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Identifying Regional Economic Concentrations in CEE Countries

Working Paper 2011

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Industries, Regions, Methods

with financial support from
Federal Ministry of Education and Research

This study is part of the research project "Identification and function of research clusters in Central and Eastern European countries" of the Fraunhofer Centre for Central and Eastern Europe on behalf of and with financial support from the Federal Ministry of Education and Research (BMBF), department 113 (project funding reference number 16 I 1605).

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Leipzig, May 2011

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1 Executive Summary

In this paper we conduct a first attempt at mapping regional economic clusters in CEE countries, namely the Czech Republic, Poland and Croatia. This cluster mapping exercise has two main goals.

The first one is to establish a consistent and comprehensive approach to cluster mapping for the whole CEE region. This implies the search and following the usage of a single data base for all countries, while avoiding having to fall back on national statistics. The only data source available for all countries is employment data, specifically the Labor Force Survey (LFS) and Structural Business Statistics (SBS) from Eurostat. Even in those countries not (yet) belonging to the European Statistical System (ESS), fairly compatible employment data are available. Additionally, a methodological framework has been developed that is compatible with the data sources, scalable, and flexible enough to be used for all CEE countries. This framework uses only the data also used for mapping, instead of using additional data sources, which are just available for a few countries, like most other mapping exercises do. The framework is based on concentration measures and follows a multi-step-procedure. In the first step internationally competitive or labor intensive industries are identified for the whole economy based on trade performance and the location quotient. The latter is also used in the next step to identify regional industry concentrations. If available, different data sets are used, whose results are later reconciled. In this paper, reconciliation follows mostly the LFS results, because the SBS data includes comparably often restricted data. In a last step, for all industries the coefficient of localization is determined, to ensure that only regionally concentrated industries are identified as clusters. The necessary threshold values for the concentration measures can be adapted to the specific country and data set used.

The second goal was to identify relevant regional clusters in the three countries, to compare the respective results with each other as well as with existent cluster initiatives and the respective economic support policies.

The mapping exercise reveals an ongoing process of structural change among the regional industry concentrations. In all three countries noteworthy changes of the mapping results for the years 2004 to 2007 and 2008/09 occur. In the Czech Republic, Prague is increasingly characterized by services industries, especially business services and creative industries usually associated with metropolitan areas. In the other NUTS-2 regions a lessening of regional specialization is observable, which is the result of a decreasing specialization in manufacturing industries, while services industries register slightly more regional concen-

trations in the newer data than in the period 2004-07. In contrast an increase in regional specialization can be observed in Poland, which is also the result of the growth in services industries concentrations; in manufacturing industries the number of regional concentrations is stable. Similar to the development in the Czech Republic, the capital region Masovian experiences a substantial increase of business services industries as well as other service industries typical for major cities, even though, unlike Prague, the region also comprises large rural areas besides Warszawa. The results for Croatia are somewhat less reliable, because only one data source can be evaluated and, moreover, for only three years instead of six years for the other two countries. A further impediment is the small size of the country and the related small number of regions. Only very few regional industry concentrations can be identified, although for the most current data of 2008/09 the results are more interesting. Northwestern Croatia, including the capital city Zagreb, now has considerably more industry concentrations than before. In general, more services industries exhibit regional concentrations.

2 Introduction

Knowledge of and information about clusters and cluster initiatives—the institutionalized collaboration of actors in a cluster—as potential partners are prerequisites of meaningful and successful initiation of contacts and cooperation projects of German cluster initiatives in Central and Eastern Europe (CEE). Even though, addressees of cooperation efforts should be carefully chosen. Given the proliferation of politically and funding induced cluster and network initiatives a thorough examination of regional industry agglomerations seems necessary. Based on their results initiatives can be classified into those aiming at combining and increasing existing strengths and those aiming at establishing an industry. The first would be located in a region with an agglomeration in the respective industries, the latter everywhere else.

There exists a broad variety of identifying approaches for regional economic agglomerations or clusters.[1] Unfortunately, a number of these approaches have data requirements that are internationally not fulfilled. Regional accounts are only available for very few countries and are often less detailed than national accounts. Especially the degree of detail on regional or ideally even local data is usually very restricted and only in few cases are these data internationally comparable. The situation in CEE is made worse by the rather short time period since the transformation from centrally planned economies ended. This constrained official statistics in terms of resources as well as stable survey populations.

Since the EU-entry or the initiation of accession procedures of most of the CEE countries the situation improved. In Europe, regional statistics is generally based on the EU NUTS-classification, which provides a comparable base for regional analyses. In the last two decades Eurostat—the statistical agency of the EU—made a range of regional statistics mandatory for all EU-countries (and indirectly through the accession procedures for all accession countries). Following these, the use and especially the thorough implementation of the NUTS-classification increased considerably. Consistent and internationally comparable identification of economic agglomerations benefitted from these statistical developments. Nevertheless, data availability is still the limiting factor for top-down/macroeconomic approaches to the identification of economic agglomerations as a first step in cluster identification exercises.

For the cluster classification a fairly simple, but in terms of data availability still ambitious, approach of identifying regional agglomerations was chosen. It is

[1] Graffenberger, M. et al. 2011.

mainly based on concentration measures but complemented with some further information concerning trade patterns and industry size.

The next chapter includes a description of the data and methods used. Then follows a short overview of the regions of each of the three countries Poland, the Czech Republic, and Croatia. The empirical results are presented in the fourth chapter. The last contains a summary and conclusions.

3 Data and Methods

3.1 Data

To identify regional economic agglomerations as precursors and indicators of economic clusters, highly detailed macroeconomic data is needed. The best possible data sources are detailed regional accounts based on national account methodology (SNA93 or ESA95). In principle, Eurostat requires from all EU-countries regional accounts tables for NUTS-2 regions for the 16 NACE rev. 1.1 industry sections.[2] Thorough agglomeration studies, especially with the aim of identifying clusters, would need an even higher disaggregation of industries, preferably on the level of divisions (2 digits; 59 industries) or even groups (3 digits; 221 industries). However, for a number of EU member states regional accounts data is only available with considerable gaps in coverage of the individual industries due to data limitations and restrictions. This precludes the use of regional accounts in this study.

Given the need for highly disaggregated data, only two other regional data sources exist on the level of the EU which are exhaustive enough; namely, structural business statistics (SBS) and the labor force survey (LFS). Both are used in this study, which allows for comparison and further refinement of the results through cross-checking.

The SBS aims to provide annual data on all private businesses in manufacturing and services.[3] Up to reporting year 2007 this included the NACE rev. 1.1 sections C-K with the exception of section J (financial services). Following adoption of NACE rev. 2,[4] coverage will be broadened slightly to include sewerage and

2 See for a detailed description of the NACE rev. 1.1 classification, its divisions and individual industry descriptions, European Commission (1996).
3 See for a description of the SBS, European Commission (2006).
4 See for a detailed description of the NACE rev. 2 classification, its divisions and individual industry descriptions, European Commission (2009).

waste management as well as some new sections and divisions (redefinitions of classes) from reporting year 2008 onwards. Due to the long time limits for reporting and delivering data to Eurostat, only data up to reporting year 2007 is used here. Therefore, the often non-market services in education and health are not included in the SBS results as well as the diverse activities of section O (other community, social and personal service activities). Also not included is agriculture and fishing.

Enterprises are classified according to their main economic activity (normally based on value added) in a top-down process ([1] section, [2] division, [3] group, [4] class). The implementation of SBS is left to the member states, so systematic differences in the allocation of businesses and local units to industries cannot be ruled out. This is primarily a result of different business conventions and habits, e.g. in the organization of value chains or customer-supplier relationships.

On a national level, SBS provides highly detailed disaggregated data on industries down to single NACE-classes. Information is available about number of businesses, number of employees, wages, investment, value added and its constituent components. Unfortunately, on a regional level the data is much less detailed. Only number of local units, wages and number of employed persons for NACE-divisions (2 digits) is released and—except for the number of local units—even this is kept confidential in a non-trivial number of cases. Nonetheless, the data allowed a valid analysis and the different indicators permit a comparison of the results and can provide a richer picture of the specific regional economic structures. SBS data for Croatia is only available for the year 2008 based on the NACE rev. 2 classification, which was at the time of the study not yet published by Eurostat for the current EU member states.

In contrast to the SBS covers the LFS[5] all industries but is restricted to the number of employed persons as the only useful indicator for the purpose of this study. The LFS is a quarterly survey of the entire population with a sampling size of between 0.3% and 3%. Questions cover the whole range of employment status, occupation and working life with additional yearly *ad-hoc* modules. For this study, the interesting question is the economic activity of the employing institution. Depending on the respective National Statistical Office, the individual answers are controlled and possibly corrected afterwards. In some countries this might lead to differences between SBS and LFS.

For the empirical analyses annual averages of the LFS are used from 2005 on, as this provides the highest accuracy and coverage. Data before 2005 is from

[5] See for a description of the LFS, European Commission (2010).

the spring quarter as this is the quarter with the most comprehensive data set. Due to the fairly small sample size, regional results are often incomplete or restricted. At least, the error margins are comparably high. This is especially relevant for small industries with less than 0.5% of total employment. Unfortunately this limit is not reached by the majority of industry groups (3-digits); hence, Eurostat disseminates for some countries even national data only on industry divisions (2-digits).

To establish some first insights into international competitiveness of the national economies of the three analyzed countries information on external trade of manufacturing industries was used. The data stems from the Comext database of Eurostat and is prepared by wiiw.[6] For all manufacturing industries import and export volumes in Euro as well as gross value added are available. The trade data is further divided into flows to and from the EU-15 (the 15 EU member states before the enlargement of 2004), the EU-27 (the EU member states after the enlargement of 2004 and 2007) and worldwide. The database is only available in NACE rev. 1.1 classification.

3.2 Methods

In this study a general to specific, top-down approach is followed to identify economic agglomerations as the precursors for cluster and cluster development. In a first step the national economies of Czech Republic, Poland and Croatia are examined to identify possible specializations and comparative advantages. Mostly the EU15-countries serve as a benchmark.

Sectoral relative trade balances and relative export-import-ratios are calculated for all industries (NACE-divisions) of the manufacturing sector as well as for mining and energy/water production and distribution. The relative trade balance is calculated as trade balance (exports minus imports) in the respective industry divided by national gross value added whereas the export-import ratio is only dependent on trade flows. The results give some indication about the development of international competitiveness and the importance of the international market. Following this, national specialization patterns are analyzed. This is based on the location quotient (LQ)[7], which is determined for the LSF (employment) and SBS (local units, employment, wages) data sets, respectively. The results for the different data sets are compared and a consensus list of national-

6 The Vienna Institute for International Economic Studies 2010.

7 The location quotient is the ratio of the regional employment share of an industry and its national employment share. Values above 1 show an overrepresentation of that industry in the region compared with the national average. See for a discussion of the location quotient as identification tool for economic agglomerations, e.g. O'Donoghue, Gleave 2004 p. 421.

ly important—essentially for employment—industries is compiled. The benchmark region here is the EU-15. Unfortunately, LFS data for some smaller countries is only available on NACE divisions, which limits the degree of detail. Similar problems arise with SBS data. In general, all countries publish data at the lowest NACE-level. But a sizeable number of observations are kept confidential which, in a lot of cases, propagates to the subsequent aggregates. This in turn prohibits the calculation of EU-15 sums, so that any further analysis of the more detailed data is stymied. The outcome is a shortlist of the most internationally competitive industries and of the comparably important industries for employment. These two are neither mutually exclusive nor equal.

The principal approach for the identification of regional concentrations is similar, with the exception of trade. International trade is only investigated on the national level because of missing and/or possibly biased data for the regions.[8] First, based on the coefficient of localization[9] the spatial concentration of all industries is analyzed. This gives an indication if possible regional agglomerations are the result of an actual concentration process or, on the contrary, they are a result of underperformance in other, more or less related, industries in that region. Next, the coefficient of specialization[10] is calculated to obtain an indication of general concentration trends in the regions. This provides, to some degree, a reference for the later identification of regionally concentrated industries. If a region is characterized by a high coefficient of specialization then it has to be expected that a comparably high number of industries are later identified as agglomeration. Then, the LQ is determined for all industries in all regions. This is again done with all SBS and LFS data, so a comparison is possible between the different data sets. In most cases the results are fairly similar but in some industries marked differences exist. Last, only SBS data is used to obtain the cluster index (Sternberg, Litzenberger 2004, p. 779) as a supposedly more advanced indicator for regional agglomerations and in particular clusters.[11]

8 Interregional trade might influence the trade statistics of the individual regions, especially in the presence of trade and logistics hubs, e.g. international airports or ports, so that the allocation of competitive advantages might be biased.

