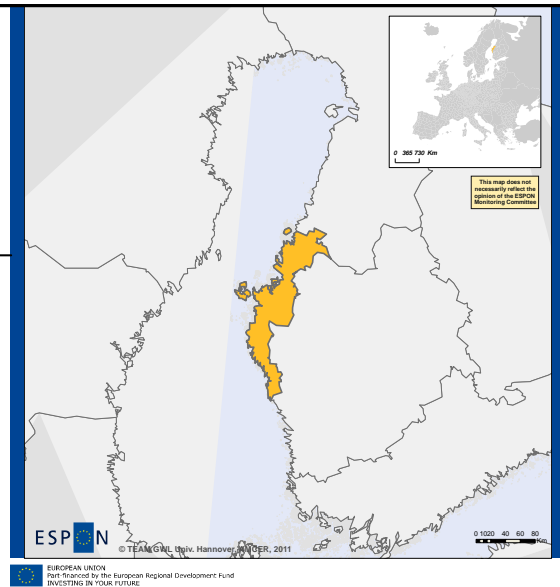
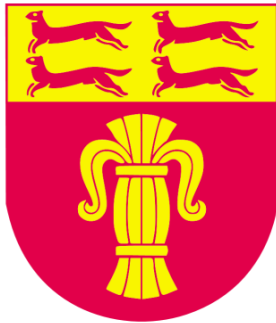


I. Region Ostrobothnia

FINLAND

Region Ostrobothnia

NUTS Code FI195 (NUTS-3-Level)



Introduction:

Ostrobothnia is a bilingual region with a Swedish speaking majority (Swedish: 51%, Finnish: 45%) situated on the west coast of Finland. Ostrobothnia is a NUTS-3 level region and a part of the Western Finland Province (Länsi-Suomi, NUTS-2 level region). Further NUTS-3 regions of the Western Finland Province are Satakunta, Pirkanmaa, Central Finland, and Southern Ostrobothnia. Ostrobothnia borders Central Ostrobothnia to the north, Southern Ostrobothnia to the west, and Satakunta to the south. Moreover, the region is one of the four regions constituting the historical province of Ostrobothnia.

Ostrobothnia has a surface of 7,749 km² and a population of about 178,000. Therewith the region has a population density of 22.5 per km², in 2010, which means that it is considerably sparsely populated by European standards (116, in 2008) but slightly more populated than the Finnish mean (17.5, in 2008). The region's capital and its economic as well as research and innovation centre is Vaasa. The city is comparatively international in nature and has about 59,000 inhabitants (cf. EUROSTAT 2011; RCO 2010, 2011a, 2011b).

National/EU context:

Ostrobothnia's regional GDP per capita is below the Finnish but fairly above the European mean. The region has a longstanding industrial tradition (e.g. sea technologies), hosts the biggest energy sector cluster among the Nordic countries, and has furthermore a broad range of service oriented often industry-related branches. The region focuses on the creation of a knowledge-based and environmentally friendly economy.

From its strong innovation environment many SMEs as well as numerous international companies benefit. Most RTDI competences are highly concentrated in the region's top R&D location Vaasa. Regarding RTDI indicators in comparison to the national level the region often achieves below average values. With respect to the European level, however, the region mostly obtains well above average results.

The most important sector in Ostrobothnia is the renewable energy branch that includes bio energy and wind power. Another major branch is the sea cluster. Further sectors of significance are metal industry, plastic industry, and environmental technology. Those have deep connections with the energy cluster. The renewable energy industries as well as therewith closely related suppliers are often medium-high and high-tech oriented and their knowledge is highly specialised. In

addition, more service-oriented branches have been developed, including in particular industry related services such as ICT, media, industrial design, maintenance of energy production systems, and welfare services. In general, the RTDI sector in Ostrobothnia is clearly business-oriented. Companies in Ostrobothnia are predominantly SMEs but also many big international companies are located there. Especially the industry sector is shaped by large enterprises supported by clustered supply chains of often dependent SMEs. However, although SMEs are involved in R&D processes mostly large enterprises are responsible for research and innovation actions. That suggests the assumption that the regional research and innovation system is shaped by larger enterprises.

