

Dynamics of Employment Clusters in the Fehmarn Region

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BeltLogistics

Dynamics of Employment Clusters in the Fehmarn Region



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Roskilde University - 2014

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Summary

As part of the EU INTERREG project BeltLogistics, this report displays a study done in cooperation between the Roskilde University in Denmark and the Lübeck Business Development Corp. (Wirtschaftsförderung LÜBECK GmbH) in Germany. The study analyzes compared employment data from the years 2005 and 2011 in a geographical area encompassing the Fehmarn Belt region formed by the City of Lübeck, the County of Ostholstein and Zealand Regions located in the border region between Denmark and Germany.

Based on the EU NACE Rev. 2 codes list, which classifies all existing commercial activities, different calculations have been performed in order to assess the employment dynamics over time in comparison to a reference (“comparison”) region. In the case of the Zealand Region, Denmark was used as a reference, whereas Germany was used as reference region when analyzing Lübeck and Ostholstein.

Special attention was given to logistics related activities since this specific sector is considered strategically important for the region and is expected to face considerable challenges in the near future brought by the construction of the Fehmarn Tunnel between Germany and Denmark. Moreover, the statistical data was used to generate a questionnaire which was used to attempt a SWOT analysis based on interviews with stakeholders related to logistics activities, regional development and cross border cooperation.

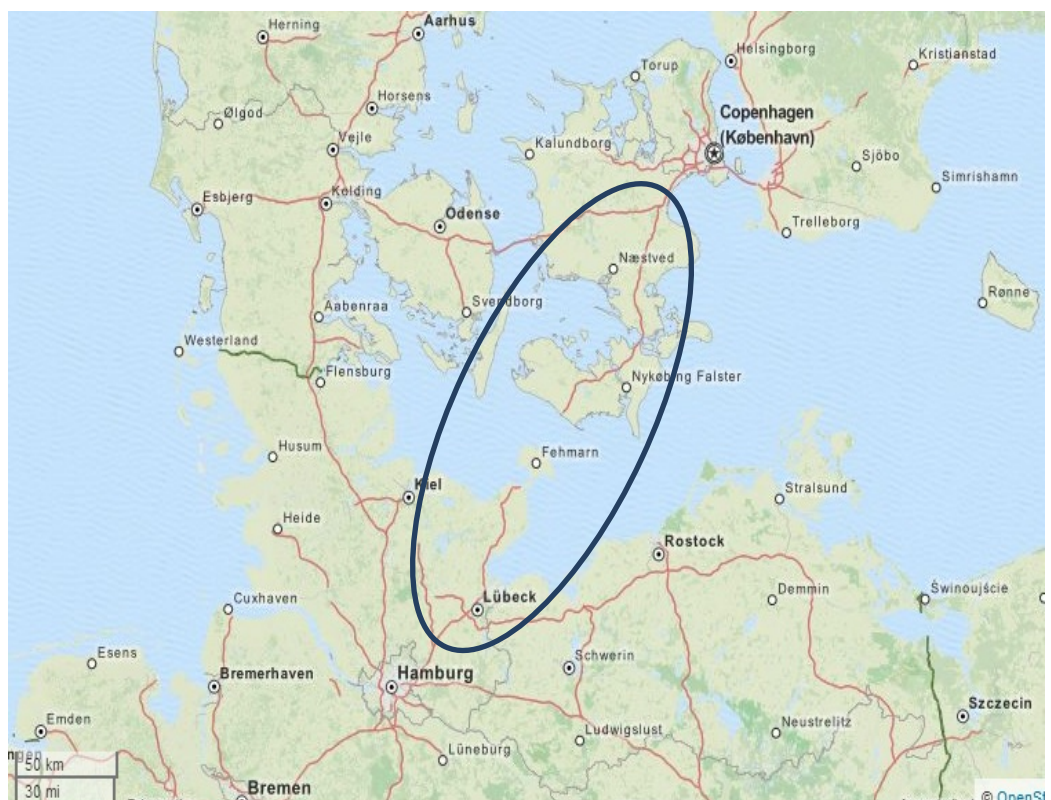
What could be seen is that in general, logistics activities, although still an important sector for the region, have had a decrease in employment in the past years. Specifically, freight transport by road and sea and coastal water transport have seen an employment decrease of more than 5%. The construction of the Fehmarn Tunnel is expected to support and strengthen logistics activities in the region, although companies on the Danish side also expect increased competition from their German counterparts. In a larger perspective, the industries located in the Fehmarnbelt region might benefit from their location between the Hamburg and Copenhagen, which is considered a major advantage due to the transport and logistics demand from both cities.

1.0 Introduction

The importance of cluster formation and maintenance has been nearly exhaustively explained by authors such as Porter (1990), Krugman (1991), Saxenian (1994) and others. To nurture businesses' clusters is a task which demands commitment from the different industries, government and institutions of a given geographical area with the aim of increasing productivity and as a consequence earning competitive advantage in relation to similar industries elsewhere. Higher productivity is influenced by different factors, but in Porter's view

it is obtained through innovation, specialized workforce, competition and collaboration between sectors and between companies in the same sector (1990).

To analyze the employment figures of different industries in a given region and to



The Fehmarnbelt Region (Open Street Maps Creative Commons)

understand the dynamics involved can be useful to nurture, incentivize and increase regional competitiveness, attractiveness and by consequence regional development.

In the Fehmarn Belt Region, an employment dynamics analysis presents a challenge due to the characteristics of being a cross border entity formed by Region Sjælland in Denmark and Ostholstein and Lübeck in Germany. Therefore, in such a study not only clusters must be identified and analyzed in each of the member regions, but the existing or potential cross border collaboration in a macro-regional perspective needs to be taken into account. The challenge here becomes more acute if we consider that in the Fehmarn Belt Region we encounter two different languages, different currencies, labor regulations,

taxation, cultures and innumerable other factors that can make objective measurements more difficult. Still, the imminent construction of the fixed rail and road link between Germany and Denmark, physically connecting the two parts of the Fehmarn Belt Region requires that we analyze the area as a whole entity with local idiosyncrasies, which can both facilitate and hinder regional competitiveness and regional development.

Therefore, this study is not a merely descriptive work about which are the raw employment dynamic figures found on both the German and Danish sides of the Fehmarn Belt Region but a study that questions the causes of the changes occurred in the recent past years.

2.0 Methodology

As mentioned before, the current study presents a challenge in terms of objective measurements due to the inhomogeneity of a cross border region; therefore the used quantitative data should not be the sole input of the study. This project will also use qualitative data in the form of interviews as a differentiating factor in relation to similar researches.

To corroborate with such approach, Porter (1990) instructs:

“In studying national economic success, there has been the tendency to gravitate to clean, simple explanations. (...) The growing specialization of disciplines has only reinforced such a perspective. More can be done. Researchers in many fields of study are just beginning to recognize that traditional boundaries between fields are limiting. It should be possible to cut across disciplines and examine more variables in order to understand how complex and evolving systems work. To do so, mathematical models limited to a few variables, and statistical tests constrained by available data, need to be supplemented by other types of work.” (p. 29-30)

2.1 Sources

Quantitative data:

German side: Bundesagentur für Arbeit

Danish side: Danmark Statistik

Qualitative data: Telephone interviews with stakeholders (business organisations, educational institutions, and public authorities).

2.2 Methods

The cluster analysis represents a measurement of the size and development of the region's major industrial sectors and industry clusters in comparison to the national level (resp. Germany + Denmark) over a certain period of time. For this purpose employment data has been defined as the indicator for an industry's regional impact (size and development).

2.2.3 Data set:

The analysis has been performed based on following statistical inventory:

The analysis assesses employment data within four-digit industrial classification NACE Rev.2 codes. NACE is the "statistical classification of economic activities in the European Community" and is the subject of legislation at the European Union level, which imposes the use of the classification uniformly within all the Member States, which means that national industry classifications must be based on the international codes.

The analysis is based on a statistical inventory of local, regional and national employment figures. Employment figures were chosen as the key variable of the cluster analysis, as compared to other potential key variables such as turnover, profit or market share, employment figures are likely to represent reliable data sources.

For the assessment of the region's economic development over time employment figures dated from November 2005 and November 2011 have been used. Hence, the present analysis illustrates the region's economic development within a time frame of six years, in similar periods before and after the 2008 global economic crisis onset.

The assessed BeltLogistics region includes the Hanseatic City of Lübeck and the County of Ostholstein in Germany and the Zealand Region in Denmark. The reference regions for the analysis were Denmark and Germany for Zealand and Lübeck-Ostholstein respectively.

2.2.4 Measurements

Employment Share

The employment share (ES) identifies a specified industry's share of the total employment in the region. If within an industry 0,2% and above of the local workforce is employed this industry is considered as "high point".

$$ES = E_{ij} / (E_r / 100)$$

ES = Employment Share

E_{ij} = total employment in industry i in community j

E_r = total employment in reference region r

Location Quotient

The location quotient (LQ) is a measure of an industry's concentration in a specific geographic area (BeltLogistics region) compared to a reference area (Germany + Denmark).

The Location Quotient represents a calculated ratio between the local economy and the economy in the reference area.

$$LQ = [(E_{ij} / E_j) / (E_{ir} / E_r)]$$

LQ = Location Quotient

E_{ij} = total employment in industry i in community j

E_{ir} = total employment in industry i in reference region r

This ratio is calculated for all industries to determine whether or not the local economy has a greater share of that industry than in the reference area. A ratio equal to one signifies that the industry share of local employment is equal to the industry share of total employment in Denmark and Germany.

A Location Quotient less than one might imply that the region's economy is not producing enough of the good or service requiring those goods and services to be imported from other areas.

A Location Quotient greater than one suggests that the supply of goods or services is greater than the local demand. The industry has the capacity to generate additional income for the region by exporting goods or services.

Basic and non-basic employment

If an industry has a greater share than expected ($LQ \geq 1,25$) of a given industry, then that "extra" industry employment is assumed to be Basic because those jobs are above what a local economy should have in order to serve local needs.

$$E_j = E_{jb} + E_{jn}$$

E_j = total employment in community j

E_{jb} = basic employment in community j

E_{jn} = non-basic employment in community j

$$E_{ijn} = E_{ij} * (1 / LQ)$$

E_{ijn} = non-basic proportion of employment for industry i in community j

$$E_{ijb} = E_{ij} * [1 - (1 / LQ)]$$

E_{ijb} = basic proportion of employment for industry i in community j

Shift-share analysis

The shift-share analysis demonstrates the number of jobs merely related to national economic growth, the number of jobs created or not created as a result of the region's industry mix and finally, the growth captured due to the competitive advantages of the region in comparison to the reference region. The sum of these three components equals the actual change in total cluster employment within a region over a prescribed time period.

$$\text{Actual Growth} = E_{ij2} - E_{ij1}$$

$$\text{Regional Growth Effect} = E_{ij1} * ((E_{j2} - E_{j1}) / E_{j1})$$

$$\text{Industrial Mix Effect} = E_{ij2} - ((E_{r2} - E_{r1}) / E_{r1})$$

Differential Shift = Actual growth – Regional growth Effect – Industrial Mix Effect

E_{ij1} = total employment in industry i in community j in start year

E_{j1} = total employment in community j in start year

E_{j2} = total employment in community j in end year

E_{r1} = total employment in reference region r in start year

E_{r2} = total employment in reference region r in end year

2.5 The interviews:

Based on the statistical analysis, some of the logistics activities that have had a significant shift in their employment figures, and/or in their location quotient and employment share have been further analyzed in order to find possible causes from the point of view of logistics industry organizations and interested public institutions. For that, a questionnaire¹ containing 10 questions was elaborated and telephone interviews were conducted with public authorities, logistics industry interest organizations, logistics companies and educational institutions.

