RIGHT
RIGHT SKILLS FOR THE RIGHT FUTURE

The RIGHT Project

Regional Report on the Energy (Blue) Sector

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Introduction

This document has 4 Parts and Appendices provide additional instructions and information as needed. Contact information of the lead researchers are also found in the Appendices.

Part 1 is the Regional Innovation Ecosystems (RIE) mapping that will provide a qualitative understanding of the region's innovation ecosystem with regards to its Smart Specialization Strategies (S3) or an equivalent regional strategy. 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. In the RIGHT Project, the benchmarking tools are used for mapping the own regional ecosystems and later through this common tool to compare the findings of the different partners in the project. Part 1 is to be filled in by experts from policy from the region. Staff from the economic departments and, or innovation policy are possible candidates for the initial mapping. The conclusions of Part 1 will then be written up in the Conclusions Part of the Regional Report (see last paragraph on Part 4 of this document).

Part 2 is intended to map the innovation capacity and needs of SMEs from the chosen sector. The questions are adapted from a systemic study on cluster developments, Future of Cluster Developments, in which an analysis model was developed (Manickam, 2018). Part 2 involves face-to-face interviews with 6-8 SMEs from the sector. The outputs of these interviews are to be summarized into one template. Common themes and issues can be extracted from the interviews and included in the Conclusions Part of the report. Partners are requested to send the complied overview of all answers from the SMEs (translated to English) and sent to the research team (mail addresses in the Appendices).

Part 3 is the Job Forecasting and Skills Gaps mapping using the JOES templates provided in the Appendices. Each region is asked to choose 2 iconic SMEs, one from the 'old' and one from the 'new' type of business in the chosen sector. Specific instructions have been included in the Appendices of this document. The findings of the JOES are to be sent to the research team as indicated in the Appendices.

Part 4 is the Conclusions section. Highlights of each of the 3 analyses are to be described in this part of the report as described. The Conclusions of the analyses should be discussed in the light of regional strategies (S3) and policies in order to identify possible future directions for the sector and possibly the region as a whole. General questions have been posed to identify issues that could be included. To support and strengthen work in this part of the analysis, a panel of experts from policy, industry and academia is strongly recommended.

Part 1

Regional Innovation Ecosystems (RIE)

Part A: Socio-economic and R&D Profile

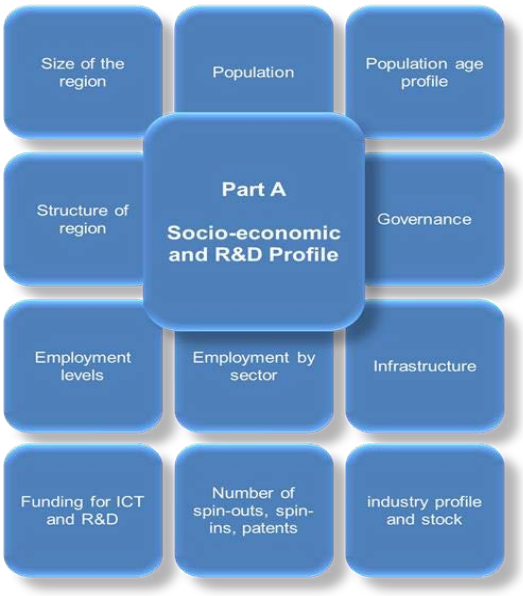

Illustration: eDigiregion Project Team (2017)

The Regional Innovation Ecosystems is an adaptation of the eDigiregion Project Team's 'Regional Innovation Benchmarking Audit' developed to support realization of the Digital Agenda in an FP7 project. The lead researcher (Bill o' Gorman) and the Spanish team provided materials and permission to build on their work. The RIGHT Project research team thanks them for their generosity and support. Details on the project to be found at www.edigiregion.eu

Region's Socio-economic and R&D Profile

General information of region

In terms of land area, Skåne county is the 10th largest county in the country. The county consists of 33 municipalities and has a land area of 11,035 square kilometres, which is about 3 per cent of Sweden's total land area.