The innovativeness of Ostrobothnia's superior region Länsi-Suomi (NUTS-2 level) in relation to the other Finnish regions, measured by the number of patents applied at the EPO, ranks in the 2nd place. In addition, even in European terms the region is a strong player with respect to patenting. In 2007, the employment in R&D (FTE) was equivalent to 2.5% of the overall Finnish R&D personnel. The R&D personnel (FTE) per 1,000 employees amount to 16.7. This figure is below the national (23.3) but well above the EU-27 (11.0) average. Regarding the business orientation of both the R&D expenditures and the R&D personnel (FTE) (90.1%, >80.0%), the region's RTDI sector clearly excels the national average (81.7%, 58.4%) and the EU-27 mean (63.7%, 52.1%; in 2007) (cf. EUROSTAT 2011).

In 2009, the Ostrobothnian per capita spending on R&D was below the national average. However, there was a rise of 72% in this figure in comparison to the year 2000 and the region's R&D centre Vaasa excels both the national and European average. The region's R&D intensity accounts for 2.55%, thus, again, being far below the national average (3.9%) but well above the EU-27 average (1.85%, in 2007). The regional R&D productivity amounts to 0.26, thus being above-average compared to the Finnish standard (0.24) but slightly below the EU-27 average (0.27) (cf. EUROSTAT 2011).

1. Socio-economic Characteristics

In 2008, the regional GDP in Ostrobothnia amounted to about €5.9b, accounting for a share of about 3.2% of the Finnish GDP. The regional GDP per capita was about €32,000, which represents 94.3% of the Finnish and 127.7% of the EU-27 average, respectively. Moreover, it ranks second after Pirkanmaa in comparison between the five regions of Länsi-Suomi. Between 1995 and 2008, the Ostrobothnian economy grew by 3.9% p.a. which is slightly above-average regarding the national (3.7%) figure and in line with the EU-27 average (3.9%) (cf. EUROSTAT 2011; STATFI 2011). Comparing the economic performance of Ostrobothnia with that of the other AMCER regions, the region ranks in the 2nd place (see App. Tab. 3). As shown, Ostrobothnia is a quite prosperous European region. Largely, this dynamism has been caused by growth in the industry sector. Especially the production of electronics and machinery devices for environmentally friendly energy production is thereby a central growth engine.

In 2009, the regional labour force amounted to about 88,400, representing 3.3% of Finland's total labour force (2.68m). Among the Western Finland regions Ostrobothnia has the smallest labour force. The regional employment rate of the 20-64 year-olds lies at 70.7%, which is above-average compared to the national average of 69.9% and among the best in Finland (cf. EUROSTAT 2011; RCO 2010). Nevertheless, taking the employment rate target of 75% defined by the "Europe 2020 Strategy", the Ostrobothnian employment rate is still too low (cf. EC 2011).

In 2008, 6.3% of the employees worked in the agricultural sector, 32.0% in the industry, and 60.8% in the service sector. Comparing the region's economic structure with both the national average (3.7%, 23.9%, 71.6%) and the EU-15 average (3.5%, 26.2%, 69.7%) profound can be observed. Particularly striking is that in Ostrobothnia the agricultural sector and particularly the industry sector appear to play a much more important role, whereas the service sector is of comparatively less relevance (cf. EUROSTAT 2011; RCO 2011a). However, although the region's share of industry is comparatively high, Ostrobothnia shifted very much towards the service sector

in recent years. Nevertheless, comparing the economic structure of Ostrobothnia with that of the other AMCER-regions, in terms of its industry sector share the region still ranks in the 2nd place after Catalonia, regarding the service sector share it ranks in the last place (see App. Tab. 4). In Ostrobothnia, both the industry and the service sector are often medium-high and high-tech or knowledge-intensive oriented (see below).

The average annual regional unemployment rate accounted for 5.0% in Ostrobothnia in 2008, coming from 7.5% in 2005. The regional trend is thus following the national development, where the unemployment rate decreased from 10.6% (2005) to 7.6% (2009) (cf. RCO 2010). Both the Ostrobothnian and the national unemployment figures are below the EU-27 average of 8.2% in 2008. This is a favourable development against the background that the unemployment dramatically increased during the 1990s and even in the phase of slight recovery at the beginning 2000s always remained above the European mean. However, in 2009, when the already in 2007/2008 begun financial crisis seemed to start to impact the regional economy, the unemployment rates started to increase again and rose to 5.9%, in 2009. At the beginning of 2011, the unemployment accounted for 6.4%. Nonetheless, even though the surge was noticeable it remained moderate. Comparing the unemployment rate of Ostrobothnia with that of the other AMCER-regions, the region has the second-lowest value after Flanders (see App. Tab. 5). Taking the youth unemployment (15-24 year-olds) Ostrobothnia ranks in the midfield. Both figures reveal a relatively well functioning labour market. On the other hand, however, the relatively high long-term unemployment share must be considered critical. At the moment the share of long-term unemployed is about 21% of all unemployed people. This figure does not change very much over time. This reflects still existing inflexibilities in the labour market, which makes reforms necessary.