The reason for choosing the respondents for the questionnaire was based on who the overall primary target group of the project. The primary target group consists of public authorities, educational institutions and logistics organizations all of whom are expected to have in-depth knowledge of the sector thus being able to add validity to their replies. Furthermore as some of the questions were based on statistical findings it made sense to focus only on the above respondents because of their expected knowledge of the sector as we did not expect the companies in the sector to have specific knowledge about these issues.

3.0 Findings:

3.1 Industry Concentrations in the Fehmarn Belt Region in 2005

47 industries out of 615 were found to have both a location quotient above 1,25 and an employment share above 0,2.

130 industries with a location quotient above 1,25 have been identified.

103 industries with an employment share above 0,2% have been identified.

¹ Complete questionnaires in the appendix 1

Logistics

The Logistics group² had in 2005 a total number of employees of 25589 in the Fehmarn Region. This group corresponds to an employment share of 5,51% and a location quotient of 1,07.

Agriculture & Food

The Agriculture & Food had in 2005 a total number of employees of 57236 in the Fehmarn Region. This group corresponds to an employment share of 12,33% and a location quotient of 1,41.

Health Care

The Health Care had in 2005 a total number of employees of 73159 in the Fehmarn Region. This group corresponds to an employment share of 15,75% and a location quotient of 1,41

Professional Services

The Professional Services group had in 2005 a total number of employees of 67665 in the Fehmarn Region. This group corresponds to an employment share of 14,57% and a location quotient of 0,81.

Building & Interior

The Building & Interior group had in 2005 a total number of employees of 36148 in the Fehmarn Region. This group corresponds to an employment share of 7,78% and a location quotient of 1,04.

Retail

The Retail group had in 2005 a total number of employees of 35269 in the Fehmarn Region. This group corresponds to an employment share of 7,60% and a location quotient of 1,21.

Energy

The Energy group had in 2005 a total number of employees of 9117 in the Fehmarn Region. This group corresponds to an employment share of 1,96% and a location quotient of 0,76.

Waste & Recycling

The Waste & Recycling group had in 2005 a total number of employees of 4235 in the Fehmarn Region. This group corresponds to an employment share of 0,91% and a location quotient of 1,15.

Hospitality

The Hospitality group had in 2005 a total number of employees of 11466 in the Fehmarn Region. This group corresponds to an employment share of 2,47% and a location quotient of 1,34.

Media & IT

The Media & IT group had in 2005 a total number of employees of 9227 in the Fehmarn Region. This group corresponds to an employment share of 1,99% and a location quotient of 0,53.

² For complete list of industry groupings refer to appendix 3

Education & Research

The Education & Research had in 2005 a total number of employees of 30933 in the Fehmarn Region. This group corresponds to an employment share of 6,66% and a location quotient of 1,61.

Personal Services

The Personal Services had in 2005 a total number of employees of 61082 in the Fehmarn Region. This group corresponds to an employment share of 13,15% and a location quotient of 1,73.

3.2 Industry Concentrations in the Fehmarn Belt Region in 2011

57 industries with both a location quotient above 1,25 and an employment share above 0,2 have been identified.

133 industries with a location quotient above 1,25 have been identified.

89 industries with an employment share above 0,2% have been identified.

Logistics

The Logistics group had in 2011 a total number of employees of 23083 in the Fehmarn Region. This group corresponds to an employment share of 5,05% and a location quotient of 0,98.

Agriculture & Food

The Agriculture & Food had in 2011 a total number of employees of 55407 in the Fehmarn Region. This group corresponds to an employment share of 12,12% and a location quotient of 1,41.

Health Care

The Health Care had in 2011 a total number of employees of 54478 in the Fehmarn Region. This group corresponds to an employment share of 11,92% and a location quotient of 1,48.

Professional Services

The Professional Services group had in 2011 a total number of employees of 67365 in the Fehmarn Region. This group corresponds to an employment share of 14,74% and a location quotient of 0,77.

Building & Interior

The Building & Interior group had in 2011 a total number of employees of 31130 in the Fehmarn Region. This group corresponds to an employment share of 6,81% and a location quotient of 1,02.

Retail

The Retail group had in 2011 a total number of employees of 34523 in the Fehmarn Region. This group corresponds to an employment share of 7,55% and a location quotient of 1,29.

Energy

The Energy group had in 2011 a total number of employees of 8110 in the Fehmarn Region. This group corresponds to an employment share of 1,77% and a location quotient of 0,75.

Waste & Recycling

The Waste & Recycling group had in 2011 a total number of employees of 3094 in the Fehmarn Region. This group corresponds to an employment share of 0,68% and a location quotient of 0,89.

Hospitality

The Hospitality group had in 2011 a total number of employees of 5490 in the Fehmarn Region. This group corresponds to an employment share of 1,20% and a location quotient of 0,68.

Media & IT

The Media & IT group had in 2011 a total number of employees of 7490 in the Fehmarn Region. This group corresponds to an employment share of 1,64% and a location quotient of 0,47.

Education & Research

The Education & Research had in 2011 a total number of employees of 32492 in the Fehmarn Region. This group corresponds to an employment share of 7,11% and a location quotient of 1,71.

Personal Services

The Personal Services had in 2011 a total number of employees of 66597 in the Fehmarn Region. This group corresponds to an employment share of 14,57% and a location quotient of 1,66.

3.3 Dynamics 2005 – 2011

In the following table the development of industry concentrations between 2005 and 2011 is illustrated.

	Fehmarn Belt Region 2005	Fehmarn Belt Region 2011
Logistics Dynamic: -9,79%	Employees: 25589 LQ: 1,04 ES: 5,51	Employees: 23083 LQ: 0,98 ES: 5,05
Agriculture and food Dynamic: -3,20%	Employees: 57236 LQ: 1,41 ES: 12,33	Employees: 55407 LQ: 1,41 ES: 12,12
Health Care Dynamic: -25,53%	Employees: 73150 LQ: 14,16 ES: 15,75	Employees: 54478 LQ: 1,48 ES: 11,92

Professional Services Dynamic: Stable	Employees: 67665 LQ: 0,81 ES: 14,57	Employees: 67365 LQ: 0,77 ES: 14,74
Building & Interior Dynamic: -13,88%	Employees: 36148 LQ: 1,04 ES: 7,78	Employees: 31130 LQ: 1,02 ES: 6,81
Retail Dynamic: -2,12%	Employees: 35269 LQ: 1,21 ES: 7,60	Employees: 34523 LQ: 1,29 ES: 7,55
Energy Dynamic: -11,05%	Employees: 9117 LQ: 0,76 ES: 1,96	Employees: 8110 LQ: 0,75 ES: 1,77
Waste & Recycling Dynamic: -26,94%	Employees: 4235 LQ: 1,15 ES: 0,91	Employees: 3094 LQ: 0,89 ES: 0,68
Hospitality Dynamic: -52,12%	Employees: 11466 LQ: 1,34 ES: 2,47	Employees: 5490 LQ: 0,68 ES: 1,20

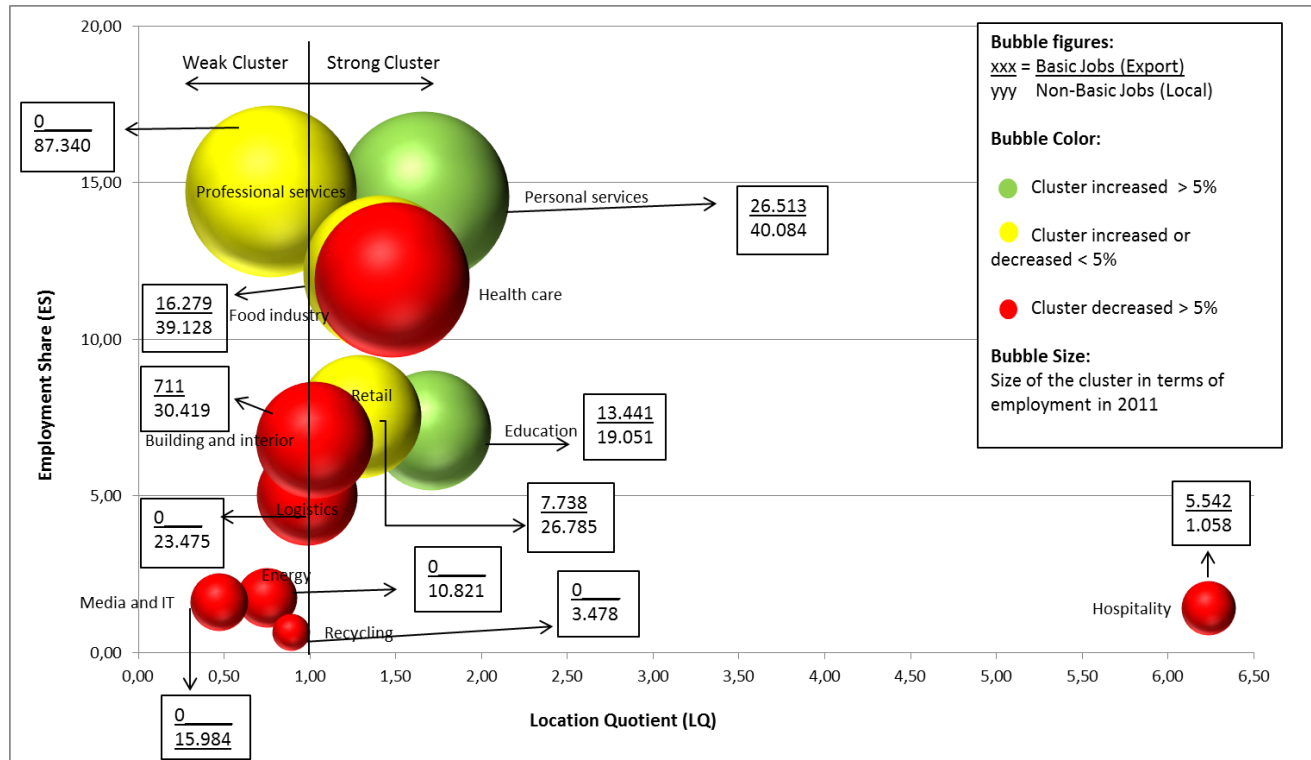
Media & IT Dynamic: -18,83%	Employees: 9227 LQ: 0,53 ES: 1,99	Employees: 7490 LQ: 0,47 ES: 1,64
Education & Research Dynamic: 5,04%	Employees: 30933 LQ: 1,61 ES: 6,66	Employees: 32492 LQ: 1,71 ES: 7,11
Personal Services Dynamic: 9,03%	Employees: 61082 LQ: 1,73 ES: 13,15	Employees: 66597 LQ: 1,66 ES: 14,57