9 The coefficient of localization is a measure of the geographical concentration of employment in a specific industry. The more evenly spread an industry is, the smaller is the coefficient. Basis of this measure is the difference of the regional employment share of an industry and its national average.

10 In principle the coefficient of specialization measures the difference between the regional shares of individual industries and their national shares. The value of this coefficient is bounded between 0 and 1 where higher values imply higher region specialization compared with the national average.

11 The cluster index expands the typical concentration measures by area and population of the region. It is defined as:

$$CI_{ij} = ID_{ij} \times IB_{ij} \div BG_{ij} = \frac{\frac{b_{ij}}{a_i}}{\frac{\sum_{i=1}^{n_c} b_{ij}}{\sum_{i=1}^{n_c} a_i}} \times \frac{\frac{b_{ij}}{z_i}}{\frac{\sum_{i=1}^{n_c} b_{ij}}{\sum_{i=1}^{n_c} z_i}} \div \frac{\frac{b_{ij}}{s_{ij}}}{\frac{\sum_{i=1}^{n_c} b_{ij}}{\sum_{i=1}^{n_c} s_{ij}}} = \frac{\frac{b_{ij}}{\sum_{i=1}^{n_c} b_{ij}}}{\frac{z_i}{\sum_{i=1}^{n_c} z_i}} \times \frac{\frac{s_{ij}}{\sum_{i=1}^{n_c} s_{ij}}}{\frac{a_i}{\sum_{i=1}^{n_c} a_i}}$$

After conciliation of all regional results, a first overview of current economic agglomerations is established. But agglomeration or concentration of industry is not growth enhancing in itself, especially not for transition countries. Therefore, these agglomerations may simply be artifacts of past economic developments and even hinder current growth. Accordingly, the identification of current growth industries is needed.

For all here applied coefficients, meaningful threshold values have to be established. Unfortunately, the literature does not provide unanimous conclusions on such thresholds. Even worse, the ongoing lively debate on methods to derive optimal thresholds and their results is far from over. Eventually, all empirical identification exercises rely on more or less ad-hoc specifications of thresholds.

In the following, all threshold values chosen are data-based and specific to the respective area under investigation. High international competitiveness of an industry is assumed if the trade balance is positive and amounts to at least 30% of local production or if the export-import ratio is bigger than 2. This might seem restrictive, but the results show that only very few industries are consistently below these thresholds and simultaneously have a positive trade balance. Most of the industries below these thresholds have at least sometimes negative trade balances, and therefore should not be treated as internationally competitive.

For the location quotient, a more flexible approach was chosen but nonetheless the resulting thresholds are uniform again. The threshold value chosen should result in about 10% acceptance rate as regional agglomeration. This was first done independently for all data sets on the regional and country level. Because the resulting thresholds were fairly close together (between 1.7 and 2.1) it was decided to use a value of 1.8 for all data. In the following conciliation exercise potential agglomerations were chosen that exceed the value at least in one data set. To be finally selected the potential agglomerations are evaluated in all data sets. In those cases were the threshold values are not always exceeded the LFS data gained precedence as long as no additional information contradicts this. E.g., if other data show that only a single company is located there, than irrespective of the number of employees such a concentration should not be counted as agglomeration. The justification of the precedence of LFS data is the lack of confidentiality problems and its universal survey population.

where a_i is the area of region i, s_{ij} the number of companies in industry j in region i, b_{ij} the number of employees in industry j in region i and z_i the population of region i. ID represents the relative industrial density, IB the relative industrial stock and BG the average company size to correct for possible outliers due to presence of single large-scale enterprises.

4 Overview of Regions

To facilitate the interpretation of the regional results below, in the following some background information on administrative structures as the basis for the regional division of the three countries is provided. Also, an overview of size and population as well as the level of economic development for the different regions is given.

Czech Republic

The administrative structure of the Czech Republic has three main layers.[12] Between national and local administrations lie the 14 *kraje*, which were established in 2003 and partly succeeded the former 76 districts. Responsibilities of the former districts (abolished in 2003) which were not delegated to the *kraje*, were vested to a special group of (mostly bigger) "municipalities of extended scope". The *kraje* represent the NUTS 3 regions, while the NUTS 2 regions are formed of one or two (in one case three) *kraje*.[13] Essentially all *kraje* with more than a million inhabitants form an individual NUTS 2 region (Prague, Central Bohemia and Silesia), with all other paired with another *kraj* to reach a sufficient population size of over one million. The allocation of responsibilities for certain policy areas on the local level is fairly complex. There exist three basic levels of municipalities with increasing responsibilities. Additionally some local powers are concentrated in a subgroup of municipalities, but these municipalities are not necessarily on the same responsibility level. For the purpose of this analysis only the structure of the NUTS 2 and 3 regions is important, so Table 1 provides a basic overview.[14]

12 The following description draws heavily on Hemmings, P. (2004) and its sources.
13 See for a description of the NUTS classification, European Commission (2007).
14 See Table 18 in the appendix for an overview of the kraje.

Table 1: Czech Republic, Regions Overview, 2008

Region	Prague	Central Bohemia	Southwest	Northwest	Northeast	Southeast	Central Moravia	Silesia
Kraj	Prague	Central Bohemia	Plzen, South Bohemia	Karlovy Vary, Usti nad Labem	Liberec, Hradec Kralove, Pardubice	Vysocina, South Moravia	Olomouc, Zlin	Silesia
Area (km^2)	496	11 015	17 617	8 649	12 440	13 991	9 230	5 426
Population	1 222 700	1 216 300	1 200 100	1 141 500	1 502 300	1 658 400	1 233 100	1 250 100
GDP/head, € (EU27 =100)	106	7	44	38	41	44	39	42
GDP/head, PPS (EU27 =100)	172	75	71	62	66	72	62	67
Employment rate (total population)	52.8	9.3	49.6	45.6	47.3	47.3	47.0	45.5
Unemployment rate	1.9	2.6	3.1	7.8	4.0	4.0	4.9	7.4
Agriculture (% GVA)	0.2	3.1	4.6	1.7	3.7	4.3	3.4	1.6
Industry w/o construction (% GVA)	13.1	40.1	36.0	41.0	38.9	33.1	37.8	43.6

Poland

Poland's public administration consists of four layers: the municipalities (*gminas*) at the local level, counties (*powiats*) and regions (*voivodeships*) at the regional level and the central government at the national level.[15] In the NUTS classification the voivodeships represent the NUTS 2 level, while NUTS 1 (*regions*) is formed of the combination of two to four voivodeships and the NUTS 3 level (*subregions*) by a combination of between one and twelve powiats. The regional and local administrations are non-hierarchic, i.e. the upper layers have no oversight capacity over the lower levels. In principle the gminas have sole responsibility for all local matters and the powiats for regional matters. The voivodeships are responsible for regional development strategies and the regional economy and are partly the result of EU membership as responsible body for EU structural funds. Voivodeships act also as state administrations and assume therefore a dual role in the Polish local government system. Today's voivodeship areas follow mainly inter-war and post World War II boundaries.

15 For a comprehensive overview of the Polish system of local governance see Kowalczyk (2000).

Table 2: Poland, Regions Overview, 2008

Region	Area (km²)	Population	GDP/head, € (EU27 =100)	GDP/head, PPS (EU27 =100)	Employment rate (total population)	Unemployment rate	Agriculture (% GVA)	Industry w/o construction (% GVA)
Masovian	35 558	5 169 500	52	87	48.0	6.0	3.8	15.6
Łódź	18 219	2 552 400	30	50	52.2	6.7	6.5	26.2
Świętokrzyskie	11 710	1 274 200	25	42	46.3	8.8	6.3	26.4
Subcarpathia	17 845	2 098 400	22	37	41.6	8.2	3.5	26.7
Lesser Poland	15 183	3 283 100	28	47	40.3	6.2	3.0	24.1
Silesian	12 334	4 649 900	35	58	39.2	6.6	1.1	32.4
Opole	9 412	1 035 100	27	45	37.2	6.5	5.3	29.
Lower Silesian	19 947	2 877 700	36	59	39.9	9.1	2.3	32.9
Lubusz	13 988	1 008 700	29	48	41.3	6.5	4.4	29.0
Greater Poland	29 827	3 392 200	34	57	38.3	6.1	6.5	27.1
Kuyavian-Pomeranian	17 972	2 067 000	28	47	35.5	9.1	5.9	24.8
West Pomeranian	22 892	1 692 600	29	49	33.4	9.5	4.2	18.5
Pomeranian	18 310	2 215 200	32	54	35.9	5.5	2.9	23.9
Warmian-Masurian	24 173	1 426 600	24	41	39.2	7.4	7.8	23.1
Podlaskie	20 187	1 192 100	24	40	41.6	6.4	10.7	19.9
Lublin	25 122	2 164 000	22	37	45.5	8.8	7.9	18.8

Croatia

In contrast to the two other countries Croatia has only a two tiered regional administrative system. At the local level are municipalities (*općine*) and towns (*gradovi*) with the first being the more rural areas (collections of villages) and the latter the more urban (mostly cities). Above the local level follow counties (*županije*) as the sole regional administrative tier.[16] These represent also the NUTS-3 level while the NUTS-2 level is represented by three collections of counties. A NUTS-1 level does not exist; respectively the whole country represents also the NUTS-1 level.

16 For an overview of the local and regional administrative system in Croatia see SIGMA (2004) 17-25. In the last years some further refinements and changes of the local government system were made without changing the overall structure of the system.

Table 3: Croatia, Regions Overview, 2007

Region	Northwestern Croatia	Central and Eastern Croatia	Adriatic Croatia
Županija	City of Zagreb, Zagreb, Krapina-Zagorje, Varaždin, Koprivnica-Križevci, Međimurje	Bjelovar-Bilogora, Virovitica-Podravina, Požega-Slavonia, Brod-Posavina, Osijek-Baranja, Vukovar-Sirmium, Karlovac, Sisak-Moslavina	Primorje-Gorski Kotar, Lika-Senj, Zadar, Šibenik-Knin, Split-Dalmatia, Istria, Dubrovnik-Neretva
Area (km²)	8 669	23 220	24 755
Population	1 669 200	1 305 600	1 464 000
GDP/head, € (EU27 =100)	48	27	38
GDP/head, PPS (EU27 =100)	75	43	59
Employment rate (total population)	41.0	33.3	33.8
Unemployment rate	6.2	14.4	9.6
Agriculture (% GVA)	3.7	15.7	8.2
Industry w/o construction (% GVA)	22.4	21.0	17.3

The three NUTS-2 regions follow only partially historical or geographical borders. This leads to fairly high diversity concerning population, urbanization, economic development and specialization within these regions. A short statistical description of the counties is available in the Appendix.

5 Results

5.1 Czech Republic

Trade

The Czech Republic is the most open and export-oriented of the three analyzed countries. In the last years exports to the EU increased as well as overall exports; also, export surpluses increased. Table 4 provides some more detailed results.

Table 4: Foreign trade statistics, Czech Republic, manufacturing sector

		2007/08	2003-2005	2000/01
Export intensity (exports as percentage of production)	EU15	48.3	47.6	43.3
	EU27	64.4	60.4	54.2
	World	76.1	69.7	62.8
Export import ratio	EU15	1.1	1.1	1.0
	EU27	1.1	1.1	1.1
	World	1.0	1.0	0.9
Trade balance (as percentage of production)	EU15	3.6	2.5	0.3
	EU27	7.1	5.6	2.9
	World	2.7	0.1	-5.2

Given the fairly strong international position of the Czech Republic, most of the identified national specialization industries are internationally competitive and exhibit a substantially positive trade balance. Even the least competitive do not record sizeable deficits. However, the services sector is not represented in the trade data, while it represents the biggest part of industrialized and post-industrial economies. Based on employment important industries include mining (C), manufacture of wood products (20), manufacture of rubber and plastics (25), manufacture of other non-metallic mineral products (26), manufacture of electrical machinery (31), manufacture of radio and television equipment (32) and manufacture of motor vehicles (34) as well as collection and purification of water (41).[17]

[17] The numbers/symbols in () are the NACE codes of the respective industries. In almost all cases the codes of similar or equal industries changed between NACE rev. 1.1 and rev. 2.