Finland generally exhibits distinctive disparities concerning the geographic distribution of socio-economic aspects. In 2009, four NUTS-3 regions (Helsinki, Southwest Finland, Pirkanmaa, and Northern Ostrobothnia) bundled about 60% of both the national GDP and total population, with Helsinki in both cases accounting for a bulk. Generally speaking, in Finland the GDP is predominantly produced in urban regions (cf. OECD 2005). This picture remains similar when looking at intra-regional disparities within Ostrobothnia. The rural areas are losing jobs in agriculture and also in traditional industries (e.g. paper mills, etc.) whereas the urban areas are growing mostly based on the service sector and more innovative industries (e.g. electronics, environmental technologies, etc.). However, some rural areas also have advantages from the growth in nearby towns through sub-urbanisation. The capital Vaasa is the central spot in the region, having the highest GDP per capita with the highest growth rates and the largest population with the highest growth rates. Followed with distance by the sub-regions Jakobstad and Syd-Österbotten. The weakest sub-region within Ostrobothnia is Kyrönmaa (cf. EUROSTAT 2011; RCO 2010, 2011a).

Although the overall contribution of the agricultural sector is low, it still has a comparatively great importance as described above. In this context especially greenhouse cultivation must be pointed out, because a vast proportion of vegetables (e.g. tomatoes and cucumbers) traded in Finland come from Ostrobothnia. The most important sector in Ostrobothnia is the renewable energy branch that includes bio energy and wind power. The region actively supports 'green' industries and wants to be a worldwide leading pioneer when it comes to production and utilisation of renewable energy. Another major branch is the sea cluster. It has a centuries-long tradition and includes boat manufacture and technical appliances for ships. Further sectors of significance are metal industry, plastic industry, and environmental technology. Those have deep connections with the energy cluster, which is highly concentrated in and around the sub-region Vaasa. The renewable energy industries as well as therewith closely related suppliers are often medium-high and high-tech oriented and their knowledge is highly specialised. Forest and wood industry is divided to sub branches like mechanical wood industry and construction industry. The Ostrobothnian food industry has development potential. In addition, more service-oriented branches have been developed, including in particular industry related services. Those include, for instance, ICT, media, industrial

design, maintenance of energy production systems, and welfare services. Companies in Ostrobothnia are predominantly SMEs but also many big international companies like ABB are located there. Especially the industry sector is shaped by large enterprises supported by clustered supply chains of often dependent SMEs. However, although SMEs are involved in R&D processes mostly large enterprises are responsible for research and innovation actions (see below). That suggests the assumption that the regional research and innovation system is shaped by larger enterprises.

Ostrobothnia is in many respects characterised as an open economy and strongly trade-oriented. In 2010, the exports amounted to €3.6b which means that in relation to its population Ostrobothnia was one of the most export-oriented regions in Finland. In Ostrobothnia 97.8% of the exports was export of industrial goods (national average 82.0%). Moreover, more than 60% of the Ostrobothnian industrial production is exported. The volume of imports at the same year was only €1.1b. Exports from Ostrobothnia have grown quite rapidly within the last decade, excluding the year 2009 when the economic decline resulting from the financial and economic crisis pushed the value of exports slightly downwards. Most important and most rapidly growing industrial branches with large shares of exports were related to environmental technologies, metal industry, electronics, machinery, shipbuilding and businesses related to them. Particularly the region's renewable energy branch is of extraordinary trade orientation. The share of export there amounts to 70%. The enterprises produce and trade products like diesel engines, electric motors, power plants, frequency converters, electrical systems, and various applications for the wind power industry (cf. STATFI 2011; RCO 2010, 2011b).