Geographic location of region: **Region Skåne**, the southernmost part of Sweden, between:

Latitude 55.6144, longitude 12.9882 (Malmö)

Population: **1,362,164** (2018-12-31) Area of region: **11,035** km^2

Governance of region: **149 members** sit in the regional assembly. The regional assembly appoints the **regional executive board** which consists of **15** members and **15** deputies. Beneath the regional assembly and **regional executive board** are **committees, councils and boards** which are responsible for implementation of the guidelines, directives and objectives that have been produced by the regional assembly.

Structure of region

(For example, number of sub-regions/counties, number of large urban areas, whether the region is predominantly urban/rural, industrial/agricultural/public sector oriented)

Employees by residence: **599,105** (2017)

Employees by place of work:

-A agriculture, forestry and fishing: **12,139** (2%)

-B+C manufacturing and mining: **57,121** (9.5%)

-D+E energy supply; environment: **5,768** (1%)

-F construction: **43,953** (7.3%)

-G commerce: **81,589** (13.6%)

-H transport and warehousing: **28,797** (4.8%)

-I hotels and restaurants: **19,499** (3.3%)

-J information and communication: **21,066** (3.5%)

-K finance and insurance: **7,921** (1.3%)

-L property: **11,075** (1.8%)

-M+N business services: **71,057** (11.9%)

-O public administration and defence: **31,067** (5.2%)

-P education: **72,011** (12%)

-Q health and medical care, social services: **102,496** (17.1%)

-R+S+T+U cultural and personal services etc.: **26,362** (4.4%)

-00 unknown: **7,184** (1.2%)

Municipalities covering region Skåne:
- Region Skåne consists of 33 municipalities. In order of magnitude, Malmö, Helsingborg, Lund and Kristianstad are the largest municipalities.

Infrastructure profile

	Size/type/quantity	**Comment**
Broadband	Both fibre and fibre-LAN Proportion of households in Skåne county – 69.7% Proportion of workplaces in Skåne county – 61.8% (2017)	95% of households will have 100 Mbit/second by 2020
Other ICT infrastructure		
Seaports	6 active commercial ports in Skåne. These account for about 20 per cent of the total volume of freight that passes through docks in all Swedish ports.	The largest ports are Trelleborg, Malmö, Helsingborg and Ystad.
Airports	3 airports for scheduled services in order of magnitude according to number of passengers: (2018) Malmö Airport: 2,147,916 Ängelholm Airport: 403,150 Kristianstad Airport: 28,863 Of these, only Malmö Airport handles a significant amount of air freight.	Copenhagen Airport, Kastrup, is also important for air freight in the region.

Roads Motorways	396 km European highway 725 km National highway	Skåne is crossed by the European highways E4, E6, E20, E22 and E65
Roads Secondary	658 km Primary road 5,193 km Other major road 683 km Other major road with OG (oil gravel)	
Public transport - railways	71 active train stations (2017).	
Public transport – bus		

Household and age distribution profile

Household expenditure as % of national average: N/A
Household income as % of national average (2017): Median SEK 258,633 thousand / SEK 278,954 thousand

*Age distribution (2018-12-31)	**< 14**	**15-29**	**30-49**	**50-64**	**>65**
Male	127,675 (9.4%)	128,615 (9.5%)	180,092 (13.3%)	120,597 (8.8%)	122,926 (8.8%)
Female	120,479 (8.8%)	123,654 (9.2%)	175,153 (12.9%)	119,942 (8.8%)	143,031 (10.5%)

*Age distribution is an aggregation of the population within the specified ages.

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Employment profile

Total population in employment: **599,105*** (2017)

*The figures are based on an amalgamation of the gainfully employed day population (aged 16+) as well as the employment intensity (aged 20–64) – 2017.