3.4 General Employment Dynamics 2005 – 2011

The following graph is used to demonstrate the changes occurred in employment during the analyzed period in all industrial activities in the Fehmarn Region. In order to understand the graphs contained in this report refer to the following table:

Vertical axe	Employment Share	Percentage of full time employees in the given industry in the related region, in relation to employment in all activities in the same region
Horizontal axe	Location Quotient	Ratio between full time employment in the given industry in the related region RELATIVE to employment in the same industry in the reference region
Bubble size	Employment	Number of full time employments in the given industrial activity
Bubble color	Growth	Green represents an increase of larger than 5% in the period; Yellow represents growth or retraction between 5% and -5% and Red represents a retraction larger than 5%
Figures in the boxes	Basic and Non-Basic Employment	The upper number represents jobs considered basic, i.e. a surplus of employment in that activity when compared to the reference region. The number below shows the number of non-basic employees in that activity. The sum of both numbers represents the total employment in that activity in the region.
Weak-Strong Cluster	Location Quotient larger or smaller than 1	If a bubble is locates below or over 1 in the horizontal axe, it represents that employment in that activity is respectively smaller or larger relatively to the same activity in the reference region

3.5 Fehmarn Belt Region employment by industry grouping 2005-2011

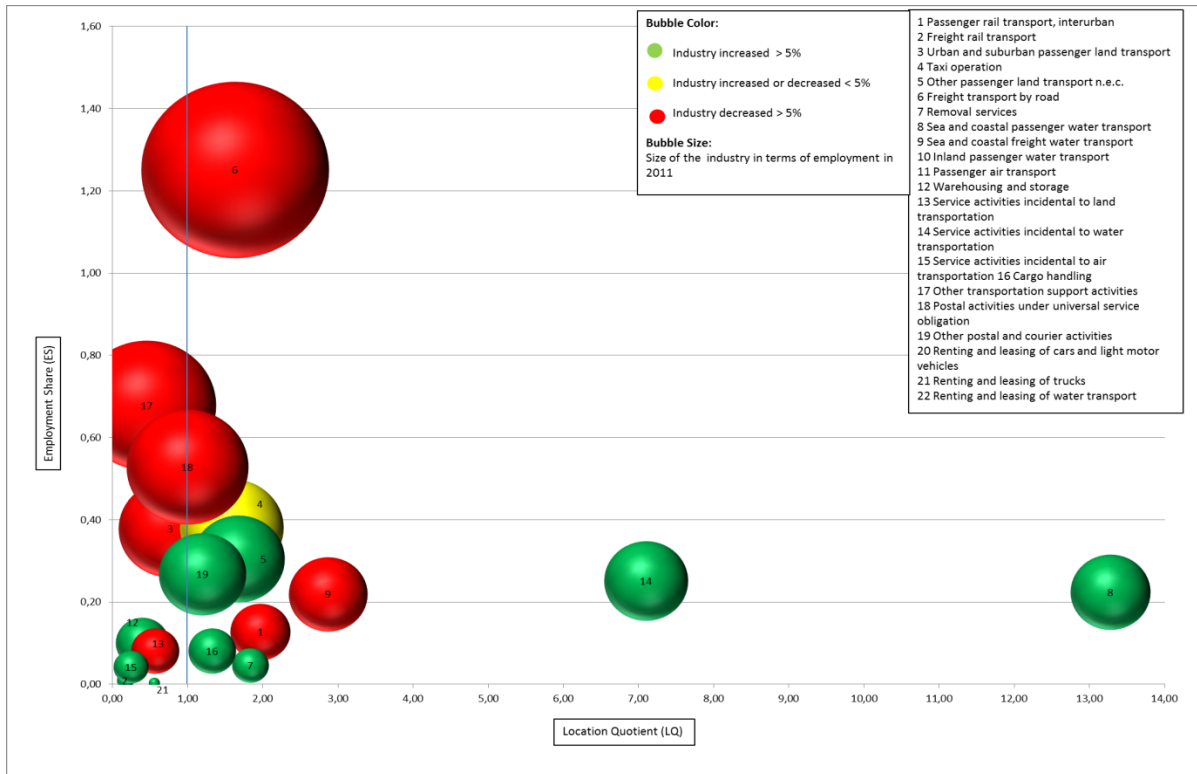


It can be seen in the graph above that the only activities that had an increase in employment of more than 5% during the analyzed period were Personal Services and Education. On the other hand, Health Care, Building and Interior, Logistics, Energy, Media and IT, Recycling and Hospitality have had a decrease of more than 5%, while Professional Services, Food Industry and Retail have been stable.

It is also apparent that Professional Services, Personal Services, Food Industry and Health Care are the largest employers in the Fehmarn Region, on the other hand, Professional services, although being a large employer, still does not match the reference region (Denmark+Germany) regarding the workforce necessary to supply its own needs.

When we look at the Logistics industry in the Fehmarn Region, we can see that it has decreased more than 5% in the years between 2005 and 2011, in fact 9,8% decrease according to the collected data. Moreover, the logistics activities in the Fehmarn Region are slightly below the reference region regarding demand, i.e. Logistics employment in the Fehmarn Region exists just enough to supply its own needs, but the region does not present a surplus of employment in this industry.

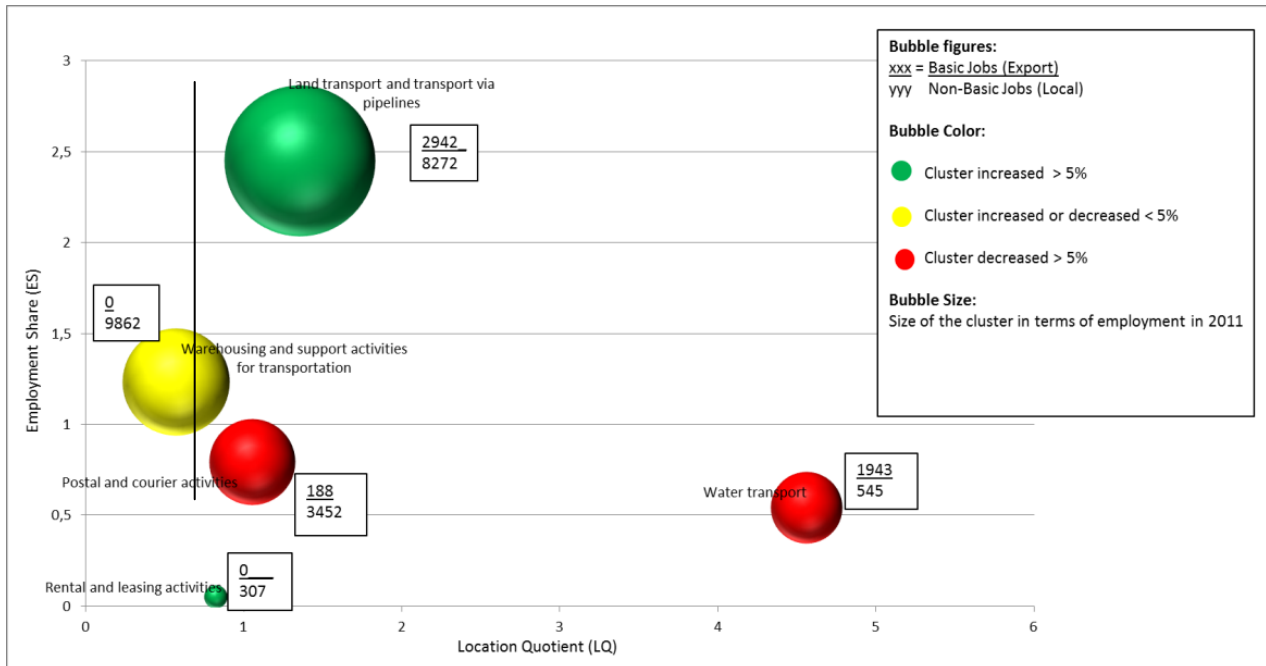
3.6 Logistics Industry employment dynamics in the Fehmarn Belt Region 2005 – 2011



If we look into the Logistics Industry in greater detail in the Fehmarn Region, we can observe the different activities which form the whole of the industry. In the graph above, we can see that Passenger land transport, Removal Services, Sea and Coastal passenger transport, Warehousing and storage, Activities incidental to water transport, Activities incidental transportation, Cargo handling and Postal and courier activities have had a growth of more than 5%. On the other hand, Interurban passenger transport, Urban and suburban passenger transport, Freight transport by road, Sea and coastal water transport, Service activities related to land transportation, Other transportation support activities and Postal activities under universal service obligation have had a reduction of more than 5%.

The two activities that had the largest decrease were Sea and coastal water freight transport (9) and Freight transport by road (6), with -48%, and -15% respectively. This reduction represented a reduction of about 1000 workplaces in each industry in the period. It is worth to mention that although the large decrease in employment in both activities, they still represent an over the average employment related to the reference region. Sea and Coastal water freight transport also seems to influence activities related to it, such as Services incidental to its practice (14), in which we can see an increase of more than 5% and a location quotient of 7. It must be noticed that coastal water transport in Germany is an activity restricted to their Baltic coast, where Ostholstein and Lübeck are located.

3.7 Logistics Industry groupings employment dynamics in the Fehmarn Belt Region 2005 – 2011



The graph above represents the logistics industry according to groups of activities³. Water transport, although having a high Location quotient has decreased more than 5% in employment figures. Land transport and transport via pipelines is the largest employer and has had an increase of more than 5% in the analyzed period.

³ For complete industry groupings refer to appendix 3

3.8 Shift Share analysis: Logistics industry in the Fehmarn Belt Region

The shift share analysis measures the real employment development of each industrial activity in the Fehmarn Region in comparison to an estimated development in the reference area (Germany+Denmark).










The comparison with the calculated estimated development allows drawing conclusions about an industry's competitiveness in the region compared to industries in other regions.

Variations from the reference area can either result in the regional industry structure or in location specific effects.

The following table illustrates the determinants actual growth (real employment development), regional growth effect and industrial mix effect, on which the differential shift effect calculation is based. Those industry codes are accentuated with a red arrow that features a differential shift effect of more than -50.

Observing the differential shift effect in the logistics industry in its sum a negative development of -25000 can be noticed. Consequently, the industry dynamics in the logistics cluster are very weak compared to the sum of Germany and Denmark as reference region.