2. RTDI Characteristics

2.1 R&D Efforts and Input into the Process of Knowledge Generation

Within Ostrobothnia a vast proportion of the research and innovation competences and resources are bundled in Vaasa. The Ostrobothnian GERD amount to €165.3m in 2009, thus contributing 2.4% to the Finnish total and about one-tenth to Länsi-Suomi's R&D expenditures. There was a rise of 72% in this figure in comparison to the year 2000. The fastest growth in this period was from 2006 to 2009. The R&D expenditures per capita amounted to €934. Vaasa, the region's top R&D location had per capita expenditures of about €1,619 and the Finnish mean lies at €1,271. When expressed as a percentage of GDP, the GERD is used to indicate the overall R&D intensity of a country or region. This measure unfolds the emphasis placed on R&D activities within a given economy. In 2008, R&D expenditures per GDP were about 2.55%, thus far below the national average (3.9%) but above the EU-27 average (1.85%, in 2007) (cf. EUROSTAT 2011). However, although the trend is quite positive, until now, the regional R&D expenditure per GDP quota is still not meeting the target of 3% defined by the "Europe 2020 Strategy" (cf. EC 2011; STATFI 2011). Comparing both the R&D expenditures per capita and per GDP of Ostrobothnia with that of the other AMCER-regions, the region ranks in the 2nd place after East of England (see App. Tab. 6).

In 2009, the FTE employment in R&D amounts to about 1,387, which is 2.5% of the overall Finnish R&D personnel and again about one-tenth of Länsi-Suomi's R&D personnel. The R&D personnel (FTE) per 1,000 employees amounted to 16.7. This figure is below the Finnish standard (23.3). However, in comparison with the EU-27 average (11.0, in 2007) the Ostrobothnian figure is far above-average. Moreover, regarding it in comparison to the other AMCER-regions, Ostrobothnia ranks again in the 2nd place after East of England (see App. Tab. 6) (cf. EUROSTAT 2011; STATFI 2011).

The R&D sector can be subdivided into the BES, the GOV, the HES, and the PNP. Their relative importance varies greatly across regions, however, generally reflecting different economic or research structures and traditions, respectively. With regard to the innovation system approach, the proposition of BERD is considered as an indicator of the overall innovative capacity of a region. Although, this should not be over-interpreted, because the other sectors also provide important

stimuli to the process of knowledge and technology production.

The RTDI sector in Ostrobothnia is clearly business-oriented. The BERD amounts to 90.1% (€136.1m) of the overall GERD, in 2008. Moreover, more than 80% of the regional overall R&D personnel work in the BES. Regarding the business orientation of both the R&D expenditures and the R&D personnel (FTE), the region's RTDI sector clearly excels the national average (81.7%, 58.4%) and the EU-27 mean (63.7%, 52.1%; in 2007). Comparing the same aspects among the AMCER-regions, Ostrobothnia ranks in both cases in the 1st place (see App. Tab. 6). Moreover, about 50% of all Finnish companies and about 80% of large companies told that they had ongoing research and innovation processes within past two years (2006-2008), underpinning a relatively high research and innovation propensity. Ostrobothnian figures are supposed to be in line with these national values due to the region's emphasis on technological sophisticated sectors and enterprises (cf. EUROSTAT 2011; STATFI 2011).

Both the HES and the GOV play a comparable subordinated role in terms of R&D expenditures and personnel (FTE). In the HES the shares of R&D expenditures amount to 9.3%. Accordingly, the shares of R&D expenditures in the GOV are 0.7% (€1.1m). In general, Ostrobothnia's innovation environment can be considered as being strong. The core of research and innovation is performed by enterprises from the new energy sector and therewith closely related industries. However, as mentioned above, most of the R&D conducting actors come from the cluster in and around of Vaasa. Although, as stated through the figures, the public sphere accounts for only a relatively small proportion, particularly the HES is of high importance for the Ostrobothnian research and innovation system. The region's system of higher education covers universities and universities of applied sciences, some of them having an internationally well-known reputation. They are part of the national and international network of education, research and development and often co-operate with the BES. They bring international know-how and use it for the benefit of the area in their development projects. The system includes the University of Vaasa, Hanken School of Economics, Åbo Akademi University, Vaasa and Novia universities of applied sciences, Western Finland's design centre Muova and Vaasa Energy Institute. Many of those institutions are situated to the same campus in Vaasa. It has made possible e.g. a joint research laboratory (cf. STATFI 2011).

