RIGHT
RIGHT SKILLS FOR THE RIGHT FUTURE

Trans-Regional Report RIGHT

Regional comparison and SME Innovation Capacity & Needs

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Interreg North Sea Region RIGHT
European Regional Development Fund
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1. Introduction to the report

The EU Joint Research Centre annual conference, held in Brussels October 2016, was entitled "Human capital for territorial growth". The objective of the conference was to discuss how Member States, regions and cities can harness the potential of their human capital under the current socio-economic and environmental challenges to make their territories more dynamic, creative and resilient to external shocks. The RIGHT project (sponsored by Interreg North Sea Program from 2018-2021) intends to contribute to territorial growth in the North Sea Region by connecting smart specialisation strategies to human capital and the skills of the workforce. The project will define existing and potential regional growth sectors and sub-sectors. It will unlock innovation capacity by uncovering the barrier and bridging the skills gaps. Further it will ensure the workforce has the necessary skills to remove the barrier and realise the potential for growth. The project is a pilot in that it will build methodology, knowledge and understanding. It will design and test tailored educational and training programs and initiatives designed to bridge the skills gap in a fast-changing skills environment in emerging and growth sectors. The methodology and results will be implemented by the partner regions to give long-term impact and the idea is to roll out the success stories in other North Sea regions and Europe.

The core of the project is about ensuring competitive North Sea regions by future-proofing the workforce, building knowledge about our industry needs and building capacity amongst our SMEs, regional governments and educational institutions. The project will apply a typical triple helix structure for partnerships and networks at both project and regional level in order to strengthen transnational value chains. This will be done within a modern policy context that emphasises an approach based on transnational and regional interaction between partners and key stakeholders. The project will start by examining partner regional smart specialisation strategies. Based on research, the project will develop a methodology to uncover the long-term growth potential in existing or emerging sectors. Each partner will then nominate one or more specialised areas within the blue growth or energy sectors based on this analysis. The partners will jointly then identify a complimentary set of sub-sectors to work closely on in order to make the project activities focused. Each partner region has built a regional partnership or has strong connections and networks to regional clusters, SMEs and the education sector. Regional partnerships are key to success since the partners will use their own regional partnerships to carry out project activities and to record results. The skills gaps will be uncovered through desk research, mapping, interviews, and in close collaboration with businesses and clusters. A selection of SMEs in each region will be the testing ground for uncovering and defining the skills gaps which clearly act as a barrier to growth and innovation in the company. In this way, partners will embed the work of the project deeper into the fabric of the region or targeted area. The public and educational partners will then bridge the gaps by producing new educational programs which will be tested, either in schools or in SMEs, through the collaborating clusters and SMEs. Cases and pilots will test how these skills programs work in different settings and different regions. Where common skills gaps or challenges are

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uncovered, the project will work transnationally to develop and implement educational programs. The project will build business cases to solve defined practical challenges. Examples could include a business case on how apprenticeships can be designed around the skills needs of the business or creating awareness for opportunities for employers to engage closer with schools. The participation of clusters and connections to SMEs is therefore a central element in the project. The project will connect regional energy, maritime and marine businesses and their value chains through clusters in North Sea Region and will build on networks and value chains while addressing common challenges in fast moving skills environment.

As the first order of business in the RIGHT project, each region produced and published its own regional report, using an underlying format developed in work package 3 in this project (Manickam & van Lieshout, 2018). The format and the regional work consisted of three parts.

Part 1 is the Regional Innovation Ecosystems (RIE) mapping to provide a qualitative understanding of the region's innovation ecosystem with regards to its Smart Specialisation Strategies (S3). This part is divided into a socio-economic and R&D profile mapping and a SWOT analysis. The RIE is an adaptation of a methodology and tool used by the eDIGIREGION Project. This part is to be filled in by desk research and consulting regional experts (through interviews and/or focus groups). This part is used for mapping the own regional ecosystems, information for the partners to get to know the other regions and to be able to identify relevant similarities and differences across the regions, which in turn, will be reported in part 1 of this trans-regional report. Regions themselves chose their own sector focus. One could focus on either energy of the blue sector, or both.

Part 2 focuses on the innovation capacity and needs of SMEs from the chosen sector(s). The questions are adapted from a systemic study on cluster developments, in which an analysis model was developed (Manickam, 2018). It is based on (on average) six face-to-face interviews with SMEs from the sector. The outputs of these interviews were summarised into one template, in English, by each partner region to allow for joint analysis and comparison that is in turn reported in part 2 of this report

Part 3 introduced the Job Forecasting and Skills Gaps mapping using the JOES templates as developed by van Lieshout et al. (2017). To gain an appreciation of the extent and nature of skills gap, each region was asked to analyse current and potential future labour demand, workforce, and discrepancies between the two, in up to 2 businesses. For obvious reasons (confidentiality and privacy), the JOEs will not be published separately, nor will their information be used in the report in a way that would be traceable to specific businesses. We will use exemplary information from them for illustrative purposes in Parts 1 and 2 of this report where relevant.

We thank all experts, SMEs and authors that delivered the regional reports. Our work in work package 3 will be concluded with the presentation and discussion of both the regional and

trans-regional reports in our regions. But the results will continue to bear fruit as our RIGHT project has embarked on the analysis of approximately fourteen regional pilots across the seven regions (work package 4) and prepares the policy analysis for work package 5.

2. Part 1: Introduction

Using the seven regional reports, and the underlying first parts of the seven filled-in regional format we used to compose them, this part of the trans-regional report will introduce and compare the seven regions. The goal is not to be complete, nor is the goal to arrive at a full comparison. The seven regional reports and this trans-regional report serve the main goal of a mutual introduction of the seven regions to each other (in general, and with a specific eye for their energy and blue sectors and their labour and education markets). Within our project, it will provide the necessary basis for a joint further operationalization and choices within the other two working packages of our RIGHT project (which focus on selected pilots to be analysed, plus policy lesson to be learned, respectively). The transnational report will also be discussed in each region, jointly with the regional report, to increase awareness of relevant opportunities for international cooperation, and joint challenges to face. The next section (2) of this part will summarise the seven regional reports. The final section of this part 1 will compare these regional reports on some main aspects.

3. Seven regions introduced

3.1 Hordaland (Norway; Blue and Energy)

Hordaland is situated in the Southwest of Norway and has direct access to the North Sea. It has a population of about 525,000 inhabitants (Sep 2018), and an area of 15,460 km2. It is currently divided into 33 municipalities with populations ranging from approximately 400 inhabitants (Modalen) to approximately 281,000 inhabitants (Bergen). Hordaland is a large county with a demanding topography. The population resides along the coastline and deep fjords, within inner valleys, and on islands close to the coast. Most of the population (79%) is concentrated around the Bergen area. The region is powered by nature (energy and blue) and owes its competitiveness mainly to the availability of natural resources: hydropower, hydrocarbons, the ocean, and unique landscapes that attract thousands of tourists yearly. The energy sector has been decisive for the development of the region during the past decades as large oil and gas fields are situated close to Hordaland's coast. The hydrocarbon value chain in Hordaland is dominated by a large operator (Equinor) and hundreds of supplier companies of different sizes (large and SMEs). The last oil crisis affected many companies dependent on the oil and gas sectors and caused a shift in focus to other sectors, such as the blue sector, including fish farming. The employed workforce, which makes up about 50% of the population, is concentrated in the Bergen area. A significant percentage (about 30%) of the workforce is employed within the public sector (public administration, social security, defence, education, and human health).

Communications technology is well developed, providing high-speed internet connection to about 90% of the population through both broadband and optic fibre. The leading communications company is in the process of phasing out 3G on a national level, expanding 4G and testing 5G for expected commercialization in 2020.

Hordaland is one of Norway's largest maritime counties and has 3 of the nation's 32 major ports. The Bergen airport is the second largest in Norway and was recently upgraded (2017). The road infrastructure is a challenge due to the difficult topography of the region. It is supplemented by ferries and is highly dependent on tunnels and bridges to solve these challenges. The Bergen Railway is the long-distance train line stretching from Bergen to Oslo, the capital. Public transport consists mainly of bus (80%), railway (18%), and boat (under 2 %). The use of taxi is very limited and declining.

The employed workforce consists of about 260,000 workers evenly distributed between males and females. The public sector is the largest employer in the region contributing with 22% of the

regional GDP and employing about 30% of the employed workforce. The Blue and Energy sectors contribute together with about 20% of the regional GDP but employ together only about 6% of the employed workforce. The wholesale, retail and repairs sector is the second largest employer in the region, employing 13% of the workforce. Professional, scientific and technical services represent only 4% of the regional GDP and employ about 4% of the employed workforce. About 27% of the employed workforce has a higher education degree (1 – 4 years higher education) and about 11% has education on masters/PHD level (4+ year's higher education). The actual number of young people under 25 completing upper secondary school is increasing. However, statistics show a recent trend amongst 25-39 year olds who merely have secondary school as their highest level completed. This is most probably due to immigration over the last 5 years and can create difficulties on the labour market for this section of the population. Since the mid-1990s, there has been a steady growth in the population between the ages of 30 and 39 who have completed higher education.

R&D expenditure within private companies in Hordaland is lower than R&D expenditure in other comparable Norwegian regions, and recently it declined. There is a trend that the industry commissions less research and conducts more research internally with own resources. At the same time, the university and college sector accounts for the majority of R&D expenditure in the county and for this sector the region has third largest county expenditure in Norway.

The Hordaland regional report offers enlightening SWOT figures on various themes. Emerging key topics (not exclusively based on the RIE but also influenced by SME interviews and JOEs, which are part of the analysis in part 2 of this report) are:

1. Skills.
   Businesses have a clear need for skills updates within the areas of:
   a. innovation and entrepreneurship;
   b. digitalization and ICT;
   c. RAS and aquaculture technology for cross sector transfer;
   d. there is a need for employees who can master a combination of skills required by the companies: a cross-over of skills between companies and within the same company;
   e. there is a potential to close parts of the skills gap through the sharing of knowledge and experiences within the clusters. A suggestion is to build partnerships for sharing knowledge and employees.

2. Funding for innovation.
   Most SMEs lack structured innovation processes. Innovation happens internally and informally. Companies do not have sufficient capacity and knowledge to be able to use existing instruments correctly and unable to find the right instrument for their current development phase.

3. Regulations.
   There is a need for increased knowledge regarding existing rules and regulations, especially for SMEs within aquaculture and oil & gas sectors. Tighter rules are expected under the green transition and SMEs need to be kept up to date and informed.