Participation rates in employment: Total **74.3%** (2017)

Men: **75.2%**

Day population 307,022

Women: **73.4%**

Day population: 292,083

Employment by sector (2017)

Sector	*% Regional GDP	% of total employment	Comment, e.g. targeted growth sector (S3)
Public	25,359	5.2%	Public administration and defence
Energy – traditional	68,070	9.5%	Manufacturing and mining
Agriculture	5,899	2.0%	Agriculture, forestry and fishing
Energy – new	17,234	1.0%	Energy supply, environment
Healthcare	62,411	17.1%	Health and medical care, social services
Services - Financial	11,162	1.3%	Finance and insurance
Other (specify)	35,515	7.3%	Construction
Other (specify)	66,627	13.6%	Trade
Other (specify)	29,103	4.8%	Transport and warehousing
Other (specify)	8,664	3.3%	Hotels and restaurants
Other (specify)	31,101	3.5%	Information and communication
Other (specify)	45,688	1.8%	Property
Other (specify)	62,926	11.9%	Business services
Other (specify)	14,477	4.4%	Cultural and personal services etc.
Other (specify)	34,153	12.0%	Education
Other (specify)	65,975	1.2%	Unknown

*Southern Sweden, SE22. No current percentage available, of which entered in SEK million (SEK).

Numbers employed by qualification level: (2017)

Post-secondary education, less than 3 years	Post-secondary education, more than 3 years	Postgraduate studies	*Proportion of highly educated
106,825 (15.6%)	179,813 (26.3%)	10,103 (1.5%)	296,741 (43.4%)

*Proportion of persons is aggregated from less than 3 years post-secondary education in the age group 25–64 with post-secondary education, more than 3 years and also with postgraduate studies

Retention rates of graduates in region**: N/A**

Education profile

Total population in education: **412,375*** (2017/18)

-Preschool, all head teachers (municipal, private and the county council's operations): **16,088** (2017/18)

-Comprehensive school, all principals from classes 1–9: **139,965** (2017/18)

-School for children with learning difficulties, all principals: **1,322** (2017)

-Upper secondary school, all principals and specialisations: **45,731** (2018/19)

-Municipal adult education with SFI, (Swedish as a Second Language) all principals who participated in the programme: **23,886** (2017)

-Municipal adult education without SFI, (Swedish as a Second Language) all principals who participated in the programme: **107,361** (2017)

-School for adults with learning difficulties, (special education for adults) all principals: **470** (2017)
-Folk high-school courses: **8,817** (2017).

-Total number of students in region Skåne's colleges and universities: **68,735**** (2017/2018).
-Lund University: **34 831** students (19,556 women and 15,275 men).
-The Swedish University of Agricultural Sciences: **5,194** students (3,524 women and 1,670 men)
-Malmö University: **17,284** students (11,738 women and 5,546 men)
-Kristianstad University: **11,426** students (8,065 women and 3,361 men)

*Relative estimation based on the fact that the individuals in the population are not included twice.

**Includes students and non-graduates, postgraduates, university access students or access students at certain colleges.

Percentage Full-time: Maximum 100% Part-Time: Minimum 25%

Participation rates in education: **N/A**

Number of students by level: (2017/19)

*Primary	**Secondary and Tertiary	***Vocational	****Further education
139,965	45,731	8,817	68,735

*Number of pupils/students in years 1–9 academic year for all principals (2017/18).

**Number of students at upper secondary school (vocational programmes, university access programmes, introductory programmes) for all principals (2018/2019).

***Number of participants in folk high-school courses (2017).

****The figures are based on an amalgamation of all students at Lund University, Malmö University, the Swedish University of Agricultural Sciences and Kristianstad University (2017/2018).

Dropout rates by level: There are no region-specific dropout rates. However, there are statistics for 2012 in relation to NEET (information about young people who are neither working nor studying). For region Skåne, population aged between 20–25, the figure is **14.5%.** In comparison with the national figure it is **12.5%.**

Number of Higher Education Institutions:

University		Institute of Technology		Technological University		University
Public	Private	Public	Private	Public	Private	
*4						**1

*Malmö College has become a university.
**Kristianstad University.