LFS

The just mentioned results are based on the SBS as well as trade data and a comparison with the EU-25/27. Data from the LFS allow in principle a much more detailed comparison, given the absence of restrictions of confidentiality rules.[18] But for a number of smaller EU member states only data for NACE divisions (2 digits) is published by Eurostat. Nevertheless, the resulting bias seems sufficiently small as the results for 2 digits industries (EU-15 less Luxembourg) compared with 3 digits industries (9/10 member states out of EU-15) reveal (see Table 5).[19] The analysis (i.e., the calculation of the different coefficients) is done in one step for all industries of the 2-digit level and for all industries of the 3-digit level. This implies that all 2-digit industries which include only one 3-digit level industry are analyzed twice. All internationally competitive industries are also found in the list of employment-intensive industries. Still, a number of important differences exist. E.g., manufacturing of motor vehicles (34) is important on division level in the SBS data, but not in LFS data where only parts and accessories (343) is above the threshold value. Also, some industry divisions (and groups) are comparatively relevant in both SBS and LFS data that seemed less competitive in the trade data. This is less a problem of industry coverage as the number of service industries that are identified as especially important is fairly small, than probably a result of internal (national) value or supply chains.

18 The LFS being a survey requires a very cautious interpretation in some aspects. First, the basic designation of employment data to industries is based on the assessment of the individual employee. In some countries this is cross checked with business registers, in some not. Such differences in procedures might lead to biased results because of individual perceptions and national economic peculiarities. Second, the limited sample size implies fairly wide error margins for a number of smaller industries, which become more acute at lower aggregation levels. For the EU, the minimum industry size to be published is around 8 000 persons employed, but data for all industries below 25 000 persons employed EU-wide and 5 000-10 000 nationally have to be considered highly imprecise. For NACE groups (3 digits) this limit is not reached by around 25 industries for the EU.

19 The data for the new member states is less complete than for the old member states. In particular, there are a number of gaps for single years for most countries. The inclusion of the new member states would then result in different bases for comparison for each year, which complicates the analysis and interpretation.

Table 5: Czech Republic, identified industries of high importance for employment, LFS data

013 Growing of crops combined with farming of animals (mixed farming)
02 Forestry, logging and related service activities
10 Mining of coal and lignite; extraction of peat
101 Mining and agglomeration of hard coal
102 Mining and agglomeration of lignite
103 Extraction and agglomeration of peat
120 Mining of uranium and thorium ores
141 Quarrying of stone
142 Quarrying of sand and clay
156 Manufacture of grain mill products, starches and starch products
17 Manufacture of textiles
171 Preparation and spinning of textile fibers
172 Textile weaving
175 Manufacture of other textiles
20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
201 Sawmilling and planing of wood; impregnation of wood
202 Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards
203 Manufacture of builders' carpentry and joinery
205 Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
223 Reproduction of recorded media
231 Manufacture of coke oven products
25 Manufacture of rubber and plastic products
251 Manufacture of rubber products
26 Manufacture of other non-metallic mineral products
261 Manufacture of glass and glass products
262 Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products
264 Manufacture of bricks, tiles and construction products, in baked clay
268 Manufacture of other non-metallic mineral products, n.e.c.
27 Manufacture of basic metals
271 Manufacture of basic iron and steel and of ferro-alloys
273 Other first processing of iron and steel
282 Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers
286 Manufacture of cutlery, tools and general hardware
287 Manufacture of other fabricated metal products
291 Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
296 Manufacture of weapons and ammunition
30 Manufacture of office machinery and computers
31 Manufacture of electrical machinery and apparatus n.e.c.
311 Manufacture of electric motors, generators and transformers
313 Manufacture of insulated wire and cable
314 Manufacture of accumulators, primary cells and primary batteries
316 Manufacture of electrical equipment n.e.c.
323 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods
343 Manufacture of parts and accessories for motor vehicles and their engines
352 Manufacture of railway and tramway locomotives and rolling stock
355 Manufacture of other transport equipment n.e.c.
363 Manufacture of musical instruments
364 Manufacture of sports goods
365 Manufacture of games and toys
371 Recycling of metal waste and scrap
40 Electricity, gas, steam and hot water supply
402 Manufacture of gas; distribution of gaseous fuels through mains
403 Steam and hot water supply
519 Other wholesale
525 Retail sale of second-hand goods in stores
527 Repair of personal and household goods
60 Land transport; transport via pipelines
601 Transport via railways
603 Transport via pipelines
612 Inland water transport
652 Other financial intermediation

For the years 2008/09 also data from the LFS using NACE rev. 2 classification is available. This classification is much more detailed in the services industries than rev. 1.1 while some manufacturing industries are redefined or pooled together. The combination of more current data and changes in the classification led to a

few changes in nationally important industries. Mining of metal ores (07), which was not of above average importance before, now includes the formerly important mining of uranium ores (old 12) and inherits the latter's importance. Industries which also grew in importance are manufacture of fabricated metal products (25) and water collection, treatment and supply (36). Newly defined industries of relative importance are repair and installation of machinery and equipment (33) as well as repair of computers and household goods (95). Almost all formerly important industries are still of above average importance with the exception of manufacture of office machinery and computers (old 30) which became part of a wider defined industry.

Regions

The Czech NUTS 2 regions are marked by a strong dichotomy between Prague and all other regions, because as capital city Prague is in itself a single NUTS 2 region. All other larger cities are part of a (substantially larger) surrounding region and therefore typical characteristics of cities like a high density of population and jobs or a high share of public and business services providers are diluted. This dichotomy has implications for the identification of the regional economic specializations. Prague is heavily dependent on the services sector and highly specialized in business services but has no single industry in the manufacturing sector with above average importance except publishing and printing (22) which belongs rather to services than to manufacturing industries (see Table 6).

Based on the dataset of the 2008/09 vintage of the LFS which is the first available dataset after adoption of revision 2 of the NACE classification, the economy of the Prague region is even more concentrated and dependent on services than in previous years, at least by looking simply at the number of concentrated industries.[20] Regarding the contents of the identified industries no serious changes are occurred with the exception of basic pharmaceutical production (21). To sum up, Prague features the typical industry specialization of nationally important metropolitan areas, which does not surprise given the size of the city (4 times larger than the second biggest city).

20 Given the large changes of the NACE-classification between revision 1.1 and 2 and the accompanying increase in the number of industry divisions it is possible that the higher number of identified industries is merely a statistical artifact.

Table 6:
Prague region, identified industry concentrations

NACE rev 1.1 (SBS and LFS, 2004-2007)	
• 22 Publishing, printing, reproduction of recorded media • 62 Air transport • 63 Supporting and auxiliary transport activities, activities of travel agencies • 64 Post and telecommunications • 65 Financial intermediation, except insurance and pension funding • 70 Real estate activities	• 71 Renting of machinery and equipment without operator and of personal and household goods • 72 Computer and related activities • 73 research and development • 74 Other business activities • 91 Activities of membership organizations • 92 Recreational, cultural and sporting activities
NACE rev 2 (only LFS, 2008/09)	
• 18 Printing and reproduction of recorded media • 21 Manufacture of basic pharmaceutical products and pharmaceutical preparations • 50 Water transport • 51 Air transport • 58 Publishing activities • 59 Motion picture, video and television programme production, sound recording and music publishing activities • 60 Programming and broadcasting activities • 61 Telecommunications • 62 Computer programming, consultancy and related activities • 63 Information service activities • 64 Financial service activities, except insurance and pension funding	• 66 Activities auxiliary to financial services and insurance activities • 68 Real estate activities • 69 Legal and accounting activities • 70 Activities of head offices; management consultancy activities • 72 Scientific research and development • 73 Advertising and market research • 74 Other professional, scientific and technical activities • 78 Employment activities • 79 Travel agency, tour operator reservation service and related activities • 90 Creative, arts and entertainment activities

In comparison with Prague the other Czech NUTS 2 regions are much more similar among each other. This is partly the result of the smaller size of the respective main cities which always account at most for a quarter of the regional population and in most regions for considerably less. The services sector is correspondingly less concentrated with almost no significant regional concentration. Exceptions are air transport (62, Central Bohemia), water transport (61, Northwest region [Ústí nad Labem]) and supporting transport activities (63, Central Bohemia) as well as renting of machinery and equipment (71, also Central Bohemia). One reason for the concentration of services in Central Bohemia is its proximity to Prague with parts of the metropolitan area extending into the region; and also the close access to the main airport of the Czech Republic. Based on the most recent LFS data (NACE rev. 2) veterinary activities (75, Southeast region and Silesia), gambling and betting (92, Northwest region) and employment activities (78, Silesia) are regionally concentrated. For the last industry this is likely more of a statistical artifact founded in the comparably high unemployment of the region. Also, the northwest region is home to a number of casinos, probably due to the close border to Germany which could explain the concentration of the gambling industry here.

Table 7: Czech Republic, NUTS 2 regions, identified industry concentrations

nationally important industries are **bold**

* nationally a non-localized industry

NACE rev 1.1 (SBS and LFS, 2004-2007)	
Central Bohemia	• 16 Manufacture of tobacco products • 23 Manufacture of coke, refined petroleum products • 30 Manufacture of office machinery and computers • **34 Manufacture of motor vehicles, trailers and semi-trailers** • 62 Air transport • 63 Supporting and auxiliary transport activities • 71 Renting of machinery and equipment
Southwest	• **20 Manufacture of wood and of products of wood and cork** • **32 Manufacture of radio, television and communication equipment**
Northwest region	• 05 Fishing • 10 Mining of coal and lignite • 14 Other mining and quarrying • 21 Manufacture of pulp, paper and paper products* • 24 Manufacture of chemicals and chemical products* • **26 Manufacture of other non-metallic mineral products** • 41 Collection, purification and distribution of water* • 61 Water transport
Northeast region	• 12 Mining of uranium and thorium ores • 17 Manufacture of textiles • 21 Manufacture of pulp, paper and paper products* • **26 Manufacture of other non-metallic mineral products** • 30 Manufacture of office machinery and computers • 36 Manufacture of furniture and other manufacturing*
Southeast region	• 12 Mining of uranium and thorium ores • 18 Manufacture of wearing apparel, dressing, dying of fur* • 19 Tanning, dressing of leather, manufacture of luggage • 30 Manufacture of office machinery and computers • 33 Manufacture of medical, precision and optical instruments*
Central Moravia	• 18 Manufacture of wearing apparel, dressing, dying of fur* • 19 Tanning, dressing of leather, manufacture of luggage • **25 Manufacture of rubber and plastics** • **32 Manufacture of radio, tv and communication equipment** • 35 Manufacture of other transport equipment*
Silesia	• 10 Mining of coal and lignite • 23 Manufacture of coke, refined petroleum products • 27 manufacture of basic metals*

Most of the competitive export industries exhibit regional concentrations. Manufacture of wood and wood processing (20) shows high concentrations in the Southwest region. Manufacture of rubber and plastics (25), where on a national scale primarily rubber production is important, is concentrated in Central Moravia; manufacture of other non-metallic mineral products (26) is concentrated in Northwest region and Northeast region—comprising mainly glass and ceramic products. The Southwest region and Central Moravia have above average employment concentrations in manufacture of radio, tv and communication equipment (32) which is represented on the national level by above average employment in manufacture of tv and radio receivers, recorders and associated goods (323). The production of motor vehicles (34) is concentrated in Central

Bohemia, which includes the main production plant of Škoda Auto; for 2008/09 also the Northeast region shows above average concentrations of employment in this industry. All regional concentrations based on data up to 2007 are included in Table 7. Table 8 then includes all regional concentrations based on the latest data of the LFS and uses revision 2 of the NACE classification. An overview of the economic structure of the *kraje* is provided in the appendix.

Based on the coefficient of localization some of the industries with regional employment concentrations appear to be more evenly spread than the regional results suggest. Using a threshold value that excludes agriculture from the list of localized industries affects the number of regional specialist industries. The reasoning behind this two-staged identification is that rather evenly dispersed industries might appear concentrated in a region if enough other industries are absent or very small. The remaining industries then seem to be concentrated in that region even though they employ not more of the population in the region than nationwide. These nationally not concentrated industries are always marked in the results tables, to provide some guidance to readers.