4. Capacity.
   a. SMEs lack capacity to send employees on courses for further education and therefore need module based courses either with an industry-wide approach or with a specific subject/field approach.
   b. SMEs are vulnerable when facing swings of the economic cycle and should be more proactive in order to increase their innovation capacity and develop new markets, also during growth periods.

5. Clusters.
   The clusters have an ambivalent role within the innovation ecosystem. For some the relevance and advantage of membership is confusing both from a geographical and sector perspective while for others there is a clear benefit in participating with courses, conventions, networks etcetera.

The attractiveness of the Hordaland region is closely connected to the abundance of natural resources, which generate value for the nation and for the region through strong export businesses across the value chain – specifically within oil and gas, aquaculture and hydropower.

As a region in a non-EU-member state, Hordaland does not have a smart specialisation strategy in the literal sense, but it does have a regional innovation strategy, a regional research strategy and other relevant plans with regional goals, for example, for greening the economy, lowering emissions and increasing energy effectiveness. This gives direction and focus on specific priorities where the regional government put in resources and support mechanisms. The findings from the SWOT analyses show that the priorities for the region are relevant for the energy and blue sectors.

Experts in the working panels and participating SMEs in general agree when discussing the challenges the region faces and the areas of specialisation the region needs to focus on.

The two JOEs reveal an immediate need to increase capacity but there are no plans to embark on path development. An additional study has been commissioned by the Hordaland County Council, which analyses the region's industrial structure in the light of employment

patterns and company patterns between 2000 and 2016. The study will supplement the findings of this research and will be used as part of the input for WP4.

The skills gaps that have been identified on a regional basis correspond with the future plans of regions' SMEs. Digitalisation and ICT skills are often cited as lacking in the current and future workforce and amongst school leavers. The challenge is to be able to educate the workforce and school leavers quickly enough and in the right numbers in order to meet the immediate and future challenges industry is facing. In addition, there is a need to develop mixed skills sets amongst employees. Companies need employees that can be adaptable and flexible so that they carry out different tasks in different parts of the organisation to prepare workers for both structural and cyclical economic changes.

The lack of a culture of entrepreneurship is also seen as a barrier for future regional growth. This kind of culture building needs to be nurtured and introduced at early education phases with continued focus throughout schooling. There is also currently a specific need for certain technological services and skills connected to fast-moving innovation within aquaculture. In addition, there is a need to keep a continuous focus on innovation and technological development. The region has recent experience with the need to turn around its industrial focus and create technology crossovers during the recent swings in the oil price which had a negative effect on the industry base in Hordaland. It is important to use this experience and to examine which mechanisms have worked best and how they can be adjusted to the current climate, in order to build a robust industrial base. The Norwegian cluster policy has given support and strengthened many industry players. However, the research has also uncovered that the jungle of support mechanisms is confusing, bureaucratic and complicated. Many SMEs are either not aware of the opportunities and miss out. SMEs confirm that they see the need for more international cooperation for example through cross border cluster organisations. This is an area where the North Sea cooperation could play a role. A certain culture among SMEs for keeping information in-house regarding products and techniques could be a barrier to this kind of cooperation. Many companies are discovering the sudden growth opportunities connected to the aquaculture sector. They have been approached for services and products and are readily focusing on the potential. The danger is that these small companies specialise themselves in a certain sector and are not robust when the market suddenly changes again.

The research points to a need to ensure continued innovation capacity amongst SMEs and to increase the role of education institutions as a support network for SMEs in their innovation work. We will define and carry out the pilots (possibly one on aquaculture), compare experiences and findings with other partners in the project and discuss results and further plans under work packages 4 and 5.

3.2 *Vordingborg (Denmark; Blue and Energy)*

Vordingborg Municipality is located on the Danish islands of Zealand, Møn, Bogø and Farø in the Region Zealand and province of South Zealand. It has an area of 620.2 km2 and a coastline of 385 km. As of the first quarter of 2019 the population stands at 45,816 people living in 16 local areas. Almost 50% of the population lives in densely populated areas, with approximately 50% living in rural areas with a relatively small population living in intermediate areas. The three biggest towns (urban areas) each have a focus in terms of development area. Thus, Vordingborg focuses on business and trade, Præstø focuses on residential activities and Stege focuses on tourism.

Vordingborg Municipality is governed by a municipal council which consists of 29 members who are voted for every four years. The municipal council also elects a mayor as well as a first and second deputy mayor.

In regard to infrastructure, Vordingborg Municipality has good internet connectivity with high speed broadband and 4G mobile reception in most areas, although coverage may be slower in rural and remote places. There are two seaports, a motorway passing through and a highway, as well as bus and train stations. This makes it easy to connect to the capital (Copenhagen) to the north and Germany to the south.

The municipality's household expenditure is 86.64% in comparison to the national average with 69% of the total population in employment. The largest employment by sector is healthcare at 22% followed by construction and services, which including tourism, operational services and food services are at a combined 10%. Looking at private employment only, the service branch accounts for 43%, trade and transport accounts for 24%, building and installation services at 14% and finally industry and land use (including, farming, forestry, fishery power and water supply) account for 10% and 9% respectively.

The participation rate in education is at 16.9%, and all students in the country are considered fulltime even if they do not go to school every day. There are two equivalents to institutes of technology that also provide other tertiary educational services in the municipality. It must be noted that there are several other study opportunities available in the region, including a university college with multiple locations and a university.

The municipality is considered attractive in terms of natural resources which would create a viable blue energy sector. There is ample wind, water and sun. There is also a well-established connectivity to Copenhagen, which in this instance counts as a positive. It is also beneficial that the municipality has two ports as well as low labour and housing costs.

There is little to very low technological orientation in the municipality and few companies that operate in the IT field. The issue could be that there are fewer people with higher technical education or university level education. There is also the sentiment that the region is not proactive and somewhat conservative in this field particularly in wind and blue energy matters.

The distance to Copenhagen also hinders the attractiveness of the region to potential highly technical employees.

Another issue is that there seems to be a lack of interest in the field of blue energy or windmills from the local population due to either the work type or hours. This is also compounded by the good welfare system that makes the jobs available not as attractive and some companies have resorted to employing foreign individuals.

There is good cooperation between the government and the industry because both parties are interested in the growth of the region. There are several development funds, subsides and schemes (as mentioned in the previous section) made available for investors. This, however, does not make it easy to borrow money for a business without incurring personal debt making entrepreneurship somewhat difficult. Due to the difficulties in borrowing money and the relatively low incomes in the region, there are few entrepreneurs and innovative companies in the region. It is relatively easy to attain funding for business cases but often difficult for infrastructural developments. Long and complicated application processes marred with bureaucracy make for a tedious procedure. Most schools in the municipality have a feature week which focuses on entrepreneurship both at primary and higher levels, but more is required.

As the municipality does not have a university, it is difficult to pinpoint their engagement, but there is need for more engagement with students. From December 2016 Vordingborg Municipality has been one of the areas focused by the Ministry of Business and Industry and targeted for business growth efforts. It has been noted that the lack of qualified labour is one of the largest barriers for growth in the municipality. This is exacerbated by the fact that there is more unskilled labour than highly educated labour in both the municipality and the region as a whole, in relation to the rest of country. This does highlight the need to have the "Right Skills" in the short to medium term, given the municipality´s ambitions as well as the offshore developments taking place in the surrounding area. This can be further noted by the fact that in 2017 93% of all employees in the municipality had up to a higher vocational education training. The remaining 7% had a bachelor's education or higher. This however is not negative in the case of Vordingborg Municipality as the skills in demand for the future, will be technical and upskilling on the current knowledge may be an easier transition.

The innovation ecosystem is simply stated as, "vague". The financing issues as well as the municipality's lack of engagement with the educational system hinders this. There is a good maritime sector network, not only in the municipality, but also within the region. This is also strengthened by the culture and strong networking.

The smart specialisations for the region will revolve around space, the sun, water and wind, which is further supported by the Krieger's Flak offshore windmill park development. There is good infrastructure surrounding the region, as well as funding and interest, so if managed carefully, they can be developed. These smart specialisations are easy to realise as they occur naturally, and the geographic location of Vordingborg Municipality is ideal. These smart

specialisations are sustainable and have potential to attract more highly skilled workers in the municipality and region as a whole. Several infrastructural projects such as the Storstrøm bridge, Vordingborg and Klintholm ports have already been invested in anticipation of the regional developments. Still, the concerns regarding the financing of clusters that may form around these developments remain.

The policy of the municipality also needs to change and be clearer on what developments can be made. Furthermore, these plans should be followed through to keep investor confidence high. The Vordingborg Municipality has a lot of potential for growth in industry, but particularly within the blue energy sector. There is, however, a deep need to create local policies that support investors, both large and small, and clearly define permissible activities to both the public and industry. There is also need for governance to take a stance on which activities they consider essential for the future, not only through industrial policy but also educational and financial policies. Better promotion of the municipality is needed to entice high technology industry and the highly technical staff that follows. There is also a need for local skills development from universities and vocational training institutes within the energy and specifically blue energy sector, as other municipalities currently are drawing more of these competencies at higher rates.

There is the general sentiment that everything is ready, it is just a matter of time until all stakeholders come together and make it happen. There is however the genuine and founded fear that it may all not come to fruition.

The blue / energy sector is also relatively new to the region, thus there is no information or expertise in terms of regional needs available. This can be noted in the JOE and SME responses. This is necessarily a "learning by doing" process, which may contribute to the perception of a large knowledge gap between service group members.

The lack of a university in the municipality may add a bias and skew to the negative in terms of the educational perspective in both the municipality highlights and certain sections in the SWOT. Proximity to cities like Roskilde and Slagelse can, however, easily alleviate the need for a municipal one. There is also a somewhat narrow focus on attracting technical and engineering profiles to the region. A wider casting of the net could serve the municipality well by including; business, internationalisation and marketing experts. These could help alleviate issues local companies have with funding, growth and business knowhow.

The policy for skills and education should focus more on future municipal needs in anticipation for the current developments. There should be policies both locally and nationally that focus on specific types of education that will provide employment in the short medium and long term in line with the municipal's blue energy goals.

There is also a need for up-skilling current staff in SMEs to be able to support the offshore windmill park. This includes embracing new innovations in technology and perhaps leveraging the municipality to become more proactive and change the current perception of having "vague" policies and not being first movers. This has the potential to encourage other start-ups

and SMEs to potentially build a thriving support industry or cluster to service the Krieger's Flak offshore windmill park.