2.2 Human Capital Endowment

In 2009, HRSTC in Länsi-Suomi¹ amounted to 0.6137m, representing 22.4% of national total (0.612m) and 20.8% of the economically active population. With this share of knowledge workers Länsi-Suomi ranks in the 2nd place in comparison with the other AMCER regions (see App. Tab. 7). Since Ostrobothnia is one of the dominating sub-regions of Länsi-Suomi the data should be sufficient (cf. EUROSTAT 2011).

Moreover, in 2009, Länsi-Suomi² had a stock of 21,586 employees working in high-tech industries and knowledge-intensive services, i.e. 15.5% of national total and 3.6% of total employment in the region. Therewith, Länsi-Suomi's share in total employment is below the Finnish standard (5.7%) (cf. EUROSTAT 2011). In comparison with the other AMCER regions Länsi-Suomi ranks in the upper midfield (see App. Tab. 7).

The education level of the human capital forms the basis for productive and innovative activities in developed countries and regions. In 2009, Ostrobothnia had about 11,900 students in the secondary education level (ISCED 2-4), i.e. 67.6 students per 1,000 inhabitants. Thus, regarding the Finnish standard (110.6), this is below-average. Overall, 38.3% of the Ostrobothnian population older than 15 years has an upper secondary education attainment (ISCED 3), in 2009. This is roughly in line with the national average (38.6%) and towards the EU-27 standard (46.8%, 25-64

¹ Since there are no statistics available for Ostrobothnia (NUTS-3 level) data from Länsi-Suomi (superior NUTS-2 level) have been used.

² Since there are no statistics available for Ostrobothnia (NUTS-3 level) data from Länsi-Suomi (superior NUTS-2 level) have been used.

year-olds) well below-average. Considering the tertiary education level (ISCED 5-6), the region had about 12,200 students in that field, in 2009, i.e. 69.5 students per 1,000 inhabitants. Regarding the Finnish average (55.7), the Ostrobothnian figure is above-average. Altogether, 26.1% of the population older than 15 years has a tertiary education attainment (ISCED 5-6). This is below the national average (38.1%) but slightly above the EU-27 mean (25.9%, 25-64 year-olds). The proportion of the 30-34 year-olds with a tertiary education attainment amounts to 45.7% in Manner-Suomi³ (Belgium: 45.7%; EU-27: 33.6%), thus the region already meets the 40%-target defined by the “Europe 2020 Strategy” (cf. EC 2011; EUROSTAT 2011; STATFI 2011). Comparing the Ostrobothnian figures of secondary and tertiary level students per 1,000 inhabitants with those in the other eight AMCER regions the region ranks in terms of secondary level students in the lower third and in terms of tertiary level students clearly in the 1st place (see App. Tab. 7).

Regarding the early leavers from education and training, which can be interpreted as at least temporarily lost human capital, in the education vintage 2010, they account for 10.3% in Manner-Suomi⁴. This is a minus of 1.3 percentage points compared to the year 2000 and thus suggesting a positive trend. In addition, this result is in line with the national average and far better than the EU-27 standard (14.1%) (cf. EUROSTAT 2011). Moreover, the regional proportion of early school leavers does almost meet the maximum target of 10% defined by the “Europe 2020 Strategy” (cf. EC 2011). Compared to the other AMCER regions Manner-Suomi’s proportion ranks among the lowest (see App. Tab. 7). Although, in general, the Ostrobothnian figures are in many respects promising, however, against the backdrop of the aging regional society (see section 4.1 below), high reintegration costs, increasing pressure for innovation, productivity, and competitiveness, the region should try to reduce further the quota.

Because the technological progress is increasingly challenging developed countries and regions and therewith requirements to education are steadily rising, further education of adults is playing an increasingly important role in knowledge- and innovation-driven economies in general and for aging societies in particular. The region’s⁵ participation share of adults aged 25-64 in education and training amounts to 21.7%, in 2010, therewith being below the Finnish (23.0%) but far above the EU-27 average (9.1%). The regional figure ranks clearly in the 1st place compared to the other AMCER regions (see App. Tab. 7) (cf. EUROSTAT 2011).

Altogether, despite some weaknesses the region’s engagement in the formation of a solid human capital basis can be assessed as comparably successful. This is underpinned by the OECD’s international assessment of student performance (PISA). Finland has consistently been among the highest scorers worldwide; in 2003, Finnish 15-year-olds came first in reading literacy, science, and mathematics; and second in problem solving, worldwide. The World Economic Forum ranks Finland’s tertiary education first in the world. Ostrobothnia is no exception to this.