Table 8: Czech Republic, NUTS 2 regions, identified industry concentrations

nationally important industries are **bold**

* nationally a non-localized industry

	NACE rev 2 (only LFS, 2008/09)
Central Bohemia	• 12 Manufacture of tobacco products • 29 Manufacture of motor vehicles, trailers and semi-trailers • 51 Air transport • 52 Warehousing and support activities for transportation
Southwest region	• **02 Forestry and logging*** • 03 Fishing • 39 Remediation activities and other waste management services
Northwest region	• **05 Mining of coal and lignite** • **13 Manufacture of textiles** • 20 Manufacture of chemicals and chemical products • **23 Manufacture of other non-metallic mineral products** • 50 Water transport • 92 Gambling and betting activities
Northeast region	• **07 Mining of metal ores** • **13 Manufacture of textiles** • **23 Manufacture of other non-metallic mineral products** • 29 Manufacture of motor vehicles, trailers and semi-trailers
Southeast region	• 06 Extraction of crude petroleum and natural gas • **07 Mining of metal ores** • 75 Veterinary activities
Central Moravia	• 14 Manufacture of wearing apparel* • 15 Manufacture of leather and related products • **22 Manufacture of rubber and plastic products**
Silesia	• **05 Mining of coal and lignite** • 19 Manufacture coke and refined petroleum products • **24 Manufacture of basic metals** • 75 Veterinary activities • 78 Employment activities

Summing up the results for Czech regions, Prague emerges as the by far most important services centre of the country at the expense of classic manufacturing, which nowadays plays only a minor role in Prague´s economy. The services industries of the surrounding region of Central Bohemia depend also on Prague, especially the logistics industries. This region is also strong in some manufacturing industries, which is also true for the Northeast and Northwest region, while Silesia is still strong in heavy industries. The Southwest and Southeast region and Central Moravia have a more diversified economic structure with no significant industry concentrations. The concentrations of mining industries are a result of naturally given conditions as are the Elbe ports and the accompanying industries in the Northwest region.

5.2 Poland

After EU entry, trade intensity increased markedly in Poland as Table 9 illustrates, but is still far below the levels of Czech Republic or Germany. The overall trade deficit also decreased; possibly as result increasing international competitiveness. Looking at regional trade flows, it seems that EU15 is losing importance as a export destination but is still vital for imports.

Table 9: Foreign trade statistics, Poland, manufacturing sector

		2007/08	2003-2005	2000/01
Export intensity (exports as percentage of production)	EU15	26.5	26.0	19.7
	EU27	33.3	31.1	23.0
	World	42.7	38.8	28.4
Export import ratio	EU15	0.8	0.9	0.8
	EU27	0.9	0.9	0.8
	World	0.9	0.8	0.7
Trade balance (as percentage of production)	EU15	-5.0	-3.7	-5.6
	EU27	-3.2	-2.9	-5.6
	World	-6.7	-7.4	-12.6

Altogether Poland's economy is more inward oriented compared with the Czech Republic which is likely a consequence of its sizeable internal market. Competitive export industries are manufacture of tobacco products (16)[21],

[21] Manufacture of tobacco products is one of the smallest industries in terms of employment or value added. Regional data are therefore less reliable than for most other industries and accordingly also the identification of regional concentrations is a bit problematic.

wearing apparel (18), wood and wood products (20), other transport equipment (35) as well as furniture and other manufacturing (36). Based on the employment data the results are very similar, additionally electricity, gas and steam production (40) as well as collection and purification water (41) exhibit above average importance.

LFS

With the more comprehensive dataset from the LSF, some further—more disaggregated—industries can be identified that have above average importance in the Polish economy. Interesting is the important role of primary industries. Agriculture and here especially mixed farming still plays a significant role in the Polish economy, which also explains the importance of some food processing industries; the regional results below confirm these results. The other important industry of the primary sector is mining of coal since coal is the only significant local primary energy source for Poland (as well as for the Czech Republic or Germany). Besides those already mentioned, there are comparably few other industries of above average importance in Poland as Table 10 shows.

The most recent data from the LSF (NACE rev. 2) confirm the previous results. While manufacturing of non-metallic mineral products (23) seems of increasing importance, all other changes on the analyzed 2-digit level are due to a more precise classification. Manufacture of furniture (31) and security and investigation services (80) are elevated from 3-digit to 2-digit industry and are identified as employment intensive.

In general, if industries are very small nationally, one of two options is followed. In cases where the regional division of employment is known for at least 67% of the national employment and at most three regions employ the vast majority of this, than regional concentrations will be published. In all other cases no regional concentrations will be published.

Table 10: Poland, identified industry concentrations, NACE 1.1, LFS

01 Agriculture, hunting and related service activities
013 Growing of crops combined with farming of animals (mixed farming)
02 Forestry, logging and related service activities
10 Mining of coal and lignite; extraction of peat
101 Mining and agglomeration of hard coal
102 Mining and agglomeration of lignite
103 Extraction and agglomeration of peat
13 Mining of metal ores
132 Mining of non-ferrous metal ores, except uranium and thorium ores
152 Processing and preserving of fish and fish products
153 Processing and preserving of fruit and vegetables
155 Manufacture of dairy products
156 Manufacture of grain mill products, starches and starch products
18 Manufacture of wearing apparel; dressing and dyeing of fur
181 Manufacture of leather clothes
182 Manufacture of other wearing apparel and accessories
20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
201 Sawmilling and planing of wood; impregnation of wood
204 Manufacture of wooden containers
205 Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
231 Manufacture of coke oven products
242 Manufacture of pesticides and other agro-chemical products
264 Manufacture of bricks, tiles and construction products, in baked clay
282 Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers
296 Manufacture of weapons and ammunition
352 Manufacture of railway and tramway locomotives and rolling stock
361 Manufacture of furniture
40 Electricity, gas, steam and hot water supply
402 Manufacture of gas; distribution of gaseous fuels through mains
403 Steam and hot water supply
41 Collection, purification and distribution of water
519 Other wholesale
522 Retail sale of food, beverages and tobacco in specialized stores
601 Transport via railways
746 Investigation and security activities
925 Library, archives, museums and other cultural activities

Regions

Compared with the situation in the Czech Republic, the Polish regions are on the one hand more equal, on the other hand more diverse. All Polish NUTS-2 regions include sizeable rural areas, therefore no clearly urban dominated region exists. But overall the degree of urbanization is highly skewed. Especially the northern and eastern regions are much more rural than the south. Altogether, primary industries play a much more important role in Poland than in the Czech Republic. As already mentioned agriculture still plays a dominant role in the Polish economy, and three *voivodeships*—Lublin, Świętokrzyskie, Podlaskie—exhibit regional concentrations of agriculture (01) beyond that already registered for the Polish economy in general. Also, forestry (02) is concentrated in Lubusz, West-Pomeranian and Warmian-Masurian. In two of the *voivodeships* with maritime borders, namely Pomeranian and West-Pomeranian, exist regional agglomerations of fishing and fish farming (05).

The nationally important industries of mining of coal and lignite (10) and mining of metal ores (13) are concentrated in Silesian and Lower Silesian, respectively. Extraction of crude oil and natural gas (11) meanwhile occurs mainly in

Subcarpathian. In Lesser Poland, Świętokrzyskie and Lower Silesian is other mining and quarrying (14) concentrated.

The internationally competitive and employment important (manufacturing) industries are concentrated in a few voivodeships. Manufacture of tobacco products (16) is concentrated in Lesser Poland, whereas manufacture of wearing apparel (18) in Łódź. Subcarpathian, Podlaskie, Warmian-Masurian, Lubusz and West Pomeranian are all important areas for manufacture of wood and wood products (20); nevertheless according to the coefficient of localization it is still a regionally concentrated industry. Manufacture of other transport equipment (35), of furniture and other manufacturing (36) and collection, purification and distribution of water (41) have each two or three particular regional concentrations: other transport equipment in Pomeranian, West Pomeranian and Subcarpathian, furniture manufacturing in Warmian-Masurian, Greater Poland and Lubusz and water related industries in Opole and West Pomeranian.

Services industries in Poland feature only seldom regional concentrations. Masovian—including the capital Warsaw—registers the most services industries with air transport (62), computer and related activities (72) and research and development (73). Łódź has the only other concentration in a business services industry with renting of machinery and equipment (71). Additionally, there are some further concentrations of transport industries; water transport (61) in West-Pomeranian und Pomeranian and supporting and auxiliary transport activities (63) in the same two regions. The reason might be that the two main sea ports of Poland of Świnoujście/Szczecin and Gdansk/Gdynia are located in these two voivodeships respectively.

Almost all other manufacturing industries exhibit at least in one region above average concentrations of employment or value added. The more services oriented publishing and printing industry (22) is important in Masovian, as is manufacture of radio, tv and communication equipment (32) which is also important in Kuyavian-Pomeranian and Pomeranian. In Lesser Poland and Pomeranian exist concentrations of manufacture of office machinery and computers (30). All other regional concentrations of industries are included in Table 11.

Table 11:
Poland, NUTS 2 regions, identified industry concentrations (NACE 1.1)

nationally important industries are **bold**

* nationally a non-localized industry

NACE rev 1.1 (SBS and LFS, 2004-2007)	
Masovian	• 22 Publishing, printing, reproduction of recorded media • 23 Manufacture of coke, refined petroleum products • 32 Manufacture of radio, television and communication equipment • 62 Air transport • 72 Computer and related activities • 73 Research and development
Łódź	• 17 Manufacture of textiles • **18 Manufacture of wearing apparel** • 71 Renting of machinery and equipment
Świętokrzyskie	• 01 Agriculture* • 14 Other mining and quarrying • 26 Manufacture of other non-metallic mineral products* • 27 Manufacture of basic metals
Subcarpathian	• 11 Extraction of crude petroleum and natural gas • **20 Manufacture of wood and of products of wood and cork** • 25 Manufacture of rubber and plastic products* • 26 Manufacture of other non-metallic mineral products* • 34 Manufacture of motor vehicles, trailers and semi-trailers • **35 Manufacture of other transport equipment**
Lesser Poland	• 14 Other mining and quarrying • **16 Manufacture of tobacco products** • 19 Tanning and dressing of leather, manufacture of luggage • 27 Manufacture of basic metals • 30 Manufacture of office machinery and computers
Silesian	• **10 Mining of coal and lignite** • 27 Manufacture of basic metals • 34 Manufacture of motor vehicles, trailers and semi-trailers • 37 Recycling
Opole	• 23 Manufacture of coke, refined petroleum products • 31 Manufacture of electrical machinery and apparatus* • **41 Collection, purification and distribution of water***
Lower Silesian	• **13 Mining of metal ores** • 14 Other mining and quarrying • 26 Manufacture of other non-metallic mineral products* • 34 Manufacture of motor vehicles, trailers and semi-trailers
Lubusz	• 02 Forestry • 19 Tanning and dressing of leather, manufacture of luggage • **20 Manufacture of wood and of products of wood and cork** • 21 Manufacture of pulp, paper and paper products* • 31 Manufacture of electrical machinery and apparatus* • **36 Manufacture of furniture, other manufacturing**
Greater Poland	• 34 Manufacture of motor vehicles, trailers and semi-trailers • **36 Manufacture of furniture, other manufacturing**
Kuyavian-Pomeranian	• 21 Manufacture of pulp, paper and paper products* • 24 Manufacture of chemicals and chemical products* • 25 Manufacture of rubber and plastic products* • 32 Manufacture of radio, television and communication equipment

Table 11 cont.