3.3 *Province of Antwerp (Belgium; Blue)*

The province of Antwerp is, according to Belgian standards, a large urban area, which is densely populated. It consists of 3 sub-regions: Antwerpen, Mechelen and Kempen.

The province of Antwerp is very accessible:

- by private transport (motorways and secondary roads) and public transport (trains, buses, trams);
- by boat/ship (seaport Antwerp) and plane (airport Deurne);
- by broadband and other ICT infrastructure.

42% of the population of the province of Antwerp is in employment; people are working foremost in the tertiary (49.5%) and quaternary (28%) sector, 43% of the employed people are higher educated (graduate, bachelor, master, PHD). 21.4% of the population of the province of Antwerp is in education (almost 98% full-time): 52.3% in elementary education, 32% in secondary education and 15.7% in higher education. In secondary and vocational education, there is a drop-out rate of 5%. The province of Antwerp has a lot of elementary and secondary schools, and several graduate schools, institutes of technology and a university. However, not all fields of study are offered: for example, there is no civil engineering at the university, which has its consequences for the search for high educated technicians in the companies of the harbour area.

Concerning industry, the province of Antwerp has a landscape consisting mainly of SMEs. The 25 multinational enterprises are primarily situated in manufacturing – heavy engineering (16%), ICT (16%) and services – creative industry (16%). SMEs mostly represent services – creative industry (21.1%), wholesale and retail/repair cars (19.2%) and manufacturing – light engineering (11.7%).

The province of Antwerp is a rather prosperous region. The expenditures on R&D (gross expenditures and business expenditures) are higher than the EU standard. These expenditures increased over the last years.

For the province of Antwerp, the smart specializations are: Specialised manufacturing solutions (Advanced production technologies and additive manufacturing), Sustainable Chemistry (agricultural and industrial applications of biotechnology and sustainable chemistry, pharmaceutical applications of biotechnology) Value-added logistics (Specialised industrial value chains and logistical services), Personalised cure and care (personalised medical and social care), Creative industries and Eco renovation of buildings. In the future, regional focus will be on sustainable living (cradle to cradle, waste management and sustainable production

and sustainable energy) – this is also confirmed by the SMEs that were interviewed in function of innovation capacity and needs.

The province of Antwerp and especially the harbour region is an industrious, attractive and active region, with a lot of SMEs and technological and innovative potential. Large centres of knowledge, sectors and sector funds are present which provide training offers and education. In terms of policy, a lot of Flemish institutions and incubators are found in the region that give support, stimulate, guide and provide incentives, frameworks, knowledge and financing. As for the entrepreneurial environment, many starter services, business counters, consultants, incubators, entrepreneurial centres and organizations (public or private) are present in the region and provide help, assistance, training and educational opportunities and basic financial resources. The same goes for the innovation ecosystem: there are many centres, institutes, organizations, incubators, mechanisms that focus on general innovation and provide financing for research and innovation.

The above mechanisms are undoubtedly positive and stimulating for technical and entrepreneurial skills and innovation, but are limited by rigid regulations and/or lacking European legislation, the fragmentation of knowledge/information and coordination, the slowness of administration, governments and education in filling the technological gaps, the reliability of research results (research ordered by policy/paid by industry). These measures should be more effective, efficient and practical, so that it could also benefit the SMEs (now, mostly the larger companies and multinational enterprises benefit from the advantages and mechanisms mentioned).

SMEs which are successful and innovative, have found a solution for in the competition with larger players, by:

- moving away from the original core business to explore new/specialised markets;
- exploring circular economy and the use of renewable energy;
- exploring new markets and partners;
- developing new services, processes and products;
- looking for 'special' approaches to attract and keep clients (client intimacy, client driven projects).

Analysing JOE results (we analysed 1 small 'older' SME and 1 bigger 'newer' SME) we are further confirmed that the challenge for the future lies in the recruitment and the retention of the technical profiles. The level of education and the field of study of current technical staff seem sufficient. Prime problems are:

- The inflow of technically skilled personnel with a work ethos and a heart for the company and the work.
- Retention of qualified people, which is aided through:
    - specialised and personalised internal training and guidance;
    - measurements taken for the enhancement of the physical and emotional well-being of employees.

In order to keep the harbour area of Antwerp competitive and innovative, measures should be taken to:

- promote technical and technological jobs;
- promote working in the harbour area;
- fill the competence/skills gap between education and labour market;
- offer advantages/support to SMEs in order to:
    - keep up with innovation and increase their innovative character;
    - be able to recruit, retain and train/specialise their technical staff;
    - be competitive and be/become a pioneer.

It is striking to see that the SWOT-analysis done by experts of the province of Antwerp and their stakeholders and the findings of the SMEs (which are part of the analysis of part 2 in this report) resonate with current Smart Specialisation Strategies, both in the region and the blue sector of the harbour of Antwerp. Both experts and SMEs recognise the importance of recruiting and retaining technical and technological skilled staff (and not the level or study field, which is confirmed by the results of the JOEs), and therefore stress the importance of:

- technical and technological education and training;
- training on the work floor:
    - basic education;
    - specialised training, just in time;
- filling the competence/skills gap between education and labour market.

In order for SMEs to keep their innovative character or to be stimulated to go for/grow in innovation, they need to be supported: informed about incentives, benefits, training; helped with applications, finding relevant information/people/organizations, sharing knowledge in network and platforms, creating opportunities to cooperating etcetera.

It is recommended that:

- Policies/companies stimulate/promote the harbour area as an exciting, dynamic, innovating area.
- Policies/companies stimulate/promote technical fields of education and working in technological environments, by:
    - focusing on the innovative, dynamic, problem solving character of technical profiles, instead of on the nature of the education ('not high education, and so not good; doing 'dirty' jobs);
    - making the learning and working in technological environments and in the harbour attractive.
- Policy/governments rethink their administration/communication/data collection in order to:
    - work more structured, efficient, coordinated;
    - offer help and opportunities to the SMEs.

3.4 IUC Syd & Region Skåne (Sweden; Blue and Energy)

Region Skåne is the highest directly elected political organisation in Skåne, charged with responsibility for healthcare, public transport, development and the business sector, culture, infrastructure, community planning and environmental and climate issues across the region of Skåne. Region Skåne consists of 33 municipalities. In order of magnitude, Malmö, Helsingborg, Lund and Kristianstad are the largest municipalities. Skåne County is the tenth largest county geographically in Sweden and home to just over 1.3 million people. Total population in employment is 599,105, and the participation rates in employment 74.3% (both 2017). Health care (17.1%), Trade (13.6%), Education (12%) and Business services (11.9%) are the largest sectors of employment. The proportion of highly educated (calculated as the proportion of persons is aggregated from less than 3 years post-secondary education in the age group 25–64 with more than 3 years post-secondary education, more than 3 years and also with postgraduate studies. The estimated total number of unique students in region Skåne's colleges and universities: 68,735 (2017/2018).

The region has a great appeal to investors (in part due to proximity to Copenhagen and the European continent) and to researchers (with the largest research facilities in Sweden). The region has a history of innovation. Skåne is generally in the top three in Sweden for most new start-ups per capita. Support systems are in place at the start. There is capacity and expertise in the region through long-term work with funding instruments for entrepreneurs. Sweden has a national incubator programme. The region finances selected incubators, with a base of seven in the region. Municipalities finance local/sub-regional science parks and incubators. There is some (already in primary education) but not large-scale entrepreneurship education in initial education.

Region Skåne maintains a high level when it comes to cluster work and policy formulation. But (as in other regions), getting academics and business to cooperate can be difficult. Region Skåne responds to manufacturing companies in a variety of contexts, for example via the skills council. Clusters facilitate contact between the industry and academia/the Region, with RISE (Research Institutes of Sweden's largest research institute) as the meeting place, where all disciplines are centralised at a joint office in Skåne: attractive and unique in comparison with the rest of Sweden. SMTF is a business-related network with more than 100 member companies and universities linked to marine technology operations across Sweden. On 1 September 2017, SMTF became part of RISE. Region Skåne has funded the Maritime Knowledge Centre in Malmö for a long period of time, which has now begun to deliver innovations.

The open Skåne 2030 – Skåne´s regional development strategy (RDS) provides a strategic environmental programme, with other policy programs in place. Skåne's smart specialisation strategies are Smart Sustainable Cities with focus on Transportation/storage and Information/communication technologies; Smart Material with focus on Manufacturing and Personal health with focus on Information/communication technologies. The International

innovation strategy for Skåne runs from 2012- 2020, but the future one is likely to be a continuation.

The Right-project has indeed the right focus, when addressing the skills gap as a barrier to innovation and growth in small and medium-sized enterprises in the field of manufacturing industry. The OECD has recently come to a similar conclusion, when pin-pointing labour skills, next to infrastructure investments, as one of the biggest challenges in Skåne. In the 2018 OECD Territorial review The Megaregion of western Scandinavia the OECD states that:

> "While Skåne has a good innovation climate according to the Regional Innovation Scoreboard, its economic performance in terms of per capita GDP and productivity growth has been lower that the national average over the past decade. Enhancing productivity will require focusing on developing a more inclusive and efficient labour market and investing in infrastructure that better links people to jobs and reinforces the role of Skåne a Sweden's physical gateway to Europe."[1]

The Right project addresses the issue of an efficient labour market, and the need for access to a strong and adaptable workforce is distinctly reinforced in the Regional Innovation Analysis carried out in Skåne in 2019. The productivity growth of Skåne has been lower than the national average over the past decade. However, labour market performance has been relatively strong compared to other regions in Sweden. The counter-intuitive combination of Low productivity and a strong labour market can partly be explained by the comparatively higher levels of population growth experienced in Skåne, particularly from newly arrived migrants. This group often has lower levels of labour force participation than native-born Swedes. However, this group also increases demand for services such as retail, health and education: services that generate labour demand.

Another factor explaining the current situation in Skåne, is the significant structural economic change since the early 2000s. The manufacturing industry in Skåne has restructured toward areas of comparative advantage, especially in areas of food and beverage, life science, ICT and clean technologies. Moving up the value chain towards a more knowledge-based economy in Skåne is of course a positive trend, but the regional economy as a whole is still experiencing the impacts of former restructuring in the manufacturing industry. This is mainly manifested through differences within the region when it comes to labour market development. The eastern part of Skåne, with a strong tradition in the manufacturing industry, is still in some senses lagging behind.