2.3 Potential for Innovation

In the course of this work the number of patent applications at the EPO is taken as an indicator for the potential for innovation, thus depicting the production of knowledge and technologies. Although in the innovation process patents are somewhere between inventions and innovation and therefore covering only a part of the whole innovation process, they are among the most widely used innovation indicators (cf. GRUPP 1997; FRIETSCH et al. 2008).

Since R&D processes are mostly conducted by large enterprises in Ostrobothnia, it’s likely that

³ Since there are no statistics available for Ostrobothnia (NUTS-3 level) or Länsi-Suomi (superior NUTS-2 level) data from Manner-Suomi (superior NUTS-1 level) have been used.

⁴ Since there are no statistics available for Ostrobothnia (NUTS-3 level) or Länsi-Suomi (superior NUTS-2 level) data from Manner-Suomi (superior NUTS-1 level) have been used.

⁵ Since there are no statistics available for Ostrobothnia (NUTS-3 level) data from Länsi-Suomi (superior NUTS-2 level) have been used.

they are also responsible for the bulk of innovations. Between 2000 and 2003 in Länsi-Suomi⁶ a number of 1,385 patents were applied at the EPO, accounting for 26.1% of the national total. Between 2004 and 2007 the number of patent applications amounted to only 1,195 (26.2% of national total), a decrease of about 14.1%. At the same time the patent applications per million inhabitants dropped from 1050, in 2000-2003, to 897, in 2004-2007 (-14.6%). Regarding the overall patent output, among the Finnish regions Länsi-Suomi ranks in the 2nd place after Etelä-Suomi (cf. EUROSTAT 2011). In comparison to the other eight AMCER regions, regarding absolute patent application figures the region ranks in the lower third, however, taking the relative figures it ranks the 1st place, underpinning the innovative strength of the region (see App. Tab. 8).

Since patents are in most cases the result of extensive R&D activities, it is possible to determine the R&D productivity (measured as EPO patent applications per million R&D expenditures in 2005). Moreover, this indicator unveils how effective the money spent on R&D is utilized in the process of knowledge generation. The regional⁷ R&D productivity amounts to 0.26, thus being above-average compared to the Finnish standard (0.24) (cf. EUROSTAT 2011). Moreover, compared to the other AMCER regions, the region's R&D productivity ranks in the upper midfield (see App. Tab. 8).

Concerning the technically more challenging high-tech patents, Länsi-Suomi⁸ accounted for 506 applications at the EPO between 2004 and 2007. Between 2000 and 2003 the region's high-tech patent applications only amounted to 588, a decrease of -13.9% and thus in line with the above-described trend regarding the overall patent applications (see above). The high-tech patent applications per million inhabitants come to 380 in the period of 2004-2007. For the same period, the proportion of high-tech patent applications to all patent applications amounted to 42.3%. Since Ostrobothnia is pretty much in line with the overall regional average (i.e. Länsi-Suomi), the high share of high-tech patent applications reflects the already above addressed fact that the regional actors are highly active in medium-high and high-tech as well as knowledge-intensive fields. Among the Finnish regions Länsi-Suomi ranks in the 2nd place after Etelä-Suomi again. Comparing the region's performance with that of the other AMCER-regions, it ranks in absolute terms in the lower midfield, however, taking the relative figures it ranks the top position again (see App. Tab. 8). Anyway, these results again clearly reflect the above-mentioned circumstance that the region is to a high degree high-tech oriented (see section 2.1) (cf. EUROSTAT 2011).

In the period 2004-2007, according to national patent figures the most Ostrobothnian patent applications have been made in the fields of electronics (28.9%), machinery (19.7%), work and transport (18.4%), and physics (11.8%). These figures are not divided by technological orientation; however, they illustrate the above-mentioned industrial specialisation of the region. Moreover, since the R&D conducting actors are often active in technological sophisticated fields, it can be assumed that in the region applied patents are also often medium-high or high-tech aligned.

3. RTDI Governance and Innovation Policy

3.1 Governance

Generally, "the Finnish political system was and still is characterized by a strong central state" (SCHENSTOCK et al. 2004:127). However, regional innovation policy structure in Ostrobothnia is based on connections between participants from various kinds of advantage groups. Municipalities, state governmental units, development agencies and companies have their representation in the group responsible for designing regional innovation policy. Wide participation is an advantage in

⁶ Since there are no statistics available for Ostrobothnia (NUTS-3 level) data from Länsi-Suomi (superior NUTS-2 level) have been used.