West Pomeranian	• 02 Forestry • 05 Fishing • **20 Manufacture of wood and of products of wood and cork** • **35 Manufacture of other transport equipment** • **41 Collection, purification and distribution of water*** • 55 Hotels and restaurants* • 61 Water transport • 63 Supporting and auxiliary transport activities
Pomeranian	• 05 Fishing • 30 Manufacture of office machinery and computers • 32 Manufacture of radio, television and communication equipment • **35 Manufacture of other transport equipment** • 61 Water transport • 63 Supporting and auxiliary transport activities
Warmian-Masurian	• 02 Forestry • **20 Manufacture of wood and of products of wood and cork** • 25 Manufacture of rubber and plastic products* • **36 Manufacture of furniture, other manufacturing**
Podlaskie	• 01 Agriculture* • 17 Manufacture of textiles • **20 Manufacture of wood and of products of wood and cork**
Lublin	• 01 Agriculture*

NACE rev. 2

In contrast to the results for the Czech Republic, the more current data from the LSF (NACE rev. 2) show substantial shifts in regional employment concentrations. Especially Masovian exhibits now more characteristics of a densely populated capital region like Prague. This is partly the result of the more disaggregated classification of services industries but also of increasing employment shares. Table 12 includes all identified industry agglomerations for Masovian, and it is notable that with the exception of two manufacturing industries all other are services industries and belong almost exclusively to knowledge intensive services.

Table 12: Masovian, identified industry concentrations

* nationally a non-localized industry

NACE rev 2 (only LFS, 2008/09)	
• 19 Manufacture of coke, refined petroleum products • 26 Manufacture of computer, electronic and optical products • 51 Air transport • 58 Publishing activities • 59 Motion picture, video and television programme production, sound recording and music publishing activities • 60 Programming and broadcasting activities • 61 Telecommunications*	• 63 Information service activities • 65 Insurance, reinsurance and pension funding* • 66 Activities auxiliary to financial services and insurance activities* • 70 Activities of head offices; management consultancy activities • 72 Scientific research and development • 73 Advertising and market research • 74 Other professional, scientific and technical activities*

The other regions show increasing specialization and concentration of specific industries, too, which is also in contrast to the Czech regions where less regional concentrations were found. Nonetheless, the less specialized or concentrated *voivodeships* still register only few concentrations of industries. For the nationally important industries some changes are notable. Manufacture of tobacco products (12) is now concentrated in Podlaskie and Greater Poland instead of Lesser Poland; manufacture of wearing apparel (14) is still important in Łódź. Meanwhile, Subcarpathian and Podlaskie lost their local concentrations of manufacture of wood and wood products (16). For manufacture of other transport equipment (30) and of furniture (31) no changes in the regional agglomerations are found. Water collection, treatment and supply (36) shows above average employment in Silesian, the two regions with previously high employment exhibit now fairly average employment concentrations.[22]

Obviously, the primary sector does not show much change in regional agglomerations given its high dependence on time-invariant natural features. The only difference with the earlier data is the decrease of regional employment concentration in agriculture (01) in Świętokrzyskie.

In the services sector the increase in the number of regional employment concentrations is mainly the result of the more detailed industry classification. In the transport sector no changes are notable besides the growth of warehousing and support activities for transportation (52) in Łódź. Of the more knowledge intensive services industries only information services activities (63) has a regional concentration in Lower Silesian; also office and other business support activities (82) are concentrated there. The tourism regions of Lesser Poland, West Pomeranian and Warmian-Masurian register concentrations in ac-

22 Fresh water as well as waste water industries are mainly the responsibility of local governments. That means that employment levels are at least partly the result of political considerations. Also, deficiencies in those industries after the political and economic transformation of the early 1990s are today reduced to varying degrees. Depending on the pace of renewal, different employment levels on the local level are to be expected. For more information on the water sector see e.g. de la Motte 2005.

commodation (55), the first also in travel agency and related activities (79) as well as gambling and betting activities (92). In the latter also Łódź has a regional specialization. Table 13 provides an overview of the other services industries concentrations.

Table 13:
Poland, NUTS 2 regions, other identified services industry concentrations (NACE 2)

nationally important industries are **bold**

* nationally a non-localized industry

NACE rev 2 (only LFS, 2008/09)	
Łódź	• 52 Warehousing and support activities for transportation • 92 Gambling and betting activities
Subcarpathian	• 94 Activities of membership organizations
Lesser Poland	• 55 Accommodation • 79 Travel agency, tour operator reservation service and related activities • 92 Gambling and betting activities
Lower Silesian	• 63 Information service activities • 82 Office administrative, office support and other business support activities
Lubusz	• 95 Repair of computers and personal and household goods
West Pomeranian	• 50 Water transport • 52 Warehousing and support activities for transportation • 55 Accommodation • 59 Motion picture, video and television programme production, sound recording and music publishing activities
Pomeranian	• 50 Water transport • 52 Warehousing and support activities for transportation
Warmian-Masurian	• 55 Accommodation • 75 Veterinary activities
Podlaskie	• 75 Veterinary activities

For the other manufacturing industries an overall decrease of regional concentrations is recognizable. A number of regions were able to retain and, partly, even to expand their industry concentrations, other were less successful. Importantly, a number of new regional concentrations in more high-tech sectors developed, while the biggest reductions were in more low-tech sectors. Especially manufacture of basic pharmaceutical products and pharmaceutical preparations (21) as well as of computer, electronic and optical instruments (26) exhibit a substantial number of regional employment concentrations.[23] For manufacture of rubber and plastic products (22) and of other non-metallic mineral products (23) only one regional concentration is left of formerly three and four, respectively. Table 14 contains a detailed listing of all identified regional employment concentrations.

[23] Both of these industry divisions are new in the NACE rev. 2. Pharmaceuticals were before part of chemical products (old 24) while the other is a combination of three NACE 1.1 divisions (30 [office equipment], 32 [radio, tv, communications equipment] and 33 [medical etc. products and watches]). While the former seems of increasing importance, the available data for the latter is less informative, partly as a result of bigger changes between the two revisions of the classification.

Table 14:
Poland, NUTS 2 regions, other identified manufacturing industry concentrations (NACE 2)

nationally important industries are **bold**

* nationally a non-localized industry

NACE rev 2 (only LFS, 2008/09)	
Łódź	• 13 Manufacture of textiles • **14 Manufacture of wearing apparel*** • 21 Manufacture of basic pharmaceuticals
Świętokrzyskie	• 08 Other mining and quarrying • **23 Manufacture of other non-metallic mineral products** • 37 Sewerage*
Subcarpathian	• 06 Extraction of crude petroleum and natural gas • 22 Manufacture of rubber and plastic products* • 30 Manufacture of other transport equipment
Lesser Poland	• 08 Other mining and quarrying • 15 Manufacture of leather and related products* • 24 Manufacture of basic metals
Silesian	• **05 Mining of coal and lignite** • 24 Manufacture of basic metals • 29 Manufacture of motor vehicles, trailers and semi trailers • 36 Water collection, treatment and supply*
Opole	• 17 Manufacture of paper and paper products • 19 Manufacture of coke and refined petroleum products • 20 Manufacture of chemicals and chemical products* • 25 Manufacture of fabricated metal products*
Lower Silesian	• **07 Mining of metal ores** • 08 Other mining and quarrying • 21 Manufacture of basic pharmaceuticals • 26 Manufacture of computer, electronic and optical products • 27 Manufacture of electrical equipment* • 29 Manufacture of motor vehicles, trailers and semi trailers
Lubusz	• **02 Forestry and logging** • 13 Manufacture of textiles • 15 Manufacture of leather and related products* • **16 Manufacture of wood and of products of wood and cork*** • 26 Manufacture of computer, electronic and optical products • **31 Manufacture of furniture**
Greater Poland	• 12 Manufacture of tobacco products • **31 Manufacture of furniture**
Kuyavian-Pomeranian	• 17 Manufacture of paper and paper products • 20 Manufacture of chemicals and chemical products* • 26 Manufacture of computer, electronic and optical products
West Pomeranian	• **02 Forestry and logging** • 03 Fishing and aquaculture • **16 Manufacture of wood and of products of wood and cork*** • 20 Manufacture of chemicals and chemical products* • 30 Manufacture of other transport equipment • 33 Repair and installation of machinery and equipment* • 37 Sewerage*
Pomeranian	• 03 Fishing and aquaculture • 19 Manufacture of coke and refined petroleum products • 21 Manufacture of basic pharmaceuticals • 26 Manufacture of computer, electronic and optical products • 30 Manufacture of other transport equipment • 33 Repair and installation of machinery and equipment*

Table 14 cont.

Warmian-Masurian	• **02 Forestry and logging** • **16 Manufacture of wood and of products of wood and cork*** • **31 Manufacture of furniture**
Podlaskie	• **01 Crop and animal production*** • 03 Fishing and aquaculture • 12 Manufacture of tobacco products
Lublin	• **01 Crop and animal production***

All in all, the Polish economy is characterized by a broad manufacturing sector. This becomes manifest in the low number of industry with internationally above average employment numbers as well as in a broad variety of regionally important industries. From the results of the latest LSF data, also a shift towards, on the one hand, more centralization—the concentration of services industries in Masovian—and, on the other hand, a more services oriented economy can be observed. However, the most rural *voivodeships* (Lublin, Podlaskie and Świętokrzyskie) do not seem to be able to reduce the gap in economic capabilities towards the other regions.

5.3 Croatia

In the aftermath of the breakup of Yugoslavia Croatia experienced a longer period of economic and political turmoil. Since the year 2000, the economic development stabilized and real GDP growth averaged around 4% p.a. until the crisis of 2009 with a decline of over 5%. One important determinant for this growth was the reconstruction and expansion of public infrastructure, another the success at reestablishing Croatia as an important tourist destination. The importance of tourism for the Croatian economy can also be seen indirectly in the information of Table 15. The very low export import ratio in manufacturing is to a large extent the result of the high surplus in services trade through tourism spending which allowed financing the deficit in the trade of goods. Nevertheless, the external trade sector—especially with the EU—is not as competitive in Croatia as in the Czech Republic or Poland.

Table 15: Foreign trade statistics, Croatia, manufacturing sector

		2007/08	2003-2005	2000/01
Export intensity (exports as percentage of production)	EU15	15.5	16.9	19.0
	EU27	23.7	22.0	24.4
	World	44.8	37.5	41.5
Export import ratio	EU15	0.3	0.4	0.5
	EU27	0.4	0.4	0.5
	World	0.5	0.5	0.5
Trade balance (as percentage of production)	EU15	-29.9	-26.0	-21.5
	EU27	-40.9	-35.8	-27.7
	World	-49.4	-43.1	-39.7

Given the overall low export performance of Croatian manufacturing, even comparatively competitive industries might record trade deficits. Also, the fact that Croatia is not a member of the EU might have consequences in the geography of trade flows. For example, trade with tobacco products (16) is overall one of the few competitive industries, but with the EU15 there exists a sizeable trade deficit. Altogether, manufacture of wearing apparel (18), of wood and wood products (20), of coke and refined petroleum products (23) and of other transport equipment (35) are relatively important and successful industries. But, trade with wearing apparel and also coke lost substantially in international competitiveness in the last years. This is true also for most other basic manufacturing industries, while some of the more technology intensive industries gained slightly (measured by the trade balance of the individual industry).[24]

LFS

Based on the LSF data some additional industries with above average importance for national employment can be identified, namely agriculture (01), forestry (02), fishing (05), extraction of crude oil and natural gas (11), tanning and dressing of leather (19), collection and purification of water (41) and water transport (61). These and the accompanying as well as additional industries on the 3-digit level are included in Table 16. Altogether, almost all of these industries are low-technology or less-knowledge intensive industries, which points to a less developed economy compared with the EU.

[24] Croatia first published data for the SBS in 2009. Unfortunately, with this, it was one of the first countries to report on 2008 when rev. 2 of the NACE classification was introduced for the SBS. For the EU15 or EU27 there are—as of December 2010—no data available for reporting year 2008 which prohibits the inclusion of Croatian SBS data in this report.