The SWOT analysis in Skåne was implemented through a workshop with participants from the manufacturing industry, cluster organisations, the regional development authority among others. It indicated a high level of technical expertise in the region; although expertise that needs to be replenished. Again, there is a strong need to keep addressing the skills gap. With a possible future of in shoring production, a current trend in many other regions, there may well

[1] OECD (2018), OECD Territorial Reviews: The Megaregion of western Scandinavia, OECD Publishing, Paris

be a demand for local production. Scandinavian companies have also proven to be able to adapt their business operations in line with demand and in order to survive.

Furthermore, the SWOT analysis has highlighted the need of a new or an updated smart specialisation strategy (S3). The current S3-strategy was developed in early 2010s, right after the 2008 financial crises, and yet right before the skills gap was seen as a major problem. The S3-strategy of Skåne is currently being updated, which makes it possible to further address the skills gap as a barrier to innovation and growth. The future skills gap is also identified in the job forecasting (JOE) carried out in Skåne, with a traditional manufacturing company in transition stands as a good example. When drafting the current S3-strategy, the International Innovation Strategy for Skåne, in 2010, the skills gap was not addressed as a major issue. The current strategy instead focuses on open innovation, and states that "we must support the emergence of new areas that are not yet defined but which may emerge in cross- fertilization between different sectors or scientific disciplines as the needs arise."[2] An updated S3-strategy, along these lines, as well as taking skills education into account, can be a driving force for future innovation in the region.

Alongside with the S3-strategy, a new Regional Cluster Development Program has been developed in Skåne. The emerging development of cluster initiatives focusing on open innovation will be very important. The cluster initiatives work one step closer to the entrepreneurs and a Regional Cluster Development Program can prove useful in supporting innovation and growth in small and medium-sized enterprises.

Moving from a strategy and policy perspective to a more hands-on perspective, there are important lessons to be learnt from working closer with the SMEs within the manufacturing industry in Skåne. The majority of manufacturing industry businesses in Skåne are small businesses that often find it difficult to focus on RTD innovation.

The S3-strategy of Skåne is currently being updated and will take the skill issues into account; it will be seen as a prerequisite for innovation and growth in small and medium-sized enterprises. However, hand in hand with drafting a new S3-strategy, there must be actions for skills education and SME innovation. One of the pilots planned within the Right-project is a concept where we put together validation of existing staff, which then forms the basis for which training programs are required to cover the future needs. Those courses are done at a local learning centre. A form of distance learning place created entirely by the companies' individual needs.

The second pilot will be based on the data presented in this report. When the joint analysis of all participating partners' work within the first part of the Right-project is completed in early June, we believe there will be a lot of interesting findings to take into consideration to provide input to new strategies and policies for the future.

[2] An International Innovation Strategy of Skåne, Skåne Research and Innovation Council (FIRS), 2011

3.5 Hamburg (Germany; Blue and Energy)

Germany is a federal state, comprised of 16 states. Hamburg is, next to Berlin and Bremen, a city-state, city and state at the same time. Hamburg is the 2nd largest city at Germany, the metropolitan region is large (from North Sea to the Baltic Sea) with typical problems (traffic crossing the river Elbe is a bottleneck, real estate market) but attractiveness for people from abroad (even for unskilled).

Hamburg and different surrounding counties ('Landkreise') are building the Metropolregion Hamburg, a more or less virtual unit without an own budget and own parliaments. Next to Hamburg the other states of Northern Germany (Lower Saxony, Schleswig-Holstein, Bremen and Mecklenburg-Western Pomerania) are having their own economic policy. In some cases, they are cooperating, but not in all. For example, they established an umbrella-body with the objective to coordinate the maritime-cluster-agencies.

Hamburg has a good infrastructure – physical and digital (with rural parts not so good in the latter aspect). Its famous port is a prominent part of that (although its competitive position is under siege, with the challenge of deepening the Elbe river); but Hamburg also has a large public airport and a private airport owned by Airbus Group. It is also a crossing point for roads and railways, with traffic congestion being a challenge on the former.

The area of Hamburg is only 0.2% of the German area, but 2.2% of the German inhabitants are living in Hamburg (only the town, not the metropolitan region) – a high urban density with all advantages and disadvantages that must be handled. Hamburg is an open-minded and diverse City with five public universities, one public and many private Universities of Applied Sciences and Business Schools.

The total population in employment is 1,259,600 (including self-employment). The participation rate in employment is 55,59%. The service sector accounts for by far the largest share of employment with 84.5%. Trade, traffic, hotels and gastronomy (27.7%). Freelancing, scientific, technical and other economic services (20.6%) and Public administration, Defense, Social Security, Education and Training, Health and Welfare (19.8%) being the largest sectors of employment.

As compared to other regions, Hamburg has a relative high number of multinational enterprises (493) as compared to SMEs (1,937). This should be a result of (at least) the city-state nature of this regional government (relatively limited rural area, where SMEs rule) and the largest individual international part (increasing the number of multinational) in all these seven regions.

Being a state-city, Hamburg has both a substantial availability of higher (and vocational) education institutes, but also its share of unemployment problems. Hamburg has the highest percentage (>50%) of secondary school graduates with higher education access ('Studienberechtigung'). Being German, it has the advantage of its famous apprenticeship system. Relative to the national average, Hamburg has currently a relatively low supply of

apprenticeship positions – understandable for a city-state. It simultaneously has the lowest level of unoccupied apprenticeship positions. While this is – on average – good news for businesses, but bad news for secondary school graduates, with the highest share of them. This may have something to do with the fact that Hamburg has integrated a following system for youth since 2012 – meaning that they more accurately follow and report on youth who may have gone unnoticed in other states surrounding Hamburg.

Hamburg has a strong tradition in trading and industry (related to transportation: Airbus, shipyards, transportation systems (Still, Jungheinrich, Mercedes). All partners and bodies for the maritime added-value-chain ('Wertschöpfungskette') are present at Northern Germany.

The federal system of Germany with the federal level and the states ('Bundesländer') and divided tasks, responsibilities and budgets prevents sometimes a fruitful cooperation with a strategic view and vision. In many cases only smaller individual solutions can be realized.

There are at least two maritime industry clusters or networks in Northern Germany:

- One is the Maritime Cluster of Northern Germany (MCN), with offices in the five northern German states.
- On the other hand, the office of the German Maritime Centre ('Deutsches Maritimes Zentrum' - DMZ), responsible for the whole Germany, is located at Hamburg.

Higher Educations Institutions & government are changing the circumstances for co-operation and transfer, but this process needs a lot of time.

Renewable energies have, after 30 years of research, development and subsidizing, become so competitive on an international scale that they have been experiencing a boom in many markets. More than 300.000 jobs have nation-wide been created in the field of Renewable Energies over the past 25 years.

Northern Germany can be regarded as a hot spot of the production and transport of Renewable Energies. At northern Germany different former shipyards are constructing and manufacturing parts for windmills. They are using their facilities and their experiences of working with steel and modern chemical fibres.

On the other side different Universities of Applied Sciences and Universities established new courses and research-projects. Different Universities and Universities of Applied Sciences and maritime research-units can be seen along the coasts of the Northern – and Baltic Sea of Northern Germany, located at bigger cities like Hamburg and Rostock, Kiel and Bremen – and smaller like Elsfleth and Leer. In all, there is a wide range of experiences and skills.

Repowering and de-construction of the off-shore-windmills are an upcoming topic, for research, development and commercial utilization.

2018 saw a significant and painful consolidation within the industry with rising pressure on all stakeholders, and the employment is not rising anymore; smaller and bigger companies have

to struggle with financial problems. There are nearly no producers of solar panels at Germany anymore.

With the establishment of the cluster-agency in 2011 at Hamburg and especially with the joint project 'NEW 4.0 – Norddeutsche EnergieWende' (Northern German Energy Transition 4.0; cf. van Düsterlho et. al., 2018) a powerful network has been formed in which the German states Schleswig-Holstein and Hamburg could form a model region for a successful load management. The partners are realizing different projects for a sustainable energy supply system, an acceptance study was published, a 48 MW battery storage went into operation. Eight working groups are active.

3.6 *Fife (Scotland; Blue and Energy)*

Edinburgh is the city across the river from the Scottish region of Fife. Fife has a coastline over 117 miles long. Over history this has accommodated industries related to transportation, trading, fishing, naval defence and leisure activities. The dockyard and mining related activities were the foundation of heavy engineering and manufacturing. During the 1960's and 70's Fife's traditional shipbuilding, coal and heavy engineering industries declined, and these were replaced by a wave of inward investment in electronics manufacturing. This then ebbed as manufacturers sought opportunities in the Far East for lower costs base. With the discovery of North Sea oil, the engineering heritage offered an attractive skills base which encouraged companies to establish oil and gas manufacturing. North Sea production has peaked, and activity declined with lower oil prices and many oil fields moving toward cessation of production. This does present an opportunity in terms of de-commissioning due to the existing engineering skills base and there is an opportunity to assist the workforce to move into new roles in renewable energy as happened with oils and gas.
Babcock, as a key driver of the local economy at the crossroads of the blue and energy sectors, is the operator of the Rosyth dockyard which continues in Naval construction and also has an active programme of diversification into offshore wind and decommissioning of nuclear and oil and gas structures.

Fife remains a major centre of manufacturing in Scotland and there is a supply of high-quality engineering skills and considerable investment in equipment. More recently one of the areas of growth has been associated with Low Carbon and sustainable energy. Fife is recognised in Scotland as one of the most supportive regions for activities related to sustainability and Offshore Renewable Energy activities. Fife has created the Energy Park Fife and the Fife Renewables Innovation Centre (FRIC) to act as focal points to attract and develop activities in this area. FRIC is situated to act as a hub and incubator centre. Recently the UK Offshore Renewable Energy catapult has set up in FRIC operating the world's largest open access wind turbine development activity. Fife energy park is mentioned specifically in the Scottish government's 2009 National renewables infrastructure and investment plan. The Fife plan for

local development identifies Fife energy corridor, the southern coast of Fife up to Methil, as a key area for renewables infrastructure and inward investment. In addition, Fife's economic strategy 2017-2017 identifies Renewables as a key growth sector and recognises Fife's competitive advantage in terms of renewables. At the national level there are several Renewables funding streams available to SME's. But: the extent to which this all has in itself generated new employment has – so far - been disappointingly slow and of a scale less than was previously predicted.

There are 28 ports and harbours in Fife with 4 major ports at Rosyth, Burntisland and Methil. Heavy engineering and fabrication activity are based around the ports, mainly in south-west Fife where larger companies tend to be based. Their supply chains include specialist SMEs; some with highly advanced engineering skills tend to locate in Mid Fife, with another SME cluster in North East Fife near to the University of St Andrews to the port activities in Dundee on the Firth of Tay.

