65 times more employees in this regions as the eastern region. It was the case for financial intermediation and for other less knowledge intensive market services as well.

### Results and discussion

The research focused on the correlational relationship between employment based locational quotients (LQ) and the per capita GDP where we examined the data of 33 countries between 1994 and 2008. The goal was to see clearly the relationship between knowledge intensive sectors and clusters and the chosen index of welfare.

In our earlier studies we showed the literature background of regional development and specialization in the context of quality of life. The value of LQ in the investigated period of time changes more often and has higher volatility than the per capita GDP, but from a regional aspect there were accentuated regions with better performance in the sector as in the others. This means that the maximum single and the maximum average LQ is coming from the same region. As an example this happened from 10 out of 10 times in Austria and 7 out of 10 times in Hungary. Similar effects were observed for maximum single and maximum average GDP as well. There was just one exception in Greece where maximum single per capita GDP and the average maximum did not come from the same region. In the other regions the region with the most welfare had (naturally) the highest average welfare as well. From this we can assume that there are no outlier data, which cannot be interpreted by the average for GDP per capita. Although the speed and magnitude of the change of LQ is higher than as it was for per capita GDP, out of 190 sectoral results in 166 the maximum and the average LQ were in the same region and no great reallocation of labor between the regions or sectors were observed.

### Conclusions

After revealing the connection between the variants and summarizing the results of the thesis we can accept there are no general good practices that can increase welfare of one region or can revive its economy. So the assumed "panacea" does not exist. Using this pharmaceutical metaphor there are still remedies with large spectrum such as the advancement of services, which after achieving a certain level of development can easily enhance welfare in the whole territory. The concentration and de-concentration of branches and industries are parallel processes, so evolution cannot be acquainted by simple monoculture economic models. Because of the exiguity on the labor market concentration in every branch cannot happen, but according to our mainstream economic paradigm constant growth can be achieved. The important message of this research is although concentration of industries and welfare are interrelated factors of society numerous other characteristics and attributes of the regions appear, which can be part of new studies and researches connected to this topic.

A well-organized regional cooperation is not only a great employer but it can also generate local values, change mindset and become a leader employer in the region. In this study we investigate the role of clusters in the European regions, therefore we assume the spatial proximity of the companies is a crucial point and the effect on welfare and quality of life is also generated in the local regions.

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