NACE	Industry	Actual growth (employees)	Regional Growth Effect (employees)	Ind Mix Effect (employees)	Differential Shift (employees)	
49.10	Passenger rail transport, interurban	-484	-17	583	-1050	↓
49.20	Freight rail transport	17	0	45	-27	
49.31	Urban and suburban passenger land transport	-345	-32	1730	-2042	↓
49.32	Taxi operation	-15	-28	1742	-1729	↓
49.39	Other passenger land transport n.e.c.	372	-16	1395	-1007	↓
49.41	Freight transport by road	-1064	-106	5719	-6677	↓

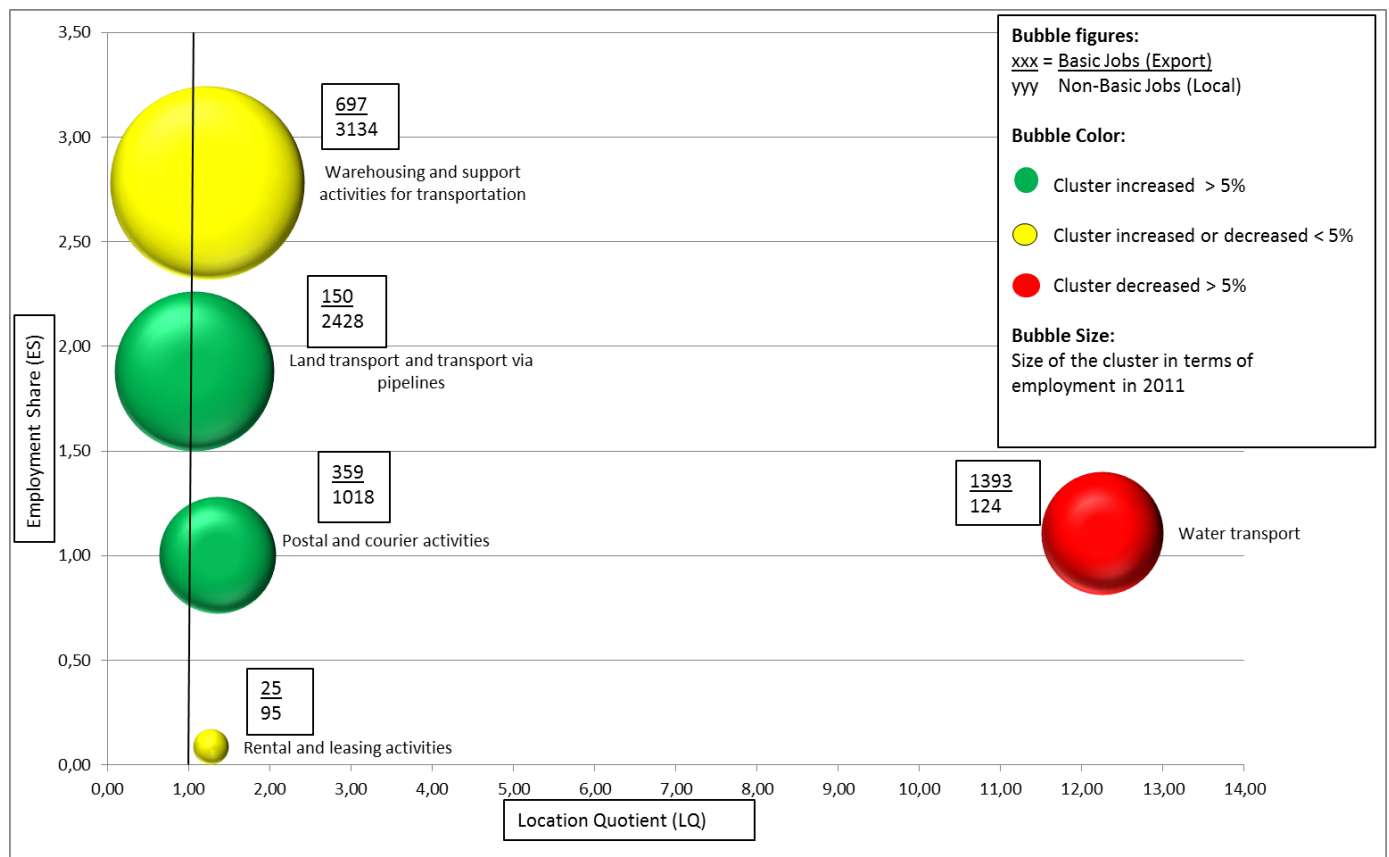
49.42	Removal services	14	-3	213	-196	
49.50	Transport via pipeline	0	0	0	0	
50.10	Sea and coastal passenger water transport	597	-7	1027	-423	
50.20	Sea and coastal freight water transport	-945	-31	1005	-1919	
50.30	Inland passenger water transport	-43	-2	65	-106	
51.10	Passenger air transport	-10	0	19	-28	
51.21	Freight air transport	0	0	0	0	
51.22	Space transport	0	0	0	0	
52.10	Warehousing and storage	72	-6	462	-384	
52.21	Service activities incidental to land transportation	-34	-6	372	-400	
52.22	Service activities incidental to water transportation	201	-15	1150	-934	
52.23	Service activities incidental to air transportation	63	-2	194	-129	
52.24	Cargo handling	265	-2	371	-104	

52.29	Other transportation support activities	-367	-54	3099	-3412	↓
53.10	Postal activities under universal service obligation	-1356	-59	2415	-3712	↓
53.20	Other postal and courier activities	513	-11	1225	-701	↓
77.11	Renting and leasing of cars and light motor vehicles	-2	-3	182	-181	↓
77.12	Renting and leasing of trucks	7	0	19	-12	
77.34	Renting and leasing of water transport equipment	8	0	21	-13	
77.35	Renting and leasing of air transport equipment	30	0	30	0	
Total	total	-2506	-401	23083	-25188	↓

From the chart above it can be seen that in general, employment has fallen in all transport and logistics industries in a higher degree than it could be expected based on economic and structural factors.

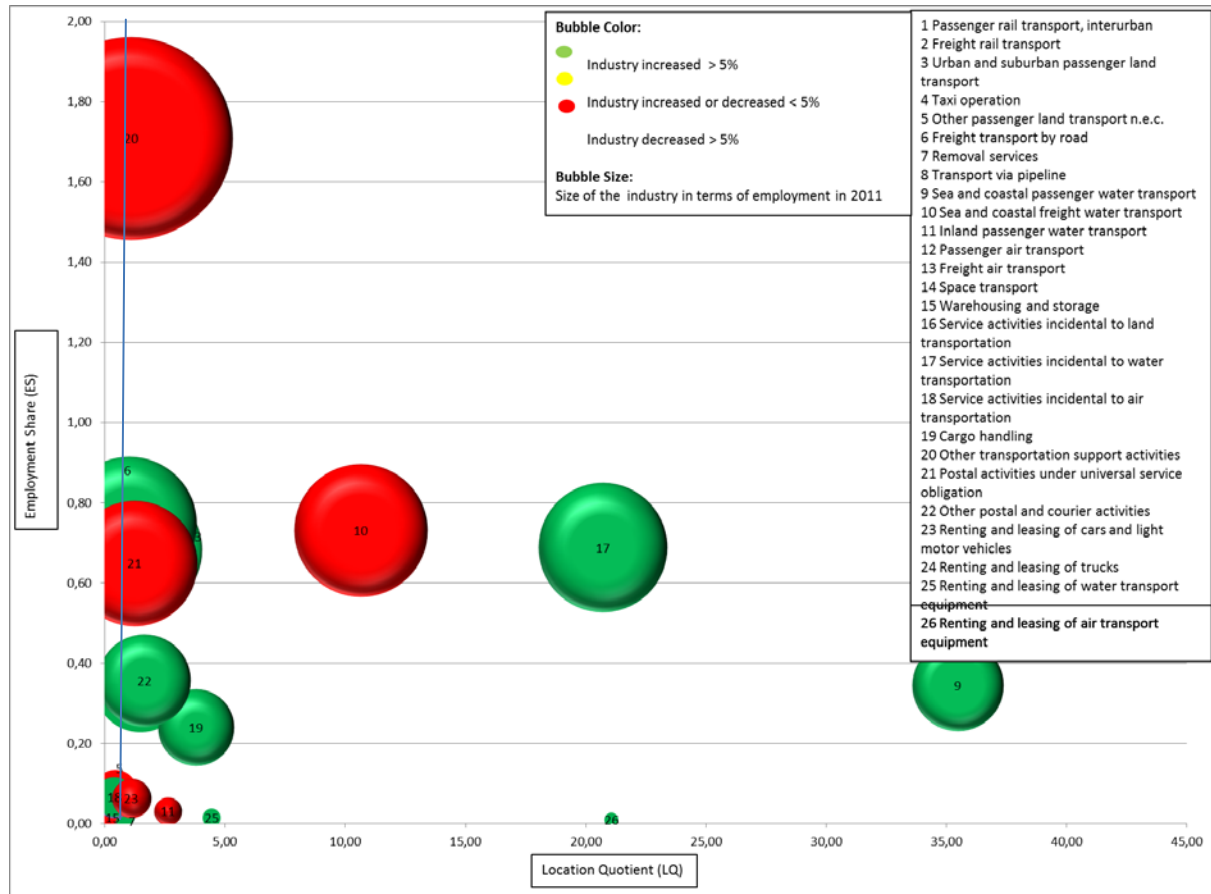
3.9 Logistics industry employment dynamics by groups - German Side of Fehmarn Belt Region 2005-2011

In the following, the dynamics of the German and Danish figures are presented separately in order to visualize differences and similarities.



Looking specifically at the German side of the Fehmarn Region, it is noticeable that Water transport is still a very strong activity, besides its reduction of more than 5% in the analyzed period. On the other hand, land transport and transport via pipeline and Postal and courier activities have shown growth above 5% and are slightly above the German relative employment for those activities. Warehousing and support activities for transportation represent the largest employment within the logistics groupings in the region.