Generally speaking, Fife is also well placed in terms of access to other means of transport (airports, road and rails). Although a peninsula Fife is well connected to the North, South and West and as such is often used as a commuter location, a strength but also a weakness in terms of retaining or attracting talent. It is worth mentioning that a potential weakness is the lack of a main road, or rail link to two of our major towns. For St. Andrews, which is a cluster for blue growth R&D, this could be an inhibitor to growth. In a similar vein, Levenmouth is not connected by rail, which is a major issue inhibiting growth in terms of rail freight and access to human capital. The area is isolated in comparison to the other large towns in fife.

Digital connectivity in Fife is comparatively good compared to more rural regions with 98.4% of premised connected to high speed fibre broadband. This is thanks in part due to the Scottish Government's Digital Scotland Superfast Broadband (DSSB) programmed.

Fife has a total population of 371,400 and a working age population (16-64) of 232,500. Of this 176,700 are in employment giving a figure of 75.2% in employment which is slightly better than the Scottish average at 74.1%. The public sector is the main employer in the region employing approximately 25% of the total workforce. Other key sectors for employment are Wholesale Retail and Trade; Repair of Motor Vehicles and Motorcycles at 15.4%. In terms of Gross Value Added Manufacturing is the largest contributor, accounting for 21% GVA to the Fife Economy.

Current School roll data shows that Fife has a current total school population of 49,660 with 20,484 currently in secondary education and 29,176 in primary. Economic Inactivity data enables us to establish that there are currently 14,600 in further and higher education. Of the working population, as identified above 22% of the Fife workforce are educated to degree level with 44% educated to NVQ level 4 and above.

In principle, there are various regional strengths for a strong regional position at the crossroads of the Blue and Energy Sectors. In terms of qualifications, 44% of the regional workforce are qualified to NVQ level 4 and above. And there is a strong firm and human capital maritime heritage in subsea Oil and Gas and manufacturing to support Energy transition. There is good

support in place for offshore wind in terms of Policy and funding and proximity to locations, with the Presence of Fife Renewables innovation Centre FRIC and the presence of ORE catapult, the UK's national renewables innovation centre at the site.

There is a strong focus on skills, inclusive and sustainable growth at the local level. Good employability and skills support are delivered through the Opportunities Fife partnership, an initiative that brings together a series of local government, private and third sector partners to provide a coordinated approach to employability, skills development and business engagement. There is recognition that there are some existing and future skills shortages some of which are entirely relevant to blue growth. The most obvious of them are digital skills, software engineering and data science; but also, in skills in engineering, manufacturing and food and drink production. All of these will show a considerable replacement demand as workers retire.

Developing the young workforce, DYW is a flagship national policy which aims to improve the connectivity between education and the business community, creating strategic partnerships between education, industry and government. It is focused on assisting business to address existing and future skills mismatches by directly influencing the school curriculum. There are many elements to the project but perhaps the most notable is the creation of the apprenticeship family which aims to increase the vocational routes into key employment sectors. Foundation apprenticeships are studied while at school in the senior phase and involve a series of industry placements. Successful students graduate with industry experience, an industry relevant vocational qualification and a qualification equivalent to the traditional higher qualification. This enables them to either enter employment or to articulate into university if they chose. There are currently 12 foundation apprenticeship frameworks available to students which match with key growth sectors of employment for Scotland. The next level, modern apprenticeships (MA) have been around for several years and are well established. MA's allow businesses to benefit from fully funded training support from Skills Development Scotland for young people up to the age of 24. The final and most recent addition to the apprenticeship family are graduate apprenticeships (GA) which are studied part time while in employment, bringing the benefit of more industry focused study. GA's are fully funded by skills development Scotland so there is no cost to the student or the employer. As such, they have proved to be very popular, and many businesses have used them to upskill their existing staff. One employer described GA's as 'the biggest freebie ever'.

A culture of entrepreneurship is being embedded into primary and secondary education promoting enterprise and entrepreneurship. Fife is a recent award winner for most enterprising place in Britain.

Weaknesses for economic development are:

- Poor industrial stock which may be unsuitable for growth in the blue sector.
- There is considerable work to be done in improving strategic cooperation between stakeholders.

- A good science and R&D environment are hampered by poor cooperation at a local level.
- There are no advanced tech centres in the region (they are based in surrounding cities).
- There is a relatively low rate of business led R&D; and no major Headquarters in Fife for blue sector companies.
- The hourglass distribution of company size: some very large and very small but few mid-sized SME's;
- Low retention of graduates, with people being drawn to work in surrounding cities.
- Clusters tend to be smaller, and not large enough to have significant impact.

Opportunities for economic development are:

- Fife is well-placed to become a hub for blue growth, given the proximity to offshore wind sites, and a strong engineering heritage.
- Blue growth can be used to meet current sustainability standards.
- improving cooperation (creating better clusters and networks, and cross-lateral connections) should help.
- Support is available in terms of start-ups and innovation funding.

Threats are:

- No one arm of government is responsible for blue growth, resulting in a confusing policy landscape.
- An ageing workforce and a large skills replacement demand (although policy efforts have been initiated).
- Potential inability to cope with the pace of change in digitisation, with a distinct lack of IT personnel.
- International competition (i.e. wind turbine jackets for a local firm to be constructed in Asia rather than locally);
- Brexit limiting access to migrant workers (from unskilled though skilled to academic) and foreign markets.

3.7 *Province of Groningen (The Netherlands; Energy)*

Groningen is one of 12 Dutch provinces, located in the Northern Netherlands and relatively sparsely populated. It has a surface of 2,960 km2 (70% is agricultural land), which is roughly 9% of the total Dutch area, and has one city, its capital Groningen. The province has 583,581 inhabitants (Eurostat, 2018), which is 3.4% of total Dutch population. The regional governance is Province of Groningen, with 12 communities as local governance. Furthermore, several collaborations between the Northern provinces exist. Since 1992 the provinces Groningen, Friesland and Drenthe have combined their resources in Northern Netherlands Provinces (SNN)

to strengthen the regional economy by pursuing joint policies and negotiation with national and European government on common Northern interests.

Since 2010 the involvement of the national government in regional economic policy was gradually phased out and formally handed over to the provinces. Innovation policy was absorbed into the national 'top sectors' approach and is based on making use of existing strengths instead of trying to develop lagging regions. The region is considered attractive in terms of natural resources (ample wind, water and land) and had selective specialisation strategies in place. The Research and Innovation Strategy for Smart Specialisation, RIS3, denotes the strategy for 2014-2020 for the Northern Netherlands, which contributes to the long-term goals of Europe. The strategy aims to stimulate research for realizing innovations and stimulating entrepreneurship. The four mayor societal challenges that are tackled with RIS3 are: Health, demography and well-being; Food security, sustainable agriculture and bio-economy; certain, clean and efficient energy; Clean, safe water supply. Groningen focuses on Health and Energy.

As part of the SNN the Northern Innovation Agenda 2014-2020 unites the provinces of Drenthe, Friesland and Groningen in their efforts to translate the strategy put forward by the Research and Innovation Strategy for Smart Specialisation (RIS3) into a detailed policy agenda, which is then operationalised through the EFRO Northern Netherlands Operational program.

Regarding infrastructure, Groningen has a good internet connectivity with high speed broadband and 4G mobile reception in most areas, although coverage may be slower in rural and remote places. Groningen is also a pilot area for testing of the new 5G technology. The province of Groningen is very accessible:

- by private transport (motorways and secondary roads) and public transport (trains, buses, trams);
- by boat/ship (seaport Eemshaven, small international harbour)
- By plane (airport Eelde/ Groningen, small international airport);

Groningen is a college / education town. It has 2 universities: Hanzehogeschool Groningen for applied sciences (29,338 students) and Rijksuniversiteit Groningen (31,257, students). There are four vocational education schools, with a joint total of 26,091 students.

The working population in Groningen consists of 385,000 people, 23,000 of them are receiving unemployment benefits. 'Werk in Zicht' (Work in sight) is the most important collaboration on the labour market and consists of regional and local governments, social security agency UWV and educational institutions. In view of the demographic developments (less youth, more older people) and, in addition, a robust group at the bottom of the labour market, investments in training are necessary. Together with the educational / knowledge institutions, the ambition is to strengthen the structure of employment and to help improve the match between supply

and demand in various ways (from work to work, from unemployment to work and from school to work), with a new training fund being discussed.

The knowledge base in energy and life sciences is manifested in the Energy Academy, various institutes at University Medical Centre Groningen (UMCG), the Centre of Applied Research and Innovation (Care Rehabilitation, Education & Sport), and the Institute for life sciences and Technology. The region has a strong base of cooperation in the Energy sector for example: Centre of Expertise Energy (including living lab EnTranCe), New Energy Coalition (containing the Energy Academy Europe), Energy College, Groningen Seaports and Hydro-green. Energy Academy Europe (EAE) brings Groningen University and the Hanze University of Applied Sciences. The New Energy Coalition combines Energy Valley (a previous network organisation for the energy transition), EAE and the Energy Delta Institute with other partners (such as the Energy College). New Energy Coalition is a knowledge and network organisation striving for a sustainable world by boosting the acceleration of the energy transition. The EAE focuses on research and education in the field of energy and has the ambition to become an international centre of excellence in energy education, research and innovation. Included in the EAE is, EnTranCe is an energy field lab at the Hanzehogeschool Groningen with facilities, technology and the best possible network to stimulate the energy transition.

The province of Groningen has an economic landscape consisting mainly of SMEs (about 95% of the companies.). The 134 large businesses are primarily situated in industry, the public sector and health. Major sectors in Groningen in terms of production are industry, business services, mineral extraction (gas!) and information and communication (CBS Stat line). Total population in employment is 285,245. Sectors with highest levels of employment are (1) health care (20%), (2) trade (15%), (3) business services (7%), (4) industry (10%) and (5) education (9%) (LISA, 2018). Groningen has a relatively low research and development intensity compared to other Dutch provinces and public expenditures dominate Groningen's R&D efforts. It does have a growing start-up scene (primarily in ICT).

Among the regional strengths of the three Northern provinces' (Groningen, Friesland, and Drenthe), energy and life sciences are most prominently represented in Groningen. Major companies in energy are Gasunie (gas transport and infrastructure) and GasTerra (gas trading). The natural gas extraction in Groningen had unfortunately resulted in earthquakes. Stopping gas extraction as soon as possible, replacing and preventing earthquake damages are currently a prominent policy issue that has created a significant tension between the regional population and the national government.