⁷ Since there are no statistics available for Ostrobothnia (NUTS-3 level) data from Länsi-Suomi (superior NUTS-2 level) have been used.

⁸ Since there are no statistics available for Ostrobothnia (NUTS-3 level) data from Länsi-Suomi (superior NUTS-2 level) have been used.

collecting information from various sources. However, it has also led to a situation where it has sometimes proven to be difficult to find a common approach and to form a functional innovation strategy. Wide range of different perspectives makes strategic decision making difficult – in this situation determining exact strategic targets for regional innovation policy is difficult. However, the participants have found a consensus which easily allows discussion-decision making, commitment and forming innovation policy is more challenging.

The Regional Council of Ostrobothnia works as the authority for regional development. Its target is to promote regional development initiatives and regional balance, and thereby promoting environmentally sustainable development. The Regional Council takes care of planning and in parts also of the implementation of regional policy. Vaasa Regional Development Company VASEK develops operational preconditions for companies and coordinates co-operation between municipalities and between education, research and economic life. South Ostrobothnian Centre for Economic Development, Transport and the Environment develops economic life by giving guidance, expert services, education and financing. It works as the local unit of TEKES (the Finnish Funding Agency for Technology and Innovation) and the Ministry of Employment and the Economy. In addition, the innovation agent of the National Board of Patents and Registration of Finland and of the Foundation for Inventions is located there. Other important actors in the innovation system are financiers like state owned Finnvera and regional investment trust Wedeco Group. Other important actors in the R&D are technology centre Merinova, Vaasa Science Park, Concordia, Yritystalo Dynamo and Viexpo.

Regional development agencies like VASEK and Merinova, the Chamber of Commerce, the Regional Council, the State Regional Administration (ELY) and the State Development Agency (TEKES), universities and polytechnics are major participants of the public sphere. However, a Triple-Helix approach can be found in this cooperation: public sector, research institutions and business sector are all present. Nonetheless, this work process is yet not very well structured and it does not necessarily lead to a functional strategy.

Administrations on regional and national levels have different scopes for their work and they complement each other's work. Actions for regional development (promoting investments, etc.) are mostly funded through regional councils which also administrate ERDF funds. National administration is responsible for e.g. labour market related issues (e.g. through ESF). The borderline is actually not this clear and simple but the point is that there are no major problems between regional and national levels of administration or inside either of them.

3.2 Policy

The contents of the regional innovation policy are not clearly specified. The in section 3.1 mentioned organizations are not too committed to form a strong common regional innovation policy. For example the companies prioritize their business networks which are not regionally formed. E.g. Vaasa sub-region is highly profiled to sustainable energy production technologies and it has been very successful in businesses related to this branch. Despite the success in this cluster in Vaasa sub-region the other sub-regions in Ostrobothnia must have some other key elements for their success.

However, the regional development plan 2040 for Ostrobothnia is one of the most important strategic plans. It sets the long-term objectives for regional development – like being a knowledge-based and multi-cultural area with high-level of wellbeing and strong sense of community. The foundation of this development is in energy technology and other knowledge based industries. Regarding this, cluster approaches play an important role. Other guidelines (for other levels of administration) are based on shorter perspective and they support the key-elements of this document.

4. Trends, Challenges, and Assessment

4.1 Trends and Challenges which are not specific to the R&D Sector

The long-term economic development of Ostrobothnia in the period of 1995-2008 was above-average compared to the national mean and in line with the European average. Much of this growth was industry-driven. If the region further succeeds to stay attractive for environmentally oriented and therewith closely related sectors this development has the chance to continue.

The region, like others in Europe, faces the problem of relatively high economic concentration in urban centres (especially Vaasa). Despite there are in some cases examples observable which illustrate that also rural area can profit from economic developments in urban areas, however, Ostrobothnia needs to address this trend in order to spread wealth more evenly within the region.