3.10 Logistics industry employment dynamics by activity – German Side of Fehmarn Region 2005-2011



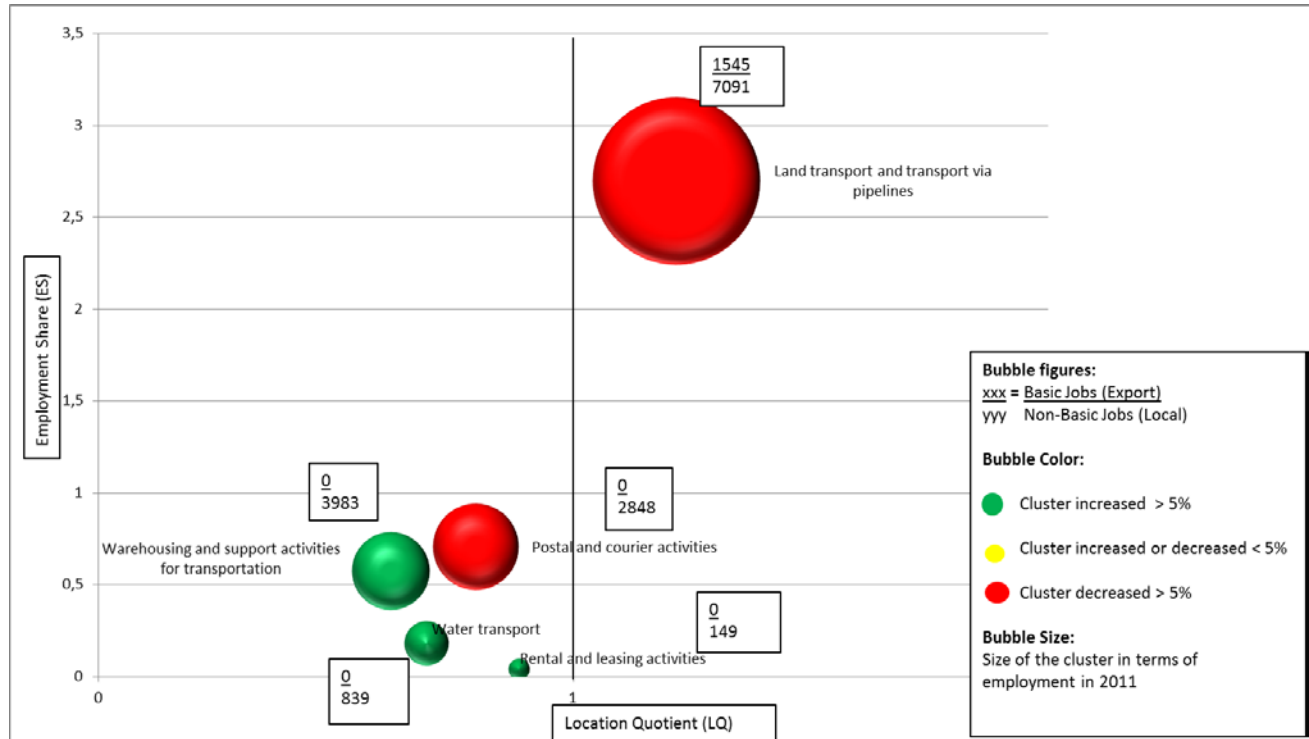
3.11 Shift Share Analysis: Logistics employment dynamics in the German Fehmarn Belt Region

NACE	Industry Classification	Actual growth	Regional Growth Effect	Ind Mix Effect	Differential Shift	
49.10	Passenger rail transport, interurban	-290	29	0	-319	↓
49.20	Freight rail transport	41	0	41	0	
49.31	Urban and suburban passenger land transport	146	78	937	-869	↓
49.32	Taxi operation	87	38	466	-416	↓
49.39	Other passenger land transport n.e.c.	-45	15	109	-169	↓
49.41	Freight transport by road	175	84	1025	-934	↓
49.42	Removal services	26	0	26	0	
49.50	Transport via pipeline	0	0	0	0	
50.10	Sea and coastal passenger water transport	472	0	472	0	
50.20	Sea and coastal freight water transport	-919	190	1002	-2111	↓
50.30	Inland passenger water transport	-56	10	43	-109	↓
51.10	Passenger air transport	1	0	1	0	
51.21	Freight air transport	0	0	0	0	

51.22	Space transport	0	0	0	0	
52.10	Warehousing and storage	-71	10	26	-107	↓
52.21	Service activities incidental to land transportation	68	1	81	-14	
52.22	Service activities incidental to water transportation	211	72	943	-804	↓
52.23	Service activities incidental to air transportation	20	7	91	-78	↓
52.24	Cargo handling	250	8	328	-86	↓
52.29	Other transportation support activities	-582	290	2342	-3213	↓
53.10	Postal activities under universal service obligation	-130	101	889	-1120	↓
53.20	Other postal and courier activities	480	1	488	-9	
77.11	Renting and leasing of cars and light motor vehicles	-12	10	87	-109	↓
77.12	Renting and leasing of trucks	-5	1	2	-8	
77.34	Renting and leasing of water transport equipment	6	1	19	-14	
77.35	Renting and leasing of air	12	0	12	0	

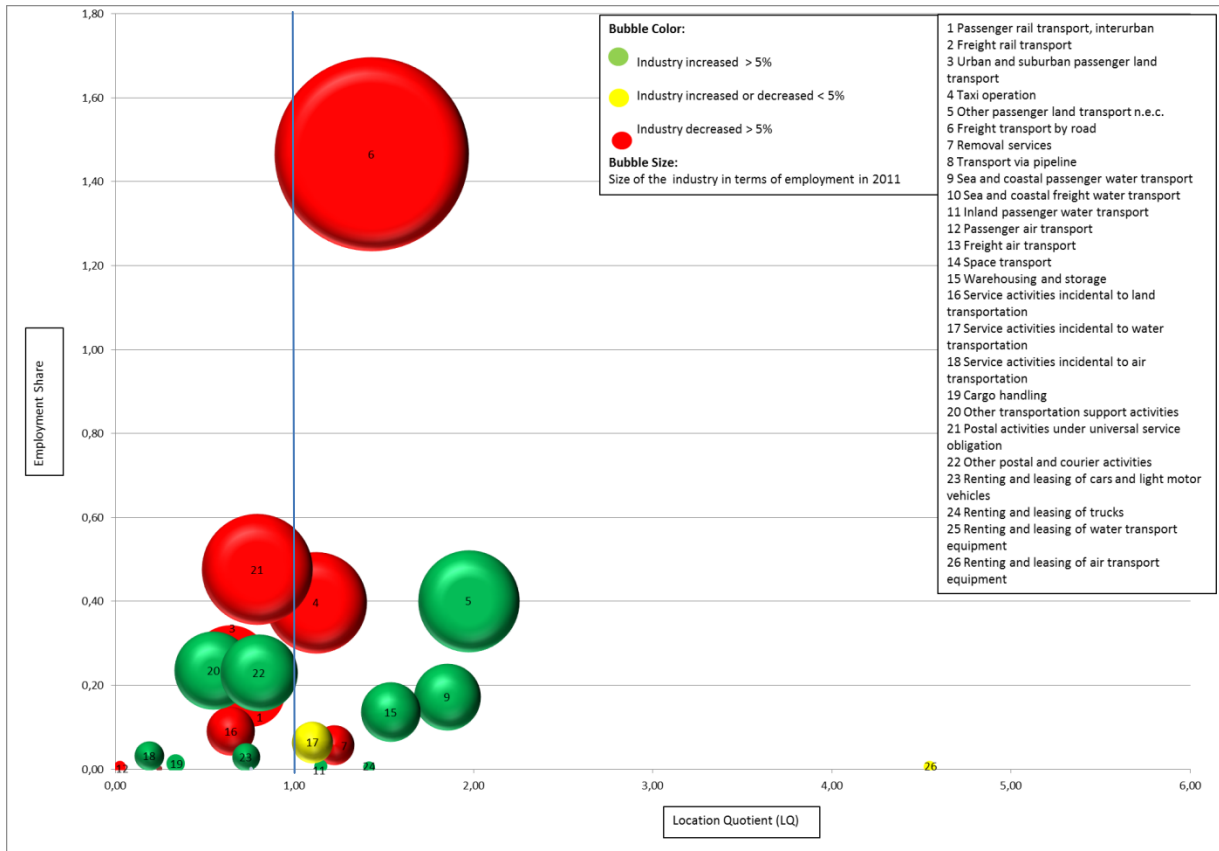
	transport equipment					
	Total	-115	945	9430	-10490	

3.12 Logistics industry dynamics by groups - Danish Side of Fehmarn Region 2005-2011



In the Danish side of the Fehmarn Region, the activities employing more people in the logistics industry are the ones related to the Land transport and transport via pipelines group, although this group has had a decrease of more than 5% in the analyzed period. Land transport and transport via pipelines is also the only group that could be considered a strong clustering in the Zealand Region. Postal and courier activities have presented a decrease of more than 5% and can be considered weak; the same for Water transport, Rental and leasing activities and Warehousing and support activities for transportation, although last three have presented increase of more than 5% in their employment figures.





3.13 Logistics industry employment dynamics by activity - Danish Side of Fehmarn Region 2005-2011



In the detailed graph above it is possible to see that Freight transport by road is the largest activity in the logistics industry in Zealand Region. Although this activity possesses a location quotient above 1,2, it has had a decrease in employment of more than 5% in the years between 2005 and 2011. In fact, that reduction was of 20,8%. On the other hand, transportation support activities and warehousing and storage have had an increase larger than 5% in the analyzed period although the absolute numbers of employment in these activities is not as significant as in Freight transport by road.

3.14 Shift Share Analysis: Logistics employment dynamics in the Danish Fehmarn region

NACE	Industry Classification	Actual growth	Regional Growth Effect	Ind Mix Effect	Differential Shift	
49.10	Passenger rail transport, interurban	-194	-45	583	-732	↓
49.20	Freight rail transport	-24	-2	4	-26	
49.31	Urban and suburban passenger land transport	-491	-74	793	-1210	↓
49.32	Taxi operation	-102	-80	1276	-1298	↓
49.39	Other passenger land transport n.e.c.	417	-50	1286	-819	↓
49.41	Freight transport by road	-1239	-343	4694	-5590	↓
49.42	Removal services	-12	-11	187	-188	↓
49.50	Transport via pipeline	0	0	0	0	
50.10	Sea and coastal passenger water transport	125	-25	555	-405	↓
50.20	Sea and coastal freight water transport	-26	-2	3	-27	
50.30	Inland passenger water transport	13	-1	22	-9	
51.10	Passenger air transport	-11	-2	18	-27	
51.21	Freight air transport	0	0	0	0	
51.22	Space transport	0	0	0	0	
52.10	Warehousing and storage	143	-17	436	-276	↓
52.21	Service activities incidental to land transportation	-102	-23	291	-370	↓
52.22	Service activities incidental to water transportation	-10	-13	207	-205	↓
52.23	Service activities incidental to air transportation	43	-3	103	-57	↓
52.24	Cargo handling	15	-2	43	-26	
52.29	Other transportation support activities	215	-31	757	-511	↓

53.10	Postal activities under universal service obligation	-1226	-159	1526	-2593	
53.20	Other postal and courier activities	33	-41	737	-663	
77.11	Renting and leasing of cars and light motor vehicles	10	-5	95	-80	
77.12	Renting and leasing of trucks	12	0	17	-5	
77.34	Renting and leasing of water transport equipment	2	0	2	0	
77.35	Renting and leasing of air transport equipment	18	0	18	0	
Total	total	-2391	-927	13653	-15117	

4.0 Qualitative analysis

In order to support the quantitative analysis it was decided to conduct a number of interviews on both sides of the Fehmarn belt. Some of the questions were of a general nature and some of them were based on the statistical findings. The interviews were done during a couple of weeks and the information was compiled into a summary from the German and the Danish side.

4.1 Results from the questionnaires – German side of the Fehmarn Region

Based on 6 interviews we are able to distinguish the answers between the type of organization which the respondent comes from i.e. organizations related specifically to the transport and logistics sector, public authority/business development and municipality.

Looking at the type of organization it has to be mentioned that a few organizations in transport and logistics as well as public authorities/business development organization partly have established cooperation with partner organizations in the Danish part of the Fehmarn Belt region. These cooperation results from direct business connections as well as cooperation from projects on EU level.