After Leiden and Amsterdam, Groningen yields the third position as city in the biotech field in terms of number of companies, highly educated employees, and turnover of "dedicated" life sciences companies (knowledge intensive, specialised companies, highly active in R&D, outcomes of which are both used internally as well as sold for use in external processes, products and/or services).

The cooperation between government and business and education is increasingly taking shape. In this way, investment agendas are drawn up (e.g. for hydrogen) and knowledge is valorised better. The region focuses on triple and quadruple helix (companies, governments, knowledge institutions and social organizations) partnerships to work on social and technological innovations on social challenges. It has created several centres with living labs, across borders between sectors, with test installations, start-up and scale-up supports, and efforts to promote the intake of students in technology. Entrepreneurship education has been also expanded in initial education, starting in higher education, with Hanzehogeschool and RUG cooperating in this field. There are now several programs/ initiatives on each education level that contribute to an entrepreneurial environment. The region is simultaneously working on transition and circularity in three related domains: natural environment, economy and socio-cultural.

The transition of old to new energy offers many opportunities for innovation. The transition from natural gas to more renewable energy (RE) is a regional choice as is the emerging digital sector as an important focus sector. There is a lot of knowledge in the Gas-sector, which can be used to make the transition toward renewable energy both the presence of Eems harbour and ample higher education students contributed to the latter development and helped attract Google and IBM. A remaining weakness is the involvement of SMEs; and knowledge is not always accessible. Potential threats are:

- Capacity problems: there are bottlenecks due to fragmented policy dimensions (e.g. policy for generating power and policy for transmission and storage are not always compatible).
- Growing resistance among a part of the population to climate change mitigation works against energy transition developments.
- A challenge in resources allocation: conflicting policy directions may hinder development/choices.

One regional pilot we will study in the RIGHT project is a regional triple helix innovation program in energy transition. The RIF GAS 2.0 program combines 7 vocational colleges, 3 provinces, 4 municipalities and 47 SMEs that cooperate in: attracting students; educational innovation: knowledge and skills; and building a community of practice. The other regional pilot concerns the start of Hanze International Business Office (HIBO), which will offer opportunities to explore SME cooperation opportunities across the national borders between our regions.

4. A trans-regional perspective: similar challenges, different assets

4.1 Introduction

This report highlights key findings across the seven regions rather than present detailed empirical details of the regions. An overview follows:

- As all participating regions reside in the north-western part of Europe, it comes as no surprise that they share basically similar levels of welfare and economic development, with similar basic institutional supports, and similar economic actors;
- As all participating regions reside in either Scandinavian, Rhineland, and Anglo-Saxon economies, they have different institutional supports on an institutional level;
- Natural resources differ somewhat, both with countries (i.e., gas in Groningen versus water as an energy source in Norway) and across time (i.e., gas in Groningen no longer being extracted in the near future). But wind, for instance, is a shared natural resource.
- Ports and other basic infrastructure, similarly, is comparable at a basic level, but different at more detailed levels – with Hamburg and Antwerp hosting the largest and most developed harbours.
- Basic labour market and education institutions are – again – similar: mostly public sponsored initial education for youth, mostly private training for the employed, and some basic social security for the unemployed.
- But there are relevant differences beyond and above that level, both on a national level – i.e., with Germany still hosting a strong and vast apprenticeship system for youth vocational training – and locally – from a true college town as Groningen to a relative lack of higher education in Vordingborg.

Despite these differences on a more detailed level, the basic challenges regions face are pretty similar between these regions, and potentially downward spiralling. Among others:

- innovating for a new socio-economic future is hard, for each firm, in every region.
- Economic change continues to speed up, resulting in increasing levels of obsolete workers and workers shortages – simultaneously.
- In each region, there is a shortage on technical workers at upper secondary and tertiary levels.
- This shortage is already there presently but expected to grow.
- These shortages hamper further innovation.

There are, obviously, also some differences, both between regions and within. While, for instance, the energy transition is a challenge (and opportunity) for all regions, the quantitative and qualitative employment challenge it provides is – in the short to medium-term – probably largest in the Groningen region, due to the rapid move from its extraction as e key national economic and energy resource of over a relative short span of years. Within regions, differences exist between rural and urban areas, with both more high skilled opportunities and a larger unemployment-threatened underclass concentrated in the latter. And regions, obviously, also differ due to their embeddedness in their own history, with Fife, for instance, still facing current challenges due to severe employment losses to past stronghold sectors such as the coal industry in recent decades.

With all due respect to regional differences: the basic challenge is similar. Automation and digitisation, for instance, will significantly influence work organisation in every firm and occupation – and entire business models in many businesses. But the *exact* way in which skill needs will change in existing occupations (who will need which new skills at what point in time) is hard to predict – for businesses themselves, as well as for experts, and hence for policymakers. A related Interreg project GrowIn4.0 specifically analyses how the related challenges and solutions to support SMEs in regions for the manufacturing sector. But this is a vital part the related human capital changes needed to facilitate the energy and blue sector transition as well.

There is a conception of control, where each region would be competing with the other, as if it were a zero-sum game. It is, decidedly, not. Sharing each other's collective resources would expand each region's capacity and help every firm within this shared geographical scope with pooled collective resources. It is the intent of this project to help achieve such trans-regional coordination.

Rather than further micro-compare the detailed empirical variations, we will present a basic empirical and theory-based foundation for the joint challenges ahead for all regions – which simultaneously provides the playground for trans-regional cooperation.

4.2 Responsiveness: a firm-level challenge

Responding to changing technological (and economic and other social) changes has long been a necessary requisite, for businesses and for regions. Empirical evidence and the literature lead us to two important lessons on the links between technological change, economic development and human capital development:

- Technological change does necessarily lead to the most economic and employment growth in the region where it originated.

- There are (more) important intermediary variables – e.g. business strategies, work organisation, training policies – than technological change itself

Part 2 (sections 5 through 7) of this report will more accurately portray the firm/SME perspective on this firm-level challenge.

4.3 Regional embeddedness of businesses shapes their strategies

Businesses do not operate in isolation. Their strategies are embedded in regional/national systems that provide supports (and obstacles) for their responsiveness, have shaped their current strategies, and will continue to shape future strategies. There is an abundant literature on this that we will not discuss here (e.g. Crouch et. al., 1999; van Lieshout, 2008). Major international institutional differences are relatively stable over at least decades. Businesses strategies are embedded in these: a German firm might not operate as effectively in an English institutional context, and vice versa.

From the long literature on effective economic regions – the Italian industrial districts and their business networks, the southern German Bundesländer and their employers' associations, the Japanese keiretsu and, more recently, Silicon Valley – we have learned that business networks help human capital investments as well as economic performance. These are not individual, but collective goods: a high-skills equilibrium can be stable for a long time if supported by the right supports (such as business networks). Partnership formation therefore is a crucial component of current national and regional economic strategies.

Partnership strategies increasingly are no long limited to business networking exclusively. Education (and applied research) is more than ever seen by today's policymakers as a partner for economic development. The term' triple helix' refers to the intended close cooperation between (regional) government, education and business, with beneficial consequences for the economy and employment. The concept of the triple helix partnership was initiated in the 1990s by Etzkowitz (1993; 2003) and Etzkowitz & Leydesdorff (1995; 2000). The proposition is that the potential for innovation and economic development in a knowledge-based economy lies in a more prominent role for (higher) education, and in the hybridization of elements of higher education, business and government to generate new institutional and social formats for the production, transfer and application of knowledge.

4.4 Vocational and professional education and lifelong learning as a key issue of regional embeddedness

Changing skill demands need to be integrated in the existing vocational and professional education and training systems – hence the increasing importance attributed to triple helix partnerships as discussed above. The general idea behind our current education and training systems is, that initial vocational and professional education lays a broader occupational basis for the next generation of youth. It has to ease their initial transition into the labour market but does not have to deliver perfectly tailor-made skilled workers for each particular job. Further learning on the job (and possibly off the job) at the firm level may be required before youth can achieve full productivity in a specific job. From then on, life-long learning will be necessary to accommodate to changing job demands within your initial occupation – or to cross borders to retrain for a new occupation. Despite the call for lifelong learning being heard since at least the 1960s, in a joint choir of policymakers and business representatives, we generally have not yet been very successful in developing lifelong development supports to accommodate large shifts in quantitative and qualitative job demands. With the increasing pace of economic and occupational change, we have no choice but to become more successful at this. Not only has it become quite unlikely that your initial job will last your entire working life; you may actually witness the entire rise and fall of an entire occupation over that span.

RIGHT
RIGHT SKILLS FOR THE RIGHT FUTURE

5. Part 2: Introduction

This part of the report captures the key findings of the interviews carried out in 36 SMEs in the 7 partner regions of the RIGHT Project that border the North Sea. The objective of this part of the research was to identify the innovation capacities, challenges and opportunities of SMEs in these regions, and to explore common themes and opportunities for cooperation and learning across the regions.

The research was a joint effort by project partners who were asked to collect information from local SMEs ideally, 6-8 per region, representing the energy or blue sectors depending on their local contexts. The information requested was an adaptation of an interview schedule developed by A. Manickam that has been used for studies focused on understanding contextual changes of businesses and their responses from a systems perspective. Partners used snowball methods in choosing their SMEs whilst capturing a diversity of businesses.

The SMEs were from a wide range of businesses related to the energy and blue sector, as even some businesses from other sectors were included. Each region has carried out their own regional innovation ecosystem audit and a report on their findings in a regional report, an overview of which has been presented in the first part of this trans-regional report. Details of SME interviews of each region are included in these regional reports. This part of the trans-regional report offers an overview of common challenges facing SMEs in the North Sea Region in the face of changing regional and global business landscapes. The report delves into specific aspects of the findings that offer opportunities for pilots, cooperation and learning across regions as well as input for policy development.

An overview of the regions with the numbers of SMEs interviewed is provided below.

Partner Region	SMEs	%	Sector
Fife Council	4	11%	Energy/Blue
Hordaland County	7	19%	Energy/Blue
Hamburg	3	8%	Energy
Province of Antwerp	6	17%	Blue
Province of Groningen	6	17%	Energy
Region of Skåne	8	22%	Blue/other
Municipality of Vordingborg	2	6%	Blue
Total	**36**	**100%**	

This part of the report looks at the information provided by these 36 SMEs to distil common issues in their responses. The research has a limited scope and the data provided has been translated and collated by the partnering organizations. Given these limitations, it needs to be acknowledged that this report captures a first glimpse of issues shared by these various SMEs, coming from very different regional contexts). In addition, the energy and blue sectors that are

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dominant sectors to which these SMEs belong are themselves diffuse and changing due to transitions taking place in the energy and general economic domains. We point to regional differences where it is relevant but on the whole points to SMEs as a group in these North Sea Regions. This part of the report covers insights into SMEs' geographic scope, types of innovation, urgent challenges, local conditions and opportunities, developments impacting their business, drivers of innovation, becoming future-proof and emerging patterns in last three years. The report provides both qualitative and quantitative insights to help understand the degree of commonality and issues raised by the participating SMEs in the partner regions of the RIGHT project.