Table 16: Croatia, identified specialist industries, LFS data

010 Agriculture, hunting and related service activities
012 Farming of animals
013 Growing of crops combined with farming of animals (mixed farming)
020 Forestry, logging and related service activities
050 Fishing, fish farming and related service activities
110 Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying
111 Extraction of crude petroleum and natural gas
112 Service activities incidental to oil and gas extraction, excluding surveying
141 Quarrying of stone
154 Manufacture of vegetable and animal oils and fats
155 Manufacture of dairy products
156 Manufacture of grain mill products, starches and starch products
159 Manufacture of beverages
160 Manufacture of tobacco products
180 Manufacture of wearing apparel; dressing and dyeing of fur
182 Manufacture of other wearing apparel and accessories
190 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
193 Manufacture of footwear
200 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
201 Sawmilling and planing of wood; impregnation of wood
230 Manufacture of coke, refined petroleum products and nuclear fuel
232 Manufacture of refined petroleum products
264 Manufacture of bricks, tiles and construction products, in baked clay
265 Manufacture of cement, lime and plaster
272 Manufacture of tubes
313 Manufacture of insulated wire and cable
350 Manufacture of other transport equipment
351 Building and repairing of ships and boats
352 Manufacture of railway and tramway locomotives and rolling stock
403 Steam and hot water supply
410 Collection, purification and distribution of water
519 Other wholesale
527 Repair of personal and household goods
552 Camping sites and other provision of short-stay accommodation
603 Transport via pipelines
610 Water transport
611 Sea and coastal water transport
652 Other financial intermediation
922 Radio and television activities

Based on rev. 2 of the NACE classification for the years 2008/09 some further industries became important employers compared with EU15. These are other mining and quarrying (08), mining support services (09), manufacturing of beverages (11), of other non-metallic mineral products (23) and of furniture (31) as well as waste collection (38), civil engineering (42), programming and broadcasting (60) and gambling and betting activities (92). Most of these industries gained only somewhat in importance, but before were part of a broader defined industry.

Regions[25]

25 The regional results in Croatia are only based on the LSF, because Croatia did not participate in SBS before reporting year 2008. Additionally, regional data from the LSF is only available for reporting year 2007 which means some industries below the reliability limit will not be evaluated.

In contrast to the other two countries, the nationally important industries are only rarely concentrated in one region.[26] In Adriatic Croatia is manufacture of tobacco products (16) and of other transport equipment (35) concentrated, and also fishing (05) and water transport (61). The only other regional agglomeration of an internationally important industry is forestry (02) in Central and Eastern Croatia.

The only other regional concentration of an industry is hotels and restaurants (55) in Adriatic Croatia. Only just below the threshold value are manufacture of wood and wood products (20) in Adriatic Croatia and of electrical machinery (31) in Northwestern Croatia. If the threshold is lowered even further, which might be admissible given the low number of regions, another five regional concentrations can be identified. These are publishing and printing (22) and research and development (73) in Northwestern Croatia, agriculture (01) and manufacture of furniture (36) in Central and Eastern Croatia and manufacture of motor vehicles (34) in Adriatic Croatia.

Partly a result of the more detailed industry classification and partly a result of ongoing changes in the economic structure and specialization of the Croatian economy, based on the LSF data of 2008 and 2009 a richer specialization picture of Croatia's regions emerges. Of the nationally important industries, again only a subset is also regionally concentrated. These are forestry and logging (02) and extraction of crude oil and natural gas (06) in Central and Eastern Croatia and fishing (03), manufacture of other transport equipment (30) and water transport (50) in Adriatic Croatia. Other regionally important industries are accommodation (55), real estate (68) and renting and leasing activities (77) in Adriatic Croatia. In Northwestern Croatia are manufacture of textiles (13) and of basic pharmaceuticals (21), production of motion pictures, video and tv programs and of sound recordings (59) and advertising and marketing research (73) of above average importance.

Once again a slight lowering of the threshold reveals some further regional concentrations of nationally important industries. In Northwestern Croatia these are manufacture of leather (15) and programming and broadcasting activities (60), in Central and Eastern Croatia manufacturing of wood and wood products (16*) and in Adriatic Croatia other mining and quarrying (08*). All other nationally important industries are less regionally concentrated or too small to allow a reliable regional classification. Based on the lower threshold

26 This is likely a result of the low number of NUTS-2 regions in Croatia. Each region then has such a high weight in the national industry, that only very sizeable regional employment concentrations are effectual to determine the international importance of this industry. Of the nationally important industry almost all of those with a regional concentration are of below average importance in the other two regions, and otherwise, almost all industries without a regional concentration are of above average importance in two of the three regions.

some other—nationally less important—industries exhibit regional concentrations. All regional concentrations for both time periods are included in Table 17.

Table 17: Croatia, NUTS 2 regions, other identified industry concentrations (NACE 2)

nationally important industries are **bold**

* nationally a non-localized industry

NACE rev 1.1 (LFS, 2007)	
Adriatic Croatia	• **05 Fishing** • **16 Manufacture of tobacco products** • **35 Manufacture of other transport equipment** • 55 Hotels and restaurants • **61 Water transport** --- • **20 Manufacture of wood and of products of wood and cork*** • 34 Manufacture of motor vehicles, trailers and semi-trailers
Central and Eastern Croatia	• **02 Forestry** --- • **01 Agriculture*** • 36 Manufacture of furniture, other manufacturing
Northwestern Croatia	--- • 22 Publishing, printing, reproduction of recorded media* • 31 Manufacture of electrical machinery and apparatus • 73 Research and development
NACE rev 2 (LFS, 2008/09)	
Adriatic Croatia	• **03 Fishing and aquaculture** • **30 Manufacture of other transport equipment** • **50 Water transport** • 55 Accommodation • 68 Real estate activities • 77 Rental and leasing activities --- • **08 Other mining and quarrying*** • 79 Travel agency, tour operator reservation service and related activities*
Central and Eastern Croatia	• **02 Forestry and logging** • **06 Extraction of crude petroleum and natural gas** --- • **16 Manufacture of wood and of products of wood and cork*** • 20 Manufacture of chemicals and chemical products* • 28 Manufacture of machinery and equipment*
Northwestern Croatia	• 13 Manufacture of textiles • 21 Manufacture of basic pharmaceuticals • 59 Motion picture, video and television programme production, sound recording and music publishing activities • 73 Advertising and market research --- • 15 Manufacture of leather and related products • 27 Manufacture of electrical equipment • 32 Other manufacturing • **60 Programming and broadcasting activities** • 72 Scientific research and development

In the latest data, Northwestern Croatia—which includes the by far biggest urban agglomeration Zagreb—displays increasingly a specialization towards typical urban services industries, while Adriatic Croatia seems to be able to capitalize on the strong tourism sector and develops also more into services and some selected manufacturing industries. But altogether the analysis revealed that with only three regions and a comparably small labor market (1.6 mln. employed persons) the here pursued identifying approach reaches its limits.

6 Synopsis and Conclusions

In this paper we conducted a first attempt at mapping regional economic clusters in some CEE countries, namely the Czech Republic, Poland and Croatia. This cluster mapping exercise had two main goals.

The first was to establish a consistent and comprehensive approach to cluster mapping for the whole CEE region. This implied above all the search and following the usage of a single data base for all countries, while avoiding having to fall back on national statistics. The only data source available for all countries is employment data, specifically the Labor Force Survey (LFS) and Structural Business Statistics (SBS) from Eurostat. Even in those countries not (yet) belonging to the European Statistical System (ESS), fairly compatible employment data are available. Additionally, a methodological framework was developed that is compatible with the data sources, scalable, and flexible enough to be used for all CEE countries. This framework uses only the data also used for mapping, instead of using additional data sources, which are just available for a few countries, like most other mapping exercises do. The framework is based on concentration measures and follows a multi-step-procedure. In the first step internationally competitive or labor intensive industries are identified for the whole economy based on trade performance and the location quotient. The latter is also used in the next step to identify regional industry concentrations. If available, different data sets were used, so that the resulting different cluster candidates had to be reconciled. In this paper, reconciliation followed mostly the LFS results, because the SBS data included comparably often restricted data. In a last step, for all industries the coefficient of localization was determined, ensuring that only regionally concentrated industries were identified as clusters. The necessary threshold values for the concentration measures can be adapted to the specific country and data set used.

The second goal was to identify relevant regional clusters in the three countries, to compare the respective results with each other as well as with existent cluster initiatives and the respective economic support policies.

The mapping exercise revealed an ongoing process of structural change among the regional industry concentrations. In all three countries noteworthy changes of the mapping results for the years 2004 to 2007 and 2008/09 occurred. In the Czech Republic, Prague is increasingly characterized by services industries, especially business services and creative industries usually associated with metropolitan areas. In the other NUTS-2 regions a lessening of regional specialization occurred, which is the result of a decreasing specialization in manufacturing industries, while services industries registered slightly more regional concentrations in the newer data than in the period 2004-07. In contrast an increase

in regional specialization could be observed in Poland, which was also the result of the growth in services industries concentrations; in manufacturing industries the number of regional concentrations was stable. Similar to the development in the Czech Republic, the capital region Masovian experienced a substantial increase of business services industries as well as other service industries typical for major cities, even though unlike Prague the region also comprises large rural areas besides Warszawa. The results for Croatia are somewhat less reliable, because only one data source could be evaluated and for only three years instead of six years for the other two countries. A further impediment was the small size of the country and the related small number of regions. Only very few regional industry concentrations could be identified, although for the most current data of 2008/09 the results got more interesting. Northwestern Croatia including the capital city Zagreb has considerably more industry concentrations than before. In general, more services industries exhibit regional concentrations.

In a related analysis the cluster support policies of the three countries were examined and compared to each other.[27] To deepen the results of the mapping research of this paper, an extensive desktop research to identify relevant cluster initiatives was conducted. The aim was to compare the identified regional industry concentrations with the industries of the cluster initiatives and, additionally, with the beneficiaries of the cluster support policies.

Tables 22 to 24 in the annex contain all identified cluster initiatives of the three countries with their respective fields of activity as well as their home region. These lists are the result of a comprehensive search but cannot be exhaustive because, first, no central cluster initiative inventory exists and, second, the delineation of an initiative as a cluster initiative in practice is fraught with problems of definition. Interesting to note is the concordance of cluster initiatives and regional industry concentrations in low tech industries whereas especially initiatives from high tech and new industries are located in many regions; most of them without strong related employment concentrations. Reasons are probably the young age of most of these initiatives and their often small size compared with older industries. Additionally, some of the cluster initiatives were established with strong political support and inducement, without always adhering to regional economic circumstances.

Support measures for cluster and cluster initiatives are an important part of recent economic policy in the CEE countries. A comparison between recipient regions and the here identified industry concentrations as well as the cluster initiatives revealed that in Poland and the Czech Republic only a part of all possible

[27] See Salameh, Ulrich 2011.

recipients received public financial support. One reason is that only financial support in the period 2007-2010 was analyzed. Especially in Poland a significant number of cluster initiating projects were started in the period 2004-2006. Also, only funding in the context of EU structural funds was analyzed, because data availability was significantly better and the support programs are financially better equipped than pure national or even regional.

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Appendix

Czech counties

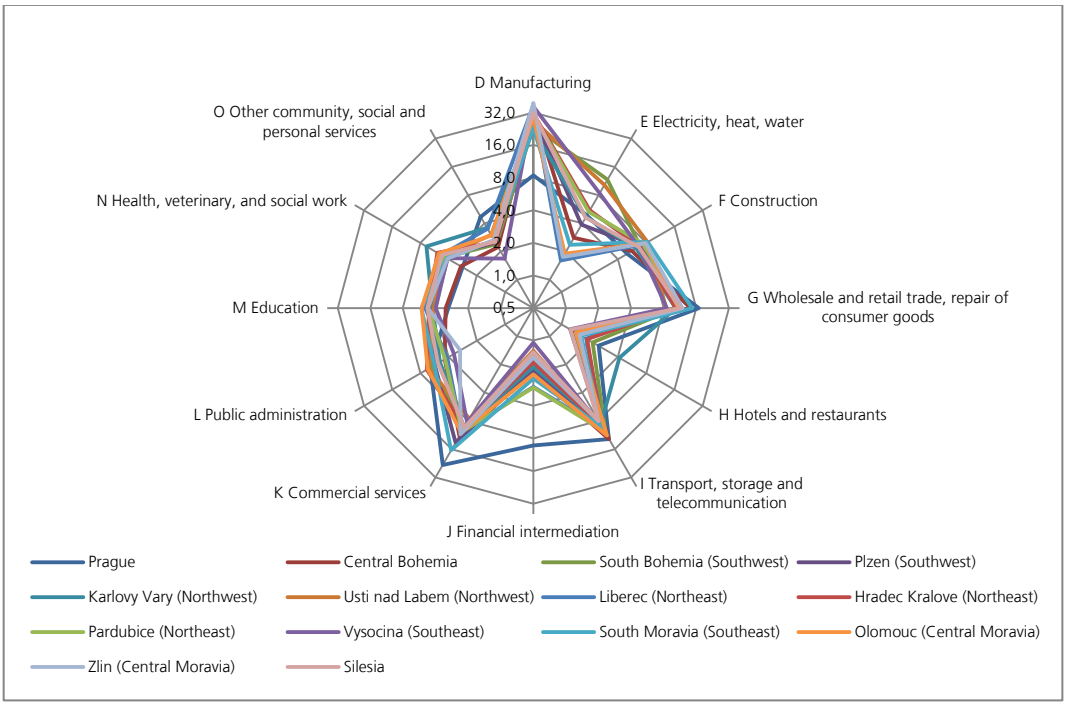
Table 18: Czech Republic, county overview, 2008