The main barriers to cross-border cooperation that has been mentioned in the interviews are i.e. the different logistics-strategies in both countries. Danish forwarding agents do normally have too small export volumes. They are not able to provide their small export volumes to German forwarding agents. Another barrier that was mentioned is the high costs for the ferry link between Puttgarden and Rødby. Just the bunker oil supplement (about EUR 30.00 per 17-m-truck) is more expensive than the diesel fuel of the truck for about 20 km = 7 liters = EUR 9.00. Other barriers that have been mentioned are the distance between Rødby and Puttgarden, different administrative structures and the different languages.

Turning to the question related to the influence of the tunnel across the Fehmarn Belt, all respondents but one expect that it will have a noticeable impact – during the construction and after the opening of the tunnel. Some expect positive impacts and some expect negative impacts. The positive impacts may be a reduction of travel-times, locate of new businesses, better business opportunities and an increase of cooperation.

It has also be mentioned that regarding the proposed costs for the Fehmarn belt fixed link there will not be major changes in the future. The costs should be about the same as now for the ferry connection. The time advantage of the tunnel connection (maximum 1 hour) is rarely effective. 90% of all goods over the Fehmarn Belt come in long-distance traffic, where a time saving of 1 hour does not really matter. To the

contrary, the truck will be slower because a 45 minutes break for the driver after passing the tunnel will be required. It is also expected that after building the tunnel the price level for the ferry connection will be reduced e.g. through the depreciation of the ferries, fewer departures of the ferries with a lower load factor and less expensive staff. From the view of the port of Lübeck a transfer from "Sea to Road" is a big risk.

When we look at the general development in employment in all of Germany and especially in the logistics sector and the increase in this, some pointed out that the increase of the transport volumes in Europe in that period are one of the main factors for this. 1% general economic growth causes a doubling of the amount in the logistics sector. More manufactured goods requires more truck traffic, more warehousing facilities, etc. The volume of transported goods rises at least to the same extent as production increases. More and more division of labor and larger production facilities require more transport of raw materials / semi-finished goods and more transports of finished goods over increasingly longer distances. The international division of labor continues to increase. The road freight transport still has competitive advantages towards other transport carriers in respect of cost and flexibility.

Turning to the question related to the development in the employment numbers in Region Lübeck/Ostholstein there has been a reduction in logistics employment around 1,2% while general employment has increased by 9,9%. One reason for that is seen in the relocation of transport on forwarding companies from Eastern Europe, this can also be seen in the toll statistics. One result from that is the reducing from German transport fleet right up to the closure of German forwarding companies. That has happened to nine forwarding companies in the Region of Lübeck over the last few years. Another reason mentioned is the decline of transport volumes caused by the financial crises started in 2008. The fact that the automotive industry as one of the strongest and rapidly grown industries in Germany in the recent years is not based in the Lübeck Region has been mentioned as a reason.

The next question was related to the sea and coastal freight transport and its reduction of 47% on its employment figures (approx. 920 workplaces) in the Region of Lübeck/Ostholstein between 2005 and 2011. It was mentioned that the imports of paper-products from the Scandinavian countries decrease for the benefit of the national recycling rate. In addition, large transport companies/groups have set up their selves on the direct transport of paper products. The result from that is the eliminating paper handling in the German ports as well as in the Scandinavian ports. Furthermore a deflection to increased containerized traffic via German ports in the North Sea Region is recognized.

Looking at the negative development in the employment numbers in the area of warehousing and other third party logistics services (decrease 70 % between 2005-2011) and the sea and coastal freight transport volumes (decreased 47% in that period) it was mentioned that there is a direct influence. But it was also mentioned that the increasing cost situation forces the few manufacturing companies in the Northern part of Germany to cost savings. An saved warehouse has a double effect in cost-saving: Less inventory, and no warehousing costs. It was also mentioned that the large warehouse locations localizes in the regions of the strong consumer markets in Germany (Rhein/Ruhr area and Hessen/Baden-Württemberg area). The general trend is to avoid warehouses by optimizing JIT concepts and VAS-systems.

The next question related to the logistics sector in the Region of Lübeck/Ostholstein and its role as an indicator for the general local economy was answered as follows: The logistics sector is one of the most important branches in the Region in addition to health care, food and tourism. But the influence of the regional logistics sector in the regional economic environment decreases for decades. Two causes are responsible for that. General growth of the global players in the logistics sector (which are not represented in the Region Lübeck/Ostholstein) and the effects of globalization (Internet / minor costs for communication) enable the provision of logistics services at any location. Growth potential is possible through stronger cooperation, know-how transfer and bundling of traffic flows.

The last question focused on regional attractiveness is based on a well-developed and competitive logistics sector was mostly answered positively. A distinctive Logistics Cluster is an outstanding location advantage. Short distances for contractors and a good range of logistics services is a strong advantage for manufacturing companies in the region. But the regional logistics industry is responsible to adapt their service-portfolio to the growing demands of the manufacturing industry. Otherwise logistics service providers from other strong logistics regions like Hamburg or Europe will get on the regional market.

Extraction of strengths and weaknesses

Having compiled a short summary of the responses to the questionnaire a deduction of the strengths and weaknesses of the logistics sector in Region Lübeck/Ostholstein will be made and also of the business cooperation climate.

4.1.1 Strengths

- The regions position in the building process of the tunnel and afterwards on the axis between the metropolis Hamburg-Copenhagen is considered as a major strength.
- Most of the regional logistics-service providers and forwarding agents have their headquarters in the region Lübeck/Ostholstein

- The logistics sector is one of the biggest in the region
- The port of Lübeck and the direct connection to the Baltic Sea is a strong locational advantage for the logistics sector in the region Lübeck/Ostholstein
- The Hanseatic City of Lübeck is a major consumption area

4.1.2 Weaknesses

- Eastern European truck drivers have weakened the logistics sector substantially
- Language and cultural barriers
- Logistics and transport are sensitive to changes in the global economy because they are cyclical
- Competition with ports in the western part of Germany
- the turnover in the port of Lübeck is retrogressive
- Having looked at strengths and weaknesses – which focus on the present situation in the region Lübeck/Ostholstein – it is only natural to take a look at the future and how the respondents viewed opportunities and threats

4.1.3 Opportunities

- Increased cooperation between organizations in the logistics sector in the future
- Story telling
- Developing of new industrial areas with potential new customers for logistics services

4.1.4 Threats

- Increased competition from Scandinavian countries once the tunnel is in place
- Increase in foreign truck drivers
- The region will not attract new businesses and the region will become a transit area

4.2 Results from the interviews – Danish side of the Fehmarn Region

Based on 11 interviews we are able to distinguish the answers between the type of organization the respondent comes from i.e. organizations related specifically to the transport and logistics sector (4 respondents), public authority/business development (3), municipality (3), education (1).

Looking at the type of organization that has cooperation with the German part of the Fehmarn belt region it is clear that organisations working in transport and logistics as well as public authorities/business development organisations have established cooperation ties with the exception of the Danish Forwarding Organisation which is more deeply rooted in a Nordic cooperation with a sister organization or at EU level. Also Køge Harbour/Scandinavian Transport Centre on a whole does not have formalized cooperation with northern Germany, but have participated in several EU projects with cross-border cooperation. Two municipalities and the educational institution do not have any cooperation with northern Germany. The main reason for this is primarily prioritizing of resources internally. One municipality mentioned that they have some cooperation regarding the development of the Fehmarn belt region and also in transportation. However it was not specified if this was cooperation with northern Germany.

Turning to the question related to the influence of the tunnel across the Fehmarn belt everybody but one expects that it will have a noticeable impact – especially during the building period of the tunnel. Some expect an increase in the competition from logistics companies in northern Germany whilst Køge Municipality expects that the tunnel will improve their local framework conditions. Again the freight forwarding association does not foresee a huge impact as their members are very good at adapting to new framework conditions and see these as “manufacturing conditions”. Køge Harbour/STC does not expect an impact as such. However they know from previous experiences that making of a fixed link will create organic growth when we look at the road sector, but there is no prediction of how this could affect Køge, as the trucks are already passing through Køge today. Instead they think that the electrification of the rail way is going to be a major influence, but the politicians have to figure out what to do with this electrification. He thinks a state-of-the-art combi terminal should be established where efficient reloading of goods to other transport modes can be done and it has to be done now in their opinion. The politicians are only talking about transit traffic – and that will not have an impact on them. Everybody is talking about moving goods away from the roads – why not use the blue motorway as it has enough space. Or alternately move goods from road to rail when we speak of the fixed Fehmarn connection. Especially as Hamburg Harbour has a goal of being free of truck traffic by 2025.

When we look at the general development in employment in all of Denmark and also specifically in the logistics sector and the decline in this some pointed out that the competition from eastern European truck

drivers is one of the main factors for this – also cabotage was mentioned several times. Furthermore the financial crisis starting in 2008 was mentioned by several of the respondents pointing out that it had an influence on supply and demand structure. The decrease in private consumption also played a role. Additionally the increased use of long trucks (EMS vehicles) has also reduced the number of trucks on the road thus replacing more truck drivers.

Turning the development in the employment numbers in Region Zealand the decline was less than in the whole of Denmark. A majority of the respondents pointed out that due to the geography of the region the sector was not hit as hard as in the rest of the country. Being a sub-supplier of goods to the Capital Region the region is not as sensitive to fluctuations in the global economy as much of the transportation is on a local basis (movement of FMCG for instance). Another reason mentioned is the fact that there is not a lot of manufacturing in the region making it less vulnerable to the crisis. Some also mentioned the Scandinavian Transport Centre in Køge as being of importance. An interesting reflection was also that the Danish companies have been very good at super optimizing and too much of it. People are willing to run faster in order to keep their jobs – and even at a lower wage in some cases.

The next question related to the most important sub-sector in the region – transport by road and its decline with nearly 1200 jobs from 2005-2011. Cabotage was mentioned as the major reason and also reflagging of origin of the trucks and drivers. Outsourcing of manufacturing to cheaper countries and bankruptcies were also mentioned as being of importance. The less products being manufactured locally the less transport of these and this has led to some bankruptcies in the sector. Before the financial crisis back in 2007 there was a lack of truck drivers in Denmark thus recruitment took place outside the country – also in the warehouses. So one reason for this massive loss of jobs could be a combination of finding sources for employment outside the country, lower activity level and sub-optimization.

Looking at the positive development in the area of warehousing and other third party logistics services one of the respondents mentioned that the money is found in coordination of sales and forwarding – not in ownership of trucks. Making fixed costs variable. Maybe the logistics sector is slightly changing its focus in the later years. E-commerce can also be an explanation.

In later years there has been a development of less physical goods being transported. How did the respondents perceive the relevance of logistics in the local economy? All of the respondents believe that the logistics sector plays a relevant role in the local economy. In Køge they employ more than 3000 individuals in the transport and logistics sector (which is 12,5% of the total employment in the

municipality). Furthermore with the disappearance of many of the labor intensive jobs in the past 30 years, Køge has shown an ability to adapt to the new framework conditions.