6. Analysis of SME interviews

6.1 SMEs and geographic scope of activities

Almost all SMEs interviewed across the regions operated locally, in the region and/or nationally. In addition, more than two thirds of SMEs had an international scope. The table below captures the details.

Current scope of operations	SMEs	%
Local	35	97%
Regional/national	34	94%
International	25	69%

6.2 SMEs and types of innovation

SMEs were asked to identify if they were engaged in product, process, service or other types of innovation. Service innovation was carried out by a large majority of SMEs whilst two thirds of them were also engaged in product innovation. Half of the SMEs were involved in process innovation. Most SMEs indicated that changes in technology and markets/customer demands and sustainability were important drivers supporting focus on innovation.

Types of innovation	SMEs	%
Product innovation	25	69%
Process innovation	19	53%
Service innovation	30	83%

More details were given when asked to elaborate:

- *Resources efficiency and cost reduction* were important drivers of innovation and business development: this could be due to clients, regulations, efficiency measures or new business potential.
- *New technological developments* offered competitive advantage and new business opportunities (new markets).
- *Modernization* was a prerequisite for some businesses due to market and policy developments.
- *Automation and digitalization* (modernization) as new industrial/business standards often led to business process innovation.

- *Increasing complexity and demands of clients* meant that SMEs focused on customised solutions, for example, engineering businesses, needed to innovate to meet client needs to continue to provide high levels of quality that were critical to their competitive advantage.
- *Artificial Intelligence and soft and hardware developments in Information Technology* were specifically mentioned as important opportunities for business developments.
- *Innovation cooperation projects*, including EU projects, were important for some SMEs that gave them opportunities to develop additional features/services through the new knowledge and partnerships in such projects. Often higher education institutions and partners from other sectors or businesses support multidisciplinary innovation developments.
- *Stakeholders* were important drivers of innovation: supply chain and other network partners, customers (B2B), higher education and students.

6.3 SMEs and urgent challenges

SMEs were asked to identify three urgent challenges faced by them. The most important challenges they listed were:

- changing market conditions and technology developments;
- prevailing policy and regulatory frameworks;
- availability of skilled labour and training;
- business capacities and needs.

They also identified important drivers of change that were pushing businesses to keep up with technological and market developments:

- modernization;
- digitalization;
- sustainability;
- globalization.

The consequences of such urgent challenges meant that there was a need to

- 'up-skill' their current workforce;
- attract new staff;
- develop business capacities.

Companies choosing innovation and niche markets as part of their business models were faced with additional challenges related to financing innovation, risks of timing and choice of

innovation, policy/regulatory limitations and/or lack of supportive policy response especially for new or emerging industries. These various challenges were often interconnected.

POLICY AND REGULATIONS

Another challenge identified is regulation and policy. SMEs have indicated that policy is often lagging in responses needed to changing technology and markets whereby regulations may not be adequate or outdated. Subsidies to support technology shifts and innovation are not always SME-friendly with bureaucracy and complexity of accessing funding being key reasons for this.

BUSINESS NEEDS AND CAPACITIES

To meet the changing business context, SMEs have personnel not (yet) adequately trained skills for changing tasks and responsibilities, due to technological and other (i.e., internationalisation) developments. Upgrading competences of current employees and/or attracting skilled labour is an urgent issue for these businesses. However, resources and capacity to do this were not always available. Similarly, access to new equipment to meet changing market conditions and demands of customers was a challenge due to a lack of equipment and/or lack of finance. The following aspects were identified as being important to business needs and capacities:

- Growth was a driving factor, often as a necessity for economic survival.
- Personnel: recruitment, training & learning, retention (upgrading), retirement (replacement).
- Organizational capacity (upgrading).
- Finance – access and administrative thresholds (grants/projects).
- Innovation as a driver and need for:
    - knowledge (R&D):
        - solutions focused (customization);
        - technology/product development (market creation);
        - supply chain-driven (knowledge spill over from suppliers);
        - technology/product/market development (cooperation with network partners, university, EU projects, etc.);
        - human capital development (see 'personnel' above and 'skilled staff below);
    - equipment;
    - skilled staff.
- New market development (driven by competition, customers, sustainability) and therefore a need for:
    - knowledge;
    - investments;
    - capacities;
    - networks.

The following sub-sections provide more information of the needs of businesses and proposals for solutions.

Knowledge and Innovation needs

Knowledge gaps were an important type of challenge identified by the interviewees. These included legal and safety issues, IT and software, market developments and opportunities for new business.

SMEs that were successful described how quick growth also brought challenges with it. These included staffing and management competences, new systems infrastructures needed due to successful implementation of new innovation and access to finance to support the growth. They also explained that in the highly competitive (global) market, SMEs were compelled to grow to be able to amass the scale needed to compete, which in turn, result in the challenges described above. SMEs involved in innovations therefore require additional resources.

Access to credit and funding

Access to credit was a major concern for SMEs, which was needed for new technology/machinery, to enhance competences and capacities of businesses and to finance growth and innovation strategies. Interviewees mentioned how SMEs are often disadvantaged in getting finance due to their size. They also mentioned that Venture Capitalists were interested in 'quick wins' in exchange for credit but that this does not match SMEs focused on quality and long-term growth, which is often the case in family businesses.

Availability of Skilled Staff

One of the key issues facing SMEs is the availability of staff. In addition to the need of responsiveness to technological change, and already existing skilled worker shortages in many labour market segments, the 'generational transition', the need to replace retiring work force, exacerbates the urgency to find skilled labour.

Business capacities and business strategies

Businesses need to adapt to changing business landscapes and need help in developing new business models and strategies, particularly, when they are involved in emerging industries (aquaculture, hydrogen energy, etc.).

Policy

The need for support through regulations that is timely and supportive of the changing technological and business trends mirrors the slow or inadequate regulatory conditions as perceived by businesses. Fiscal incentives to customers to support new market creation are desired, specifically for new energy sectors. Funding to support innovation is also described as being important to ease innovation risks. Education policies to increase availability of training for up-grading skills and to attract more students to technical programs are also mentioned.

6.4 Local conditions and opportunities

SMEs were asked to identify what local factors (geography, history, cultural context, etc.) are important to their business (development). This was to understand what contextual factors were important and to seek commonality in the partner regions. SMEs were asked to identify up to 3 factors.

The focus on quality, high standards and practices of doing business were shared by most SMEs (16) as well location factors (21). However, location had different dimensions, for example, North Sea/sea (9), proximity to urban centres (2), other regions (1), etc. The influence of location was in any case important.

Other factors were:

- connections to and a focus on local communities and markets (8);
- influence of culture (6);
- being a family business (4);
- business networks (5);
- presence of oil and gas (5);
- new energy developments and green policies (3);
- infrastructure – general and ports (4);
- fishery sector (2);
- technology/digitalization (3);
- previous business developments (3).

The local context of SMEs seemed to play an important role in their developments, be it cultural and business practices, location, proximity and history of energy and maritime sectors and infrastructures, policy measures or their local markets, networks and communities. The embedded nature of SMEs in their local context is an important commonality across the regions.

6.5 General Developments impacting SMEs

SMEs were asked to identify developments in energy or blue sectors that may have a positive or limiting impact on their businesses. This aspect focuses on contextual changes of SMEs from their perceptions and the potential impact it might have on their businesses.

POSITIVE DEVELOPMENTS

Common developments that were seen to be promising for their businesses were:

- modernization of the industry due to innovation/digitalization (12) with (new) certification standards (1) and stricter regulations (5);
- 'greening'/sustainability trends in the sectors (10);
- growth potential of sector (10);
- markets developments (8);
- energy transition (6).

Less common factors mentioned were:

- political changes (5);
- regional trends (1);
- workforce transition - 'generational transition' (1).

LIMITING FACTORS

Developments that were mentioned as limiting factors most across regions and SMEs were those related to regulations and sustainability trends. Following these were developments in technology and industries (in their sectors). These developments were also seen as offering opportunities as described in the previous sub-section. Below are the main factors identified that had an impact on their business:

- regulations (13);
- sustainability trends (9);
- technology developments (7);
- industry developments (4).

Other factors were limited to 1-3 mentions by SMEs and these included carbon emissions requirements, availability of finance and personnel, digitalization, consumer demands and negative image (windmills), political landscapes. These factors could be a result of local contexts or specific business issues.

6.6 *Drivers of Innovation*

On the question "*Who is driving or pushing innovation?*" SMEs indicated that customers were an important driver as were R&D and policy. Other drivers mentioned were suppliers, current trends and digitalization. The drivers of innovation questions show how external forces played an important role in decisions related to innovation strategies and actions. The table below shows their responses.

	No. of SMEs	% SMEs (36)	No. of Regions
Customers	28	78%	7
R&D	22	61%	6
Policy	21	58%	5
Other: Staff	3	8%	2
Other: Suppliers	3	8%	1
Other: Trends	5	14%	3
Other: Digitalization	1	3%	1

6.7 *Becoming future proof*

The next sections describe how SMEs were preparing for their future and what considerations were likely. They were asked to identify what was needed to be competitive. They were also asked about their likelihood of connecting to new markets, technologies, products and partners, to understand their preferences, considerations and openness to new developments.

FUTURE STRATEGIES

SMEs were asked to identify how they were preparing for their future. The most common strategies were:

- connecting to other businesses/value chain/hubs (13);
- new markets/products/projects (11);
- focus on quality/customer needs (9);
- new skills training (11);
- recruitment of skilled staff (7);
- change in scope of business (8);
- connecting to global trends (7);
- new technologies (8);
- improving business performance/capacities/visibility (8);
- new knowledge/R&D/university (7);
- traditional approach (top-down, planned) strategies (5);
- focus on first next steps (5);
- staff retention/well-being focus (2).

The need to take action was reflected in their responses, with a focus on creating new opportunities and expanding the scope of the business, to ensure competitiveness through quality and business standards and customization, keeping up trends and new developments in technology and knowledge. The appreciation of the need to focus on staff recruitment, retention and adequate competences and capacities as part of future strategies was also evident in their responses.