Source: Eurostat

Kraj	Population	Population density (1/km²)	GDP/head, (€, EU27=100)	GDP/head, (PPS EU27=100)	Employment rate (total population)	Unemployment rate (employed population)
Pragu	1 222 700	2465	106.3	171.	4	2
Centra Bohemia	1 216 300	110	46.5	75.	1	
South Bohemia	634 800	63	42.6	68.8	51	3
Plzeň	565 400	7	45.5	73.6	51	4
Karlo Vy	307 900	93	35.3	57.1	52	8
Ústí nad Labem	833 500	156	39.2	63.5	48	8
Li rec	435 0	138	38.2	61.8	48	
Hradec Král	553 400	16	42.1	68.1	50	4
Pardubice	513 3	114	41.4	66.9	50	4
Vysočina	514 500	76	41.8	67.6	50	3
So Moravia	1 143 800	19	45.5	73.6	49	4
Olom c	642 000	122	36.6	59.	49	6
Zlín	591 100	149	40.5	65.5	50	4
Moravia-Silesia	1 250 100	230	41.7	67.5	49	7

Figure 1: Czech Counties, share of GVA, (NACE 1.1 divisions), log scale

Source: Eurostat



Croatian counties

Northwestern Croatia

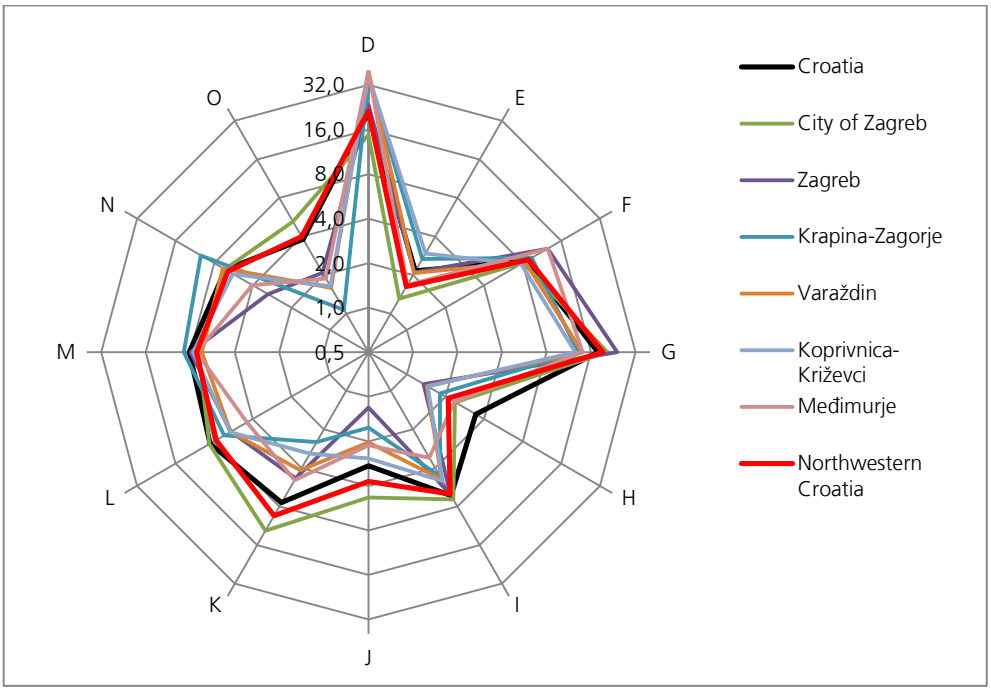
Table 19: Northwestern Croatia, county overview, 2007

Source: Central Bureau of Statistics

	Population	Population density	Employment	GDP/head	Employment rate	Unemployment rate
Northwestern Croatia	1670 786	192.7	691 487	124.4	41.4	8.2
City of Zagreb	788 095	1229.5	421 585	173.6	53.5	6.2
Zagreb	326 880	106.8	85 924	76.2	26.3	10.6
Krapina-Zagorje	137 001	111.5	38 888	74.0	28.4	9.6
Varaždin	180 781	143.2	66	85.2	36.6	11.2
Koprivnica-Križevci	120 106	68.7	38 736	94.7	32.3	14.0
Međimurje	117 923	161.8	40 24	78.5	34.1	11.6

Figure 2: Counties in Northwestern Croatia, employment shares in legal entities, (NACE 1.1 divisions), log scale

Source: Central Bureau of Statistics



Central and Eastern Croatia

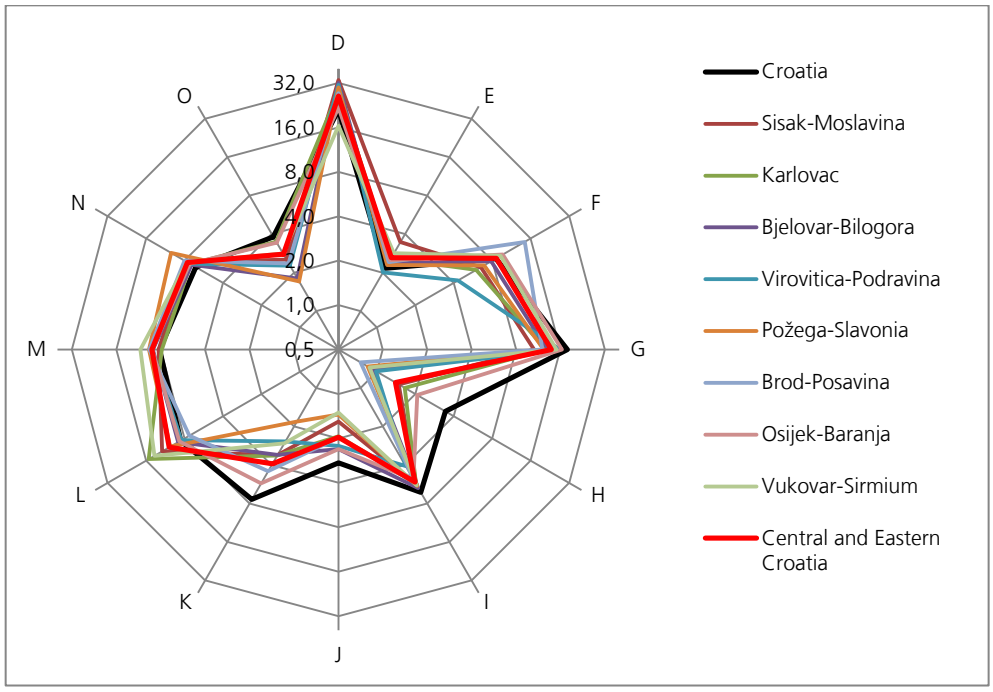
Table 20: Central and Eastern Croatia, county overview, 2007

Source: Central Bureau of Statistics

	Population	Population density	Employment	GDP/head	Employment rate	Unemployment rate
Central and Eastern Croatia	1296 739	55.8	356 058	71.0	27.5	23.7
Sisak-Moslavina	174 301	39.0	47 919	74.6	27.5	24.9
Karlovac	133 405	36.8	41 157	81.0	30.9	21.8
Bjelovar-Bilogora	125 652	47.6	36 462	69.3	29.0	23.1
Virovitica-Podravina	88 299	43.6	24 240	71.7	27.5	25.8
Požega-Slavonia	82 548	45.3	20 967	67.4	25[illegible]4	[illegible]9.4
Brod-Posavina	173 628	85.5	41 427	55.4	23.9	24.7
[illegible]ijek-Baranj	320 617	77.2	97 [illegible]03	81[illegible]	30.3	22.0
Vukovar[illegible]irm[illegible]m	198 2[illegible]89	80.8	46 683	59.6	23.	27.5

Figure 3: Counties in Central and Eastern Croatia, employment shares in legal entities, (NACE 1.1 divisions), log scale

Source: Central Bureau of Statistics



Adriatic Croatia

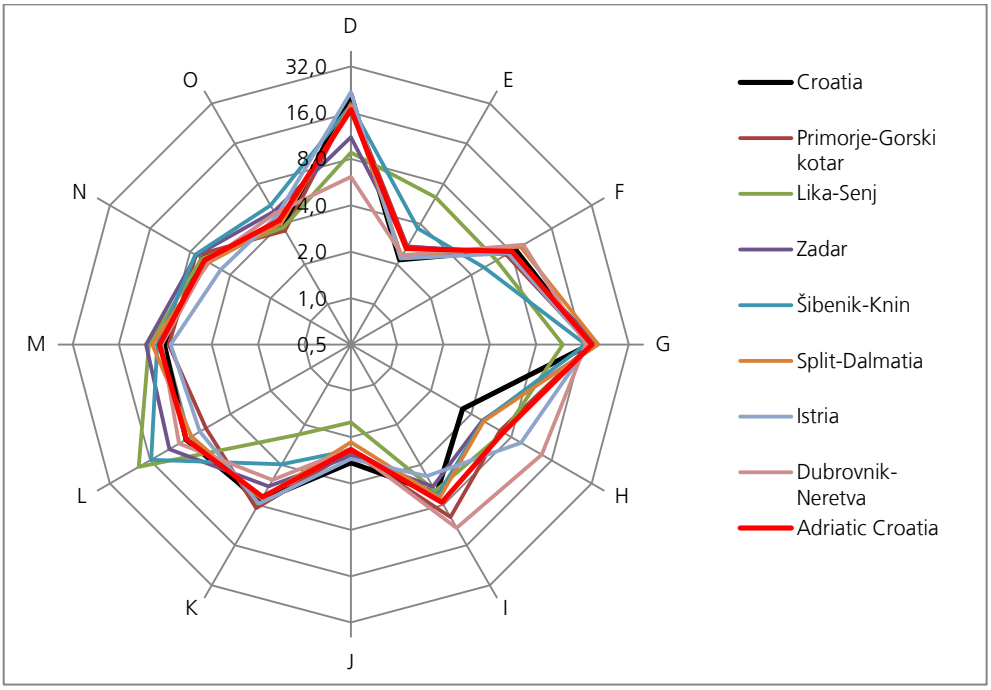
Table 21: Adriatic Croatia, county overview, 2007

Source: Central Bureau of Statistics

	Population	Population density	Employment	GDP/head	Employment rate	Unemployment rate
Adriatic Croatia	1466 983	59.4	488 621	98.1	33.3	14.7
Primorje-Gorski kotar	304 750	84.9	118 109	115.8	38.8	10.8
Lika-Senj	50 576	9.4	14 117	83.3	27.9	18.8
Zadar	174 595	47.9	48 162	82.6	27.6	17.7
Šibenik-Knin	114 283	38.3	31 308	80.8	27.4	19.6
Split-Dalmatia	481 872	106.1	146 500	82.9	30.4	19.1
Istria	214 156	76.1	89 241	129.1	41.7	6.7
Dubrovnik-Neretva	126 751	71.2	41 184	104.0	32.5	15.3

Figure 4: Counties in Adriatic Croatia, employment shares in legal entities, (NACE 1.1 divisions), log scale

Source: Central Bureau of Statistics



Cluster initiatives

Poland

Table 22: Cluster initiatives Poland

Cluster initiative	Region	Industry (NACE 1.1)	Industry (NACE 2)
Innowacyjny Śląski Klaster Czystych Technologii Węglowych	Silesian	10, 29	05, 28
Dolnośląski Klaster Surowcowy	Lower Silesian	13, 27	07, 24
Klaster Dolina Ekologicznej Żuwności	Lublin	01, 15	01, 10, 11
Lubuski Szlak Wina i Miodu	Lubusz	01, 15	01, 10, 11
„Zielona Dolina"- Klaster Przetwórstwa Roln-Spożywczego	Opole	01,15	01, 10, 11
Podlaski Klaster Spożywczy	Podlaski	15	10, 11
Stowarzyszenie Klaster Spożywczy „Naturalnie z Podlasia"	Podlaskie	15	10, 11
Klaster branży spożywczej „Żywność z Pomorza"	Pomeranian	15	10, 11
Klaster Ogrodniczo- Sadowniczy „Ekologiczna żywność"	Świętokrzyskie	15	10, 11
Klaster Browarniczy	Warmian-Masurian	15	11
Klaster Mleczarski	Warmian-Masurian	15	11
Klaster Wołowiny	Warmian-Masurian	01, 15	01, 10, 11
Regionalne Centrum Współpracy Przemysłu	West Pomeranian	15	10, 11
Klaster Zaawansowanych Technologii Przemysłu Włókienniczo Odzieżowego	Łódź	17, 18	13, 14
Wielkopolski Klaster Meblarski	Greater Poland	36	31
Klaster Lubelskie Drewno	Lublin	20	16
Północno-Wschodni Innowacyjni Klaster Drzewny	Podlaskie	20	16
Śląski Klaster Drzewny	Silesian	20	16
Północno-Wschodni, Innowacyjny Klaster Drzewny (Meblarski)	Warmian-Masurian	20, 36	16, 31
Lubawski Klaster Meblowy	Warmian-Masurian	36	31
Stowarzyszenie Klaster Mebel- Elblag	Warmian-Masurian	36	31
Zachodniopomorski Klaster Drzewno-Meblarski	West Pomeranian	30, 36	26, 31
Klaster Poligraficzno Reklamowy	Greater Poland	22, 74	18, 73
Klaster Medialny	Łódź	22	18
Mazowiecki Klaster Druku i Reklamy „Kolorowa Kotlina"	Masovian	22, 74	18, 73
Wielkopolski Klaster Chemiczny	Greater Poland	24	20
Chemiczny Klaster Opolski Innowacyjna Chemia Województwa Opolskiego	Opole	24	20

Table 22 cont.