The last question focused on regional attractiveness is based on a well-developed and competitive logistics sector. 7 of the 11 respondents believed it to be an important framework condition and that accessibility to the market is important. One municipality mentioned story-telling as an important means of being able to attract new businesses and gave an example of a municipality in Jutland that is very good at doing exactly this. Bragging was mentioned in this context. Above all being clear from the municipality's side on what their core competences are and what they can offer. Also more cooperation between the municipalities in the Region of Zealand was mentioned as being important instead of being competitors.

4.2.1 Extraction of strengths and weaknesses

Having compiled a short summary of the responses to the questionnaire a deduction of the strengths and weaknesses of the logistics sector in the Region of Zealand will be made and also of the business cooperation climate.

4.2.2 Strengths

The region's position in the building process of the tunnel is considered a major strength. The development in recent years of STC in Køge is considered a major asset and strength from several sides. Also the development around the cities of Høje Taastrup and Ringsted are seen as a strengthening of the region.

Some headquarters of companies are located in Zealand and even though the financial crisis hit hard there may have been less redundancies due to the location of HQ's in the region. The logistics sector is generally strong in the region and being a sub-supplier to the Capital Region is a major strength – even during times of crisis.

The region (including the Capital Region) is a major consumption area.

Several organisations have made either cooperation agreements with German counterparts or are already in contact with German organisations through projects.

4.2.3 Weaknesses

Decision making structures in northern Germany are not transparent. Whom supports what? Where does the federal government support, when do the länder take over? The issue of co-financing from the German side for EU projects is also an issue. Language can also be a weakness.

We are not good enough at making logistics interesting as an education.

Logistics and transport are sensitive to changes in the global economy because they are cyclical.

Outsourcing of manufacturing has also weakened the region from an overall perspective. The less that is manufactured in the region, the less has to be transported.

Eastern European truck drivers have weakened the sector substantially.

Less infrastructure funds to make use of meaning less opportunities for development of for instance business development areas.

Having looked at strengths and weaknesses – which focus on the present situation in Region Zealand it is only natural to take a look at the future and how the respondents viewed opportunities and threats.

Super optimization of the work force has led to people running faster at lower salaries (not in all sectors)

4.2.4 Opportunities

Increased cooperation between organizations in the sector in the future.

Maybe there is going to be an increase of goods on rail as the opportunity will be there.

A freight forwarder will be able to cover a larger geographical area and will be able to travel to and from in one day.

Storage location of building materials during the building years.

Hamburg Harbour's ambition of becoming free of truck traffic by 2025 is an opportunity for both rail and sea freight. Rail through the Fehmarn tunnel especially.

More cooperation with northern German harbours (and the rest of the Baltic states). Maybe some of the harbours will be able to offer additional services in order for the region not to become a mere transit region.

Continuous built up of the logistics centers in Køge and Ringsted.

Distribution, knowledge of products, language and skills – preferably in cooperation with freight forwarders.

Big opportunity of transport to web shops, retail and the construction sector.

More focus on environmental safety in the companies.

Story telling

4.2.5 Threats

Increased competition from northern Germany once the tunnel is in place.

Increase in foreign truck drivers and cabotage.

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Appendix 1:

Questionnaire for primary stakeholders (Region Zealand)

Date
Name of organisation
Name of person interviewed
Type of organisation/representing which sector?
Does your organisation have any cross-border cooperation with Northern Germany today?
What are the main barriers to cross-border cooperation?
How do you expect the Fehmarn fixed link to influence your organisation? (or your members)
Between 2005 and 2011 in Denmark there has been a reduction of 3,2% in general employment, in the logistics sector the reduction has been of 16,8%. What do you see as the main reason for this discrepancy?
In Region Zealand during the same period the reduction in logistics employment has been of around 14,5% while general employment has been reduced by 6,8%. To what can be attributed this less steep difference compared to the national numbers?
Freight transport by road is a significant industry in the Region, with over the average employment compared to the rest of the country, still, it has faced a reduction of 20% on its employment figures (ca. 1200 workplaces) between 2005 and 2011. Who's to blame about this reduction?
On the positive side, warehousing and storage, although not showing significant absolute numbers, have had an increase of ca. 40% in working positions on the same period (on a general decreasing scenario). Does that mean that the logistics sector of Reg. Zealand is changing its scope while companies from outside take over the transport part?
More and more we can see transactions involving non-physical goods. Does this mean that the logistics sector is a bad or irrelevant indicator for the general local economy?
Is a well-developed and competitive logistics sector a precondition for regional attractiveness to new companies?
Are there any other persons in your organization we could/should interview too?

Questionnaire for primary stakeholders (Ostholstein and Lübeck)

Date
Name of organisation
Name of person interviewed
Type of organisation/representing which sector?

Does your organisation have any cross-border cooperation with Region Zealand today?
What are the main barriers to cross-border cooperation?
How do you expect the Fehmarn fixed link to influence your organisation? (or your members)
Between 2005 and 2011 in Germany there has been an increase of 8,4% in general employment. In the road freight transport the increase has been of 14,7%. What do you see as the main reason for such an increase?
In Ostholstein and Lübeck during the same period there has been a reduction in logistics employment around 1,2% while general employment has increased by 9,9%. To what can be attributed this reduction in logistics employment in the region, when it has increased in the rest of the country?
Sea and coastal freight transport is a significant industry in the Region, with an over the average employment compared to the rest of the country. Still, it has faced a reduction of 47% on its employment figures (approx. 920 workplaces) between 2005 and 2011. Who is to “blame” for this reduction?
Freight transport by road, has had an increase of approx. 20% in working positions on the same period (double than the general regional growth), while warehousing and storage employment, although not having significant absolute numbers, has decreased by more than 70%. Could that mean that the warehousing and storage business in the region is highly influenced by the sea and coastal freight transport volumes (decreased 47%)?
More and more we can see transactions involving non-physical goods. Does this mean that the logistics sector is a bad or irrelevant indicator for the general local economy?
Is a well-developed and competitive logistics sector a precondition for regional attractiveness to new companies?
Are there any other persons in your organization we could/should interview too?

Appendix 2:

Nace codes and correspondent activity

Agrifood Cluster

01.11 Growing of cereals (except rice), leguminous crops and oil seeds

01.13 Growing of vegetables and melons, roots and tubers

01.19 Growing of other non-perennial crops

01.24 Growing of pome fruits and stone fruits

01.25 Growing of other tree and bush fruits and nuts

01.26 Growing of oleaginous fruits

01.29 Growing of other perennial crops

01.30 Plant propagation

01.41 Raising of dairy cattle

01.42 Raising of other cattle and buffaloes

01.43 Raising of horses and other equines

01.45 Raising of sheep and goats

01.46 Raising of swine/pigs

01.47 Raising of poultry

01.49 Raising of other animals

01.50 Mixed farming

01.61 Support activities for crop production

01.63 Post-harvest crop activities

01.64 Seed processing for propagation

01.70 Hunting, trapping and related service activities

03.11 Marine fishing

03.21 Marine aquaculture

03.22 Freshwater aquaculture

46.23 Wholesale of live animals

77.31 Renting and leasing of agricultural machinery and equipment

46.61 Wholesale of agricultural machinery, equipment and supplies

10.11 Processing and preserving of meat

10.13 Production of meat and poultry meat products

10.20 Processing and preserving of fish, crustaceans and molluscs

10.32 Manufacture of fruit and vegetable juice

10.39 Other processing and preserving of fruit and vegetables

10.42 Manufacture of margarine and similar edible fats

10.51 Operation of dairies and cheese making

10.61 Manufacture of grain mill products

10.71 Manufacture of bread; manufacture of fresh pastry goods and cakes

10.72 Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes

10.73 Manufacture of macaroni, noodles, couscous and similar farinaceous products

10.81 Manufacture of sugar

10.82 Manufacture of cocoa, chocolate and sugar confectionery

10.84 Manufacture of condiments and seasonings

10.85 Manufacture of prepared meals and dishes

10.89 Manufacture of other food products n.e.c.

10.91 Manufacture of prepared feeds for farm animals

10.92 Manufacture of prepared pet foods

11.01 Distilling, rectifying and blending of spirits

11.02 Manufacture of wine from grape

11.05 Manufacture of beer

11.06 Manufacture of malt

11.07 Manufacture of soft drinks; production of mineral waters and other bottled waters

12.00 Manufacture of tobacco products

28.93 Manufacture of machinery for food, beverage and tobacco processing

28.30 Manufacture of agricultural and forestry machinery

46.31 Wholesale of fruit and vegetables

46.32 Wholesale of meat and meat products

46.33 Wholesale of dairy products, eggs and edible oils and fats

46.34 Wholesale of beverages

46.35 Wholesale of tobacco products

46.36 Wholesale of sugar and chocolate and sugar confectionery

46.37 Wholesale of coffee, tea, cocoa and spices

46.38 Wholesale of other food, including fish, crustaceans and molluscs
46.39 Non-specialised wholesale of food, beverages and tobacco
47.11 Retail sale in non-specialised stores with food, beverages or tobacco predominating
47.21 Retail sale of fruit and vegetables in specialised stores
47.23 Retail sale of fish, crustaceans and molluscs in specialised stores
47.24 Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores
47.25 Retail sale of beverages in specialised stores
47.26 Retail sale of tobacco products in specialised stores
47.29 Other retail sale of food in specialised stores
56.10 Restaurants and mobile food service activities
56.21 Event catering activities
56.29 Other food service activities
56.30 Beverage serving activities
46.21 Wholesale of grain, unmanufactured tobacco, seeds and animal feeds

Building & Interior Cluster

31.01 Manufacture of office and shop furniture
25.12 Manufacture of doors and windows of metal
30.12 Building of pleasure and sporting boats
16.22 Manufacture of assembled parquet floors
16.23 Manufacture of other builders' carpentry and joinery
22.23 Manufacture of builders' ware of plastic
23.32 Manufacture of bricks, tiles and construction products, in baked clay
23.41 Manufacture of ceramic household and ornamental articles
23.42 Manufacture of ceramic sanitary fixtures
23.51 Manufacture of cement
23.61 Manufacture of concrete products for construction purposes
23.63 Manufacture of ready-mixed concrete
23.64 Manufacture of mortars
23.69 Manufacture of other articles of concrete, plaster and cement
23.70 Cutting, shaping and finishing of stone
25.30 Manufacture of steam generators, except central heating hot water boilers
27.51 Manufacture of electric domestic appliances