COMPETITIVENESS NEED

SMEs were also asked to reflect on 'what is needed to be competitive in the future?' A number of categories were offered, these being, new competences, research & innovation, additional finance and new networks and cooperation. Finance and new competences needs scored the highest with 25 SMEs each, followed by R&D with 15 SMEs and new networks and cooperation having 14 SMEs. Finance and new competences needs scored the highest with 27 and 24 respectively, followed by new networks and cooperation with 17 SMEs and R&D with 16 SMEs.

LEVERAGING INNOVATION CAPACITY

SMEs were asked to indicate if they were considering exploiting new ventures in the form of markets, through new technologies, products or partners. This was to explore what types of innovation potential SMEs would consider in their future strategies. The table below captures the outcome. All options deemed to be likely candidates for these SMEs. These SMEs were open to exploring different ways to increase their innovation capacities.

	Fife (4)	Hordaland (7)	Hamburg (3)	Antwerp (6)	Groningen (6)	Skåne (8)	Vordingborg (2)	Total
New Markets	4	7	2	5	6	7	2	**33**
New Technology	4	6	2	5	6	7	2	**32**
New Products	4	7	1	4	5	6	1	**28**
New Partners	4	7	2	5	6	7	1	**32**

The section on 'Being Future Proof' captures SME responses through the different questions asked to reflect on how SMEs are generally consisted in their responses even as there are some variations. The combination of open questions with structured ones offers SMEs to address issues that may be neglected and provide complementary insights into their future needs and strategies.

6.8 *Emerging Patterns in the last 3 years*

SMES' DEVELOPMENTS

The following sections capture developments of SMEs in the last three years as described by them. Key trends identified were increased communications through digitalization, increase in new knowledge developed or sought, as well as an enhanced and solutions-driven innovation process and finally there was an increase in new partnerships and cooperation. More internationalization was also mentioned by a number of these SMEs as a recent development.

DIGITALIZATION AND DIGITAL COMMUNICATIONS

Almost all SMEs mentioned digitalization as an emergent pattern in their business (32 of 36). A key use of digital technologies by two-thirds of the SMEs was for communication, be it for internal processes or with customers or other stakeholders. The use of digital technologies was often related to (increased) internationalization. Recruitment via digital channels was also mentioned by three SMEs as a change in the last three years.

NEW KNOWLEDGE

More than three quarters of SMEs indicated that new knowledge needs were growing and that these are addressed through the own R&D departments where these were present, but mostly through staff working on development of products, solutions, etc. They indicated that additional new knowledge was accrued through cooperation with external partners such as higher education and other network partners, be it suppliers or customers or project partners. In addition, training employees is one of the ways indicated to acquire relevant knowledge. Recruitment of new skilled staff was another strategy to add new knowledge to enhance business capacities, even as skilled labour shortages limit his process.

Another aspect of new knowledge development and sharing mentioned is the increased internal interactions to leverage and combine existing knowledge to increase multidisciplinary approaches.

Working with students and higher education are a common means to gain access to new knowledge. Some SMEs mentioned how they also connected to vocational and high schools as a longer-term strategy to help support new supply of skilled labour in the future. Similarly, new knowledge is shared by SMEs with schools and customers as a way of enhancing new knowledge across the value and educational chains. Cooperation and partnerships (below) were another means to gain new knowledge. New knowledge is also needed when SMEs venture into new international markets.

NEW PARTNERSHIPS AND COOPERATION

SMEs identified different reasons for cooperation with partners as described in the sub-section above. The main category of cooperating partners was 'other businesses' more than half the interviewees indicated that this included (business) customers and suppliers, including international cooperation. Only one SME mentioned increased cooperation with universities

explicitly in their developments *of the past 3 years*. Elsewhere SMEs have indicated that they either already work with universities or intend to do so in the future. Some of these companies have their own staff developing knowledge and innovative solutions, which also may explain the limited mention in this sub-section. Increased cooperation with policy was mentioned by only one SME as a change in the last years. Need for new technology (drone, robotics, etc.) was mentioned as a reason for changes in cooperation.

Furthermore, SMEs mentioned that there is more cooperation within the company to expand their scope of knowledge/solutions for their customers as well as internal business processes such as mergers, split from parent company or new owners that meant a revisiting of business competences and strategies.

SCOPE IN RELATION TO INTERNATIONALIZATION AND REGIONAL FOCUS

More internationalization was mentioned by half the SMEs as a change in the last 3 years. It was noted that things did not change for some SMES as they were already working internationally, namely, 71% had an international scope. New international markets mentioned were Australia, South America, China and Africa. Emerging markets seem to be offering new opportunities for some companies. Two SMEs mentioned that other European countries were new for them.

A limited number of SMEs indicated that they had an increased focus on regional or local markets (three from three different regions). It was interesting to note that in the Skåne Region, 5 (of 8) SMEs indicated that there was no change of scope in the last 3 years. One reason offered by two of these companies from Skåne, but also by two SMES from Antwerp, is that (new) internal re-organizations were dominant in the last years. In Fife County, a reason for limitations to change the scope was due to lack of availability of staff.

INNOVATION PROCESSES AND SOLUTIONS DRIVEN

A majority of SMEs (86%) indicated that there was an increase of innovation processes in the last 3 years. At the same time, some of these SMEs (7 of 36) indicated that continual changes in innovation processes were an integral part of their business. Customers or suppliers were mentioned as being an additional reason for the increased focus on innovation processes and solutions in the past 3 years (4 of 36). Other reasons offered were technology driven innovation processes, the circular economy and greening agendas.

7. Conclusions and policy implications from the interviews

The interviews set out to understand changing contexts of businesses from SME perspectives and SME responses to such changes and what was needed to support business development and innovation capacities. The conclusions drawn from the research focus on urgent challenges faced by SMEs across the 7 partner regions and common themes for cooperation and learning.

KEY CHALLENGES IDENTIFIED BY SMES

The challenges SMEs felt as urgent included the need to

- bridge knowledge gaps, given market and technological developments;
- access to credit and funding;
- gain new competences and availability of skilled staff;
- develop new business models and strategies;
- have relevant support mechanisms and regulations.

These challenges are common to all partner regions and offer an opportunity for learning and cooperation, both locally and across regions.

COMMON THEMES FOR COOPERATION AND LEARNING

The key focus of understanding urgent challenges of SMEs is to connect these to their needs in developing their businesses and to be future proof. SMEs clearly have common grounds that offer opportunities for cooperation and learning. The common themes identified are:

- connecting to new networks and value chains;
- getting access to new knowledge and competences;
- increasing innovation capacities related to markets, technology, products and partners;
- financing strategies;
- focus on quality and customer needs.

Each of these themes could serve as leverage points not only for the individual SME's business development but also as part of creating collective innovation spaces and developments that could strengthen regional transformations.

IMPLICATIONS FOR POLICY

Policy responses to changing business contexts including an urgent need for skilled labour and training are a key focus of the RIGHT project. SMEs have reinforced the growing concern of availability of skilled staff and their ability to finance upgrading of skills of current employees. Facilitation of recruitment, retention and retraining needs could be an important policy focus

for the regional and national governments of the regions. Similarly, revisiting support mechanisms for SME innovation and related financial aspects is another area for policy consideration. Finally, facilitating collective innovation spaces as a means to increase individual SME innovation capacities, cluster development and clustering initiatives could become a focus area for policy in these regions and potentially, across the regions to increase market and knowledge scope for their SMEs.

8. Epilogue

The RIGHT project, an Interreg North Sea Program, intends to contribute to growth in the North Sea Region by connecting smart specialisation strategies to human capital and skills development of the workforce in order to support competitiveness. Future-proofing the workforce, building knowledge about our industry needs and building capacity amongst our SMEs, regional governments and educational institutions are related aspects that this project explores.

As a first step, seven regional reports and this trans-regional report were produced based on desk research, work sessions and interviews. These regional reports serve both as an audit of the region for their key regional actors as well as introductory briefs to the seven participating regions to each other. These reports provide insights on the participating regions in terms of their regional innovation ecosystems, including labour market and education sector, with a specific focus on energy and/or blue sectors.

These reports will be presented and discussed in the respective regions with relevant actors including regional authorities, business associations and businesses, educational and training partners. These reports could help facilitate learning from other regions to further improve their own regional institutional and policy development due to degree of both similarities and differences present. Next to this, there is an important opportunity for these participating regions to explore how regional cooperation could support and accelerate the transitions in energy and blue sectors in their regions and the related human capital transition.

The conclusions from the trans-regional desk research (section 4) as well as the SME interviews (section 7) will inform choices to be made in the RIGHT project related to pilots (work package 4) and policies (work package 5). The collective decision-making process of the partners are in turn based on the analyses and discussions that had taken place in each of the partner regions. This methodology of working is an important part of the RIGHT project in effecting transition processes and policy development.

At the level of businesses (SMEs), the responsiveness of businesses to rapidly changing contexts is an important key to economic transitions as described in section 4. SMEs identified knowledge gaps, funding, human capital, new business models and adequate support mechanisms and regulations as key challenges they face (section 7). In the RIGHT project, pilots and policy areas will be identified to address these challenges. At the same time, businesses are embedded in their regions with their respective regional institutions and policies shaping business strategies and responsiveness (section 4). The RIGHT project therefore will not only limit itself to analysing pilots and policies at the individual firm level, but will also analyse economic and education infrastructure, including triple-helix interactions and innovation, at the regional level. This includes collaborations whereby businesses can work together to solve common challenges (section 4) but also work together to create new and improved value chains. Governments and educational institutions could play an important part in addressing

such challenges. The list below captures themes identified by SMEs for possible cooperation and learning (section 7):

- connecting to new networks and value chains;
- getting access to new knowledge and competences;
- increasing innovation capacities related to markets, technology, products and partners;
- financing strategies;
- focus on quality and customer needs.

Improving regional infrastructure for lifelong learning (section 4 and 7) is an important common challenge faced by all regions. Businesses are of course a key part of that infrastructure since most learning takes place at the workplace. However, educational institutions including schools and living labs are also a necessary part of this infrastructure and will continue to support these developments.

The challenges facing businesses and key regional players due to ongoing transitions in the energy and blue sectors but also more generally in regional economics of our regions dictate alignment and cooperation to ensure that both businesses and our regions are future-proof. The RIGHT project will continue to explore in the next phases through the pilots and policy analyses, opportunities to enhance current efforts to get this right.

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