Zachodniopomorski Klaster Chemiczny „Zielona Chemia"	West Pomeranian	24	20
Tarnowski Klaster Przemysłowy-Plastikowa Dolina	Lesser Poland	25	22
Grono Ceramiczne Końskie-Opoczno	Świętokrzyskie	26	23
Klaster Producentów Okien i Drzwi „Mazurskie Okna"	Warmian-Masurian	20, 25, (28)	16, 22, (25)
Lubuski Klaster Metalowy	Lubusz	27	24
Warmińsko-Mazurski Klaster „Razem Cieplej"	Warmian-Masurian	28	25
Pleszewski Klaster Kotlarski	Greater Poland	28	25
Wielkopolski Klaster Zaawansowanych Technik Automatyzacji ELPROTECH	Greater Poland	29	28
Klaster Zaawansowanych Technologii Energetycznych „Ekoenergia"	Łódź	31	27
Bałtycki Klaster Ekoenergetyczny	Pomeranian	31, 40	27, 35
Wielkopolski Klaster Motoryzacyjny	Greater Poland	34	29
Śląski Klaster Lotniczy	Silesian	35	30
Dolina Lotnicza/ Aviation Valley	Subcarpathian	35	30
Sieć Porozumienia Lotniczego „AVIA-SPLot"	Subcarpathian	35	30
Klaster Europejskie Centrum Gier	Lesser Poland	36	26
Małopolskie - Podkarpacki Klaster Czystej Energii	Lesser Poland	31, 40	27, 35
Klaster Bioenergia dla Regionu	Łódź	31, 40	27, 35
Dolnośląski Klaster Energii Odnawialnej	Lower Silesian	31, 40	27, 35
Sieć Naukowo-Gospodarcza „Energia"	Lower Silesian	31, 40	27, 35
Klaster Ekoenergia Opolszczyzny	Opole	31, 40	27, 35
Gdański Klaster Budowlany Sp. z o.o.	Pomeranian	45	41
Klaster budownictwa pasywnego energooszczędnego	Silesian	45	41
Świętokrzyski Klaster Budowlany	Świętokrzyskie	45	41
Klaster Restauratorów i Hotelarzy	Lublin	55	55
Klaster Kosmiczny Mazovia (KKM)	Masovian	35, 62	30, 51
Mazowiecki Klaster Lotniczy „Aviation Mazovia"	Masovian	35, 62	30, 51
Wielkopolski Klaster Teleinformatyczny	Greater Poland	64, 72	61, 62
Klaster ITC COPERNICUS	Kuyavian-Pomeranian	64, 72	61, 62
E-Klaster Małopolskie Klaster Informatyczny	Lesser Poland	64, 72	61, 62
Klaster Multimediów i Systemów Informacyjnych	Lesser Poland	64, 72	61, 62
Małopolskie Klaster Technologii Informacyjnych	Lesser Poland	64, 72	61, 62

Table 22 cont.

Wspólnota Wiedzy i Innowacji w Zakresie Technik Informacyjnych i Komunikacyjnych	Lower Silesian	64, 72	61, 62
Alternatywny Klaster Informatyczny	Masovian	64, 72	61, 62
Mazowiecki Klaster ICT	Masovian	64, 72	61, 62
Klaster ICT Pomeranian	Pomeranian	64, 72	61, 62
Klaster Multimediów i Systemów Informacyjnych	Subcarpathian	64, 72	61, 62
Podkarpacki Klaster Informatyczny	Subcarpathian	64, 72	61, 62
Klaster Firm Informatycznych ICT Pomorze Zachodnie	West Pomeranian	64, 72	61, 62
Budgoski Klaster Przemysłowy	Kuyavian-Pomeranian	25, 29	22, 28
Klaster Krakowska Strefa Dizajnu	Lesser Poland	74	74
Klaster Life Science Kraków	Lesser □ola□d	32, 73, 85	26, 72, 86
Sieć Naukowo-Gospodarcza „BIOTECH"	Lower Silesian	24, 73	20, 72
Klaster Nutribiomed	Lower Siles□an	24, 73	20, 72
Klaster Bieliźniarski	Podlaskie	18	14
Klaster Biotechnologii, Farmacji i Kosmetyków	Pomeranian	24, 73	20, 72
Gdańska Delta Bursztynu	Pomeranian	36	31
Innowacyjny Klaster Przemysłowy Stowarzyszenie Producentów Komponentów Odlewniczych „KOM-CAST"	Subcarpathian	27	24
Podlaski Klaster Obróbki Metali	Podlaskie	27	24
Mazowiecki Klaster Innowacyjnych Technologii Fotonicznych „Optoklaster"	Masovian	33	26
Śląski Klaster Wodny	Silesian	41	36
Klaster Budownictwo- Polska Centralna	Masovian	45	41
Klaster Zielonych Technologii	Podlaskie	31, 40	27, 35
Zachodniopomorski Klaster Morski	West Pomeranian	35, 61	30, 50
Inter MareC Interregional Maritime Cluster	Pomeranian	35, 61	30, 50
Polski Klaster Morski	Pomeranian	35, 61	30, 50
Klaster Turystyczny „Kraina mlekiem i miodem płynąca"	Opole	55	55
Północno-Wschodni Innowacyjni Klaster Turystyczny „Krystał Europy"	Podlaskie	55	55
Klaster Turystyki i Rozwoju Regionalnego „Słońce Regionu"	Świętokrzyskie	55	55
Klaster Usługowy „Grono Targowe Kielce"	Świętokrzyskie	74	74
Bieszczadzki Transgraniczny Klaster Turystyczny	Subcarpathian	55	55

Table 22 cont.

Klaster Kultury Lubelszczyzny	Lublin	92	90
Ogólnopolski Klaster „E-Zdrowie"	Lower Silesian	85	86
Klaster Medycyna Polska Południowy Wschód	Lublin	85	86

Czech Republic

Table 23: Cluster initiatives Czech Republic

Cluster initiative	**Region**	**Industry (NACE 1.1)**	**Industry (NACE 2)**
CLUTEX	Northeast	17	13
Oděvní klastr BERNHARDT	Southeast	17	13
Obuvnický klastr	Central Moravia	18	14
Královéhradecký lesnicko-dřevařský klastr	Northeast	20	16
ABC WOOD cluster	Central Moravia	20	16
Jihočeský dřevařský klastr	Southwest	20	16
Moravskoslezsky drevarsky klastr	Silesia	20	16
Moravskoslezsky energeticky klastr	Silesia	31, 40	27, 35
Klastr technické plasty - PLASTICOR	Northeast	25	22
Plastikářský klastr	Central Moravia	25	22
Elektrotechnický klastr	Southeast	30	26
Klastr českých nábytkářů	Southeast	36	31
ENWIWA	Northwest	37	38
ENERGOKLASTR	Southeast	31, 40	27, 35
BIOENERGETIKA	Prague	31, 40	27, 35
ENVICRACK	Silesia	31, 37, 40	27, 35, 38
HIT Hradecký IT klastr	Northeast	72	62
ITEKO	Central Moravia	72	62
Český IT klastr	Southwest	72	62
IT Cluster	Silesia	72	62
CEITEC	Southeast	72	62
OMNIPAK	Northeast	21	17
CZECH STONE CLUSTER	Northeast	26	23
Slévárenský Klastr	Southeast	27	24

Table 23 cont.

Klastr Kovo	Southwest	27	24
Klastr přesného strojírenství Vysočina	Southeast	28, 29	25, 28
Moravian-Silesian Engineering Cluster	Silesia	29	28
The Moravian-Silesian Wood Cluster	Silesia	20	16
The Moravian-Silesian Automotive Cluster	Silesia	34	29
CREA Hydro	Southeast	40, 41	35, 36
Water Treatment Alliance	Southeast	41, 90	36, 37
Klastr HYDROGEN	Silesia	24, 29	20, 28
Klastr Aquarius	Northwest	41, 90	36, 37
Stavební klastr Ostrava	Silesia	45	41
Nanomedic	Northeast	33, 85	26, 32, 86
Czech Nanotechnology Cluster	Central Moravia	73, 29, 33	26, 28, 32, 72
CzechBio	Prague	24, 73	20, 72
CEVTECH	Southwest	41, 90	36, 37
KLACR	Silesia	55	55
NAKLIV	Southeast	80	85
MedChemBio	Central Moravia	24, 73	20, 72

Croatia

Table 24: Cluster initiatives Croatia

Cluster initiative	**Region**	**Industry (NACE 1.1)**	**Industry (NACE 2)**
EUVITA	Northwest	15	10, 11
Cluster hrvatske tekstilne industrije	Northwest	17, 18	13, 14
Drvni cluster sjeverozapadne Hrvatske	Northwest	20	16
Tehnointerijeri- zagrebački poslovno proizvodni centar	Northwest	36	31
Međimurski graditeljski grozd	Northwest	45	41
Nacionalna udruga obiteljskih i malih hotela	Adriatic	55	55
Hrvatski IT cluster	Northwest	72	62
BEAM ICT Alliance klaster	Nortwest	72	62
Cluster Proizvođaca i Prerađivaca Šljive „SLAVONKA"	Central and Eastern	15	10, 11
Klaster Slavonska jabuka	Central and Eastern	15	10, 11
Regionalni cluster pčelarstva „ROJ"	Central and Eastern	15	10, 11

Table 24 cont.

Klaster Grozd plavac mali	Northwest	15	10, 11
Cluster Hrvatska cipela	Central and Eastern	19	15
BIO Q - Cluster ekološke proizvodnje	Central and Eastern	15	10, 11
Klaster male brodogradnje	Northwest	35	30
Udruga trgovaca „051"	Adriatic	52	47
Gastro Grupa	Northwest	51	46
Turistički klaster po Sutli i Žumberku	Northwest	55	55
Grafički Cluster BIOS	Central and Eastern	22	18
Inteligentna Energija	Northwestern	31, 40	27, 35
cro.ict	Adriatic	72	62
Automobilski Cluster Hrvatske, A.C.H.	Adriatic	34	29
Klaster Brodogradnje SDŽ	Adriatic	35	30
Cluster „Posavina povrće"	Central and Eastern	01	01
HKB-Hrvatski Klaster Brodogradnje	Central and Eastern	35	30
Slavonski hrast	Central and Eastern	20	16
Udruga trgovaca Međimurja	Northwest	52	47
Turistički Klaster „kuna"	Central and Eastern	55	55
Klaster Transportni Centar	Central and Eastern	60	49
Udruga Agro -Turistički Klaster „Lepoglavna"	Central and Eastern	55	55