The population development and especially the aging figures of a population are crucial for innovation related purposes, because the youth of a population virtually determines its dynamism and innovativeness and therewith its future viability. In 2010, the Ostrobothnian population reached its present maximum of about 178,000 (cf. RCO 2011a). Since 2005, the regional population thus grew by 2.5%. With its population size the region is the smallest among the sub-regions of Länsi-Suomi. However, although the Ostrobothnian population experienced growth throughout the last decades and this trend is likely persist on a low level until 2030 due to slightly above-average fertility figures compared to the European average and in-migration, like in most areas of Europe the demographic change will be very challenging in near future. At the end of 2008, 17.4% of the regional population was younger than 15 years, 64.1% were between 15 and 64 years, thus representing the population of working age and about 18.5% were 65 years or older (retirement age). In the future, the age cohorts entering the labour market are getting smaller. At the same time number of those retiring is getting higher. Projections assume that in 2040, the share of people which is 65 years and older will already account for about 25.8% in Ostrobothnia, showing the economic and social challenges the region is confronted in the future (cf. EUROSTAT 2011; RCO 2010). Therefore effect is dual. More people are needed for the care of the elderly and there will be lack of labour. As less people enter the labour market the lack of labour will be inevitable. Against this backdrop the quota of early leavers, which is doubtless already comparably small, becomes more relevant. The region is challenged to further decrease the number of people without or very low levels of education. In order to solve the problem of a shrinking proportion of the population of working age there are only few solutions. Increasing migration is one of them but also improving effectiveness through high technology and more efficient working methods are possible. All these options require investments in education. The immigrants need training to be able to work in Finland and using more high technology innovations requires higher level of education too. Other ways of increasing the labour supply are finding ways to employ e.g. disadvantaged and other groups of people which have not been active in the labour market so far.

4.2 Trends and Challenges which are specific to the R&D Sector

Ostrobothnia has many advantages regarding RTDI aspects. The region is shaped by R&D activities from the BES but also universities are important actors. This trend is likely to continue due to the region's relatively well-developed research infrastructure and economic structure.

Since it has sometimes proven to be difficult to find a common approach and to form a functional innovation strategy the Triple Helix model and the overall efficiency should be further developed and increased, respectively. Otherwise, in the long run the region runs danger to lose important competitive advantages.

Currently, most of the research and innovation competences and resources are concentrated in and around of the regional capital Vaasa. Given the assumption that regions without enough competences and capacities in R&D will face difficulties in participating in and gaining from a knowledge-driven economy it is likely that regional economic disparities will sharpen in the future. Against this backdrop the region will face the challenge of supporting the dispersion of R&D-intensive activities within Ostrobothnia without stalling regional economic dynamism and evolved cluster structures.

Although SMEs are of great importance for Ostrobothnia's economy and some are active in

research and innovation processes, most of those activities are performed by large, often international enterprises. In order to broaden further technological sophistication within the BES, the region is challenged to increase further the participation of SMEs in research and innovation.

4.3 Assessment of the regional R&D System

4.3.1 Governance Dimension

Concerning the governance dimension Ostrobothnia has a *network R&D system with dirigiste features* due to the strong Finnish central state. The support of knowledge and technology creation and transfer takes place on different levels (e.g. local, regional, or national) and is based on connections between municipalities, state governmental units, development agencies and companies. Funding is mostly determined, guided and assessed centrally, with decentralized units located in the region. The Ostrobothnian research competences are broad in nature, covering basic, applied and experimental research. This is due to the extended region's private and public research landscape. However, since the R&D system is highly business-oriented and the BES contributes the most to the overall research and innovation activities, it must be said that applied and experimental research are in the focus. Due to the high number of involved actors in the Triple Helix model, the need for coordination can be assessed as very high. The region's degree of specialization with respect to its governance and policy characteristics is rather flexible. Administrations on different levels have different scopes for their work and they complement each other's work.

4.3.2 Business Innovation Dimension

Regarding the business innovation dimension, the Ostrobothnian R&D system is rather close to an *interactive system with globalised features*. The region's R&D system is dominated by large companies of those many are active internationally and supported by clustered supply chains of often dependent SMEs. Generally, the research and innovation system is quite strongly specialized in environmental friendly technologies and energy production. Moreover, most activities are concentrated in the capital Vaasa. Although SMEs constitute the main pillar of regional employment, their potential for innovation is often comparatively limited. The region hosts a mix of public and private research institutions, regional headquarters of larger firms and a national and regional administration keen to promote innovation. Although, the HES is of high importance for the Ostrobothnian research and innovation system the R&D system is pretty much dominated by private rather than public research activities. However, the public and private actors often cooperate with each other, whereby both spheres benefit from knowledge transfers. The overall degree of association can be assessed to be very high and the policy is actively supporting co-operations, networks and clusters.