32.50 Manufacture of medical and dental instruments and supplies

32.99 Other manufacturing n.e.c.

41.10 Development of building projects

41.20 Construction of residential and non-residential buildings

42.11 Construction of roads and motorways

42.12 Construction of railways and underground railways

42.13 Construction of bridges and tunnels

43.12 Site preparation

43.21 Electrical installation

43.22 Plumbing, heat and air conditioning installation

43.29 Other construction installation

43.31 Plastering

43.33 Floor and wall covering

43.34 Painting and glazing

43.39 Other building completion and finishing

43.91 Roofing activities

43.99 Other specialised construction activities n.e.c.

Energy Cluster

20.11 Manufacture of industrial gases

20.12 Manufacture of dyes and pigments

19.20 Manufacture of refined petroleum products

20.13 Manufacture of other inorganic basic chemicals

20.14 Manufacture of other organic basic chemicals

20.15 Manufacture of fertilisers and nitrogen compounds

20.16 Manufacture of plastics in primary forms

20.30 Manufacture of paints, varnishes and similar coatings, printing ink and mastics

20.41 Manufacture of soap and detergents, cleaning and polishing preparations

20.42 Manufacture of perfumes and toilet preparations

20.51 Manufacture of explosives

35.11 Production of electricity

35.12 Transmission of electricity

35.13 Distribution of electricity

35.14 Trade of electricity
35.21 Manufacture of gas
35.22 Distribution of gaseous fuels through mains
35.23 Trade of gas through mains
43.21 Electrical installation

Waste & Recycling Cluster

36.00 Water collection, treatment and supply
37.00 Sewerage
38.11 Collection of non-hazardous waste
38.12 Collection of hazardous waste
38.21 Treatment and disposal of non-hazardous waste
38.22 Treatment and disposal of hazardous waste
38.31 Dismantling of wrecks
38.32 Recovery of sorted materials
39.00 Remediation activities and other waste management services

Health Care Cluster

- 21.10 Manufacture of basic pharmaceutical products
- 21.20 Manufacture of pharmaceutical preparations
- 26.60 Manufacture of irradiation, electromedical and electrotherapeutic equipment
- 32.50 Manufacture of medical and dental instruments and supplies
- 47.74 Retail sale of medical and orthopaedic goods in specialised stores
- 86.10 Hospital activities
- 86.21 General medical practice activities
- 86.22 Specialist medical practice activities
- 86.23 Dental practice activities
- 86.90 Other human health activities
- 87.10 Residential nursing care activities
- 87.20 Residential care activities for mental retardation, mental health and substance abuse
- 87.30 Residential care activities for the elderly and disabled
- 87.90 Other residential care activities
- 47.73 Dispensing chemist in specialised stores
- 46.46 Wholesale of pharmaceutical goods

Retail & Wholesale Cluster

- 45.11 Sale of cars and light motor vehicles
- 45.19 Sale of other motor vehicles
- 45.31 Wholesale trade of motor vehicle parts and accessories
- 45.32 Retail trade of motor vehicle parts and accessories
- 46.22 Wholesale of flowers and plants
- 46.65 Wholesale of office furniture
- 46.73 Wholesale of wood, construction materials and sanitary equipment
- 46.90 Non-specialised wholesale trade
- 47.19 Other retail sale in non-specialised stores
- 47.30 Retail sale of automotive fuel in specialised stores
- 47.41 Retail sale of computers, peripheral units and software in specialised stores
- 47.42 Retail sale of telecommunications equipment in specialised stores
- 47.43 Retail sale of audio and video equipment in specialised stores
- 47.51 Retail sale of textiles in specialised stores

47.52 Retail sale of hardware, paints and glass in specialised stores
47.59 Retail sale of furniture, lighting equipment and other household articles in specialised stores
47.61 Retail sale of books in specialised stores
47.62 Retail sale of newspapers and stationery in specialised stores
47.63 Retail sale of music and video recordings in specialised stores
47.64 Retail sale of sporting equipment in specialised stores
47.65 Retail sale of games and toys in specialised stores
47.71 Retail sale of clothing in specialised stores
47.72 Retail sale of footwear and leather goods in specialised stores
47.75 Retail sale of cosmetic and toilet articles in specialised stores
47.76 Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores
47.77 Retail sale of watches and jewellery in specialised stores
47.78 Other retail sale of new goods in specialised stores
47.79 Retail sale of second-hand goods in stores
47.81 Retail sale via stalls and markets of food, beverages and tobacco products
47.82 Retail sale via stalls and markets of textiles, clothing and footwear
47.89 Retail sale via stalls and markets of other goods
47.91 Retail sale via mail order houses or via Internet
47.99 Other retail sale not in stores, stalls or markets

Hospitality Cluster

55.10 Hotels and similar accommodation
55.20 Holiday and other short-stay accommodation
55.30 Camping grounds, recreational vehicle parks and trailer parks
55.90 Other accommodation
79.11 Travel agency activities
79.12 Tour operator activities
90.03 Artistic creation
90.04 Operation of arts facilities
91.01 Library and archives activities
91.02 Museums activities
91.04 Botanical and zoological gardens and nature reserves activities
92.00 Gambling and betting activities

93.11 Operation of sports facilities
93.12 Activities of sport clubs
93.13 Fitness facilities
93.19 Other sports activities
93.21 Activities of amusement parks and theme parks
93.29 Other amusement and recreation activities

Logistics Cluster

49.10 Passenger rail transport, interurban
49.20 Freight rail transport
49.31 Urban and suburban passenger land transport
49.32 Taxi operation
49.39 Other passenger land transport n.e.c.
49.41 Freight transport by road
50.10 Sea and coastal passenger water transport
50.20 Sea and coastal freight water transport
50.30 Inland passenger water transport
51.21 Freight air transport
52.10 Warehousing and storage
52.21 Service activities incidental to land transportation
52.22 Service activities incidental to water transportation
52.23 Service activities incidental to air transportation
52.24 Cargo handling
52.29 Other transportation support activities
53.10 Postal activities under universal service obligation
53.20 Other postal and courier activities
77.11 Renting and leasing of cars and light motor vehicles
77.12 Renting and leasing of trucks
77.34 Renting and leasing of water transport equipment
77.35 Renting and leasing of air transport equipment

Media & IT Cluster

1811 Printing of newspapers

18.13 Pre-press and pre-media services
18.14 Binding and related services
18.20 Reproduction of recorded media
26.20 Manufacture of computers and peripheral equipment
26.30 Manufacture of communication equipment
58.11 Book publishing
58.12 Publishing of directories and mailing lists
58.13 Publishing of newspapers
58.14 Publishing of journals and periodicals
58.19 Other publishing activities
58.21 Publishing of computer games
58.29 Other software publishing
59.11 Motion picture, video and television programme production activities
59.12 Motion picture, video and television programme post-production activities
59.13 Motion picture, video and television programme distribution activities
59.14 Motion picture projection activities
59.20 Sound recording and music publishing activities
60.10 Radio broadcasting
60.20 Television programming and broadcasting activities
61.10 Wired telecommunications activities
61.20 Wireless telecommunications activities
61.90 Other telecommunications activities
62.01 Computer programming activities
62.02 Computer consultancy activities
62.03 Computer facilities management activities
62.09 Other information technology and computer service activities
63.11 Data processing, hosting and related activities
63.12 Web portals
63.91 News agency activities
63.99 Other information service activities n.e.c.
73.12 Media representation
95.11 Repair of computers and peripheral equipment
95.12 Repair of communication equipment

Professional Services Cluster

64.19 Other monetary intermediation

66.22 Activities of insurance agents and brokers

68.20 Renting and operating of own or leased real estate

68.31 Real estate agencies

68.32 Management of real estate on a fee or contract basis

69.10 Legal activities

69.20 Accounting, bookkeeping and auditing activities; tax consultancy

70.10 Activities of head offices

70.22 Business and other management consultancy activities

71.11 Architectural activities

71.12 Engineering activities and related technical consultancy

72.19 Other research and experimental development on natural sciences and engineering

73.11 Advertising agencies

74.20 PhotoFigureic activities

74.90 Other professional, scientific and technical activities n.e.c.

77.21 Renting and leasing of recreational and sports goods

77.31 Renting and leasing of agricultural machinery and equipment

77.34 Renting and leasing of water transport equipment

77.35 Renting and leasing of air transport equipment

78.10 Activities of employment placement agencies

78.20 Temporary employment agency activities

78.30 Other human resources provision

79.90 Other reservation service and related activities

80.10 Private security activities

80.20 Security systems service activities

81.10 Combined facilities support activities

84.11 General public administration activities

84.12 Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security

84.13 Regulation of and contribution to more efficient operation of businesses

84.22 Defense activities

84.23 Justice and judicial activities

84.24 Public order and safety activities

84.25 Fire service activities

84.30 Compulsory social security activities

94.11 Activities of business and employers membership organisations

94.20 Activities of trade unions

94.91 Activities of religious organisations

94.99 Activities of other membership organisations n.e.c.

Education Cluster

85.10 Pre-primary education

85.20 Primary education

85.31 General secondary education

85.32 Technical and vocational secondary education

85.41 Post-secondary non-tertiary education

85.42 Tertiary education

85.51 Sports and recreation education

85.52 Cultural education

85.59 Other education n.e.c.

85.60 Educational support activities

Personal Services Cluster

33.11 Repair of fabricated metal products

33.13 Repair of electronic and optical equipment

33.14 Repair of electrical equipment

33.15 Repair and maintenance of ships and boats

33.20 Installation of industrial machinery and equipment

43.22 Plumbing, heat and air conditioning installation

43.32 Joinery installation

45.20 Maintenance and repair of motor vehicles

49.42 Removal services

81.21 General cleaning of buildings

81.22 Other building and industrial cleaning activities

81.29 Other cleaning activities

81.30 Landscape service activities

82.20 Activities of call centres

82.92 Packaging activities

88.10 Social work activities without accommodation for the elderly and disabled

88.91 Child day-care activities

88.99 Other social work activities without accommodation n.e.c.

95.24 Repair of furniture and home furnishings

95.25 Repair of watches, clocks and jewellery

96.01 Washing and (dry-)cleaning of textile and fur products

96.02 Hairdressing and other beauty treatment

96.04 Physical well-being activities

96.09 Other personal service activities n.e.c.

98.20 Undifferentiated service-producing activities of private households for own use

Appendix 3:

Logistics Cluster Groupings

NACE Codes "Land transport and transport via pipelines"

- 49.10 Passenger rail transport, interurban
- 49.20 Freight rail transport
- 49.31 Urban and suburban passenger land transport
- 49.32 Taxi operation
- 49.39 Other passenger land transport n.e.c.
- 49.41 Freight transport by road

NACE Codes "Water transport"

- 50.10 Sea and coastal passenger water transport
- 50.20 Sea and coastal freight water transport
- 50.30 Inland passenger water transport
- 50.40 Inland freight water transport

NACE Codes "Air transport"

- 51.21 Freight air transport

NACE Codes "Warehousing and support activities for transportation"

- 52.10 Warehousing and storage
- 52.21 Service activities incidental to land transportation
- 52.22 Service activities incidental to water transportation
- 52.23 Service activities incidental to air transportation
- 52.24 Cargo handling
- 52.29 Other transportation support activities
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NACE Codes "Postal and courier activities"

- 53.10 Postal activities under universal service obligation
- 53.20 Other postal and courier activities

NACE Codes "Rental and leasing activities"

- 77.11 Renting and leasing of cars and light motor vehicles
- 77.12 Renting and leasing of trucks
- 77.34 Renting and leasing of water transport equipment
- 77.35 Renting and leasing of air transport equipment