Research and innovation profile

Number of Research Centres: (2019)

Public	Private
*38	

*The figures are aggregated and based on some of the major national and international research centres and institutes at Lund

University (32): Malmö University (5) and the Swedish University of Agricultural Sciences (1).

Number of Incubation Centres:

Public	**Private**
*7	

*A broad spectrum of incubators in Skåne. There are seven incubators that have constituted the base.

Industry stock: (2018)

~~**MNEs**~~ (+200 employees)	**SMEs** (10-199 employees)	**Micro** (1-9 employees)	**0 employees** (includes self-employed)
238	10,407	41,763	103,366

Industry stock by sector: (2018)

Sector	~~**MNEs**~~	**SMEs**	**Micro**	**0 employees**	**Comment**
Public	24	289	143	50	Public administration and defence; mandatory social insurance
Energy traditional & new?)	2	114	214	409	Extraction of minerals; Supply of electricity, gas, heating and cooling; Water supply; sewage treatment, waste treatment and sanitation
Manufacturing	44	849	1,906	3,552	Manufacturing
Agriculture	0	143	1,675	18,147	Agriculture, forestry and fishing
Healthcare	45	1,467	2,413	3,325	Medical and healthcare; social services
Services - Financial	6	119	656	2,043	Finance and insurance
Other (specify)	9	863	4,702	6,886	Construction
Other (specify)	13	1,775	7,796	10,623	Commerce; Repair of motor vehicle and motorbikes.
Other (specify)	22	494	1,711	1,687	Transport and warehousing
Other (specify)	1	537	2,348	1,670	Hotels and restaurants

Other (specify)	13	346	2,194	4,958	Information and communication
Other (specify)	1	185	2,269	11,210	Property
Other (specify)	2	222	1,476	7,509	Culture, entertainment and leisure time
Other (specify)	0	0	62	701	Unknown
Other (specify)	15	1 532	1 110	2 948	Education
Other (specify)	2	236	2 053	7 354	Other service operations
Other (specify)	19	712	7 211	16 816	Activities within law, economics, science and technology
Other (specify)	20	524	1 823	3 477	Letting, property services, travel services and other support services

R&D Investment: (R&D is reviewed biennially)

Source of R&D funding	2017	2016	2015	2014	2013
Total Government spend on R&D in region	SEK 18,266 million		SEK 16,344 million		SEK 17,566 million
% of national R&D spend	11.7%		-		-
Private sector spend on R&D in region	-		-		-
% of national R&D spend	-		-		-
*Total EU R&D funding coming into the region	15,128		14,156	13,047	13,364
EU R&D funding as % of EU funding nationally	3.327%		3,264%	3.143%	3.303%

*Stated in millions of American dollars.

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Regional Innovation Ecosystems

Part B: SWOT Analysis

Illustration: eDigiregion Project Team (2017)

Theme: Technology Orientation

How would you describe the technological orientation of the region?

Overview:	
Strengths - Capacities & capabilities	•There is a high level of technical expertise in the region today. A higher level in terms of technical know how than, for example, business development.
Weaknesses - Issues that need to be addressed	•Extensive expertise today but the challenge facing us is that this knowledge is not being replenished going forward. The older generation who possess much of the expertise is retiring, and the younger generation is showing little interest in educating themselves in the industry.
Opportunities - Potential for innovation/S3 focus	•We have no idea today how the future needs for skills will pan out. There may well be a demand for local production and keeping production close by. •We have the future option of inshoring production, something that is currently taking place across other parts of the world. •Scandinavian companies have proven to be able to adapt their business operations in line with demand and in order to survive. This is positive for future changes in the manufacturing industry. •Environmental engineering •The future development of the sharing economy
Threats - Constraints to be addressed	•One scenario is that manufacturing in the region will be phased out in the future. This can be regarded both as an opportunity and a threat. •Greater technical skills will be required in the future and here there may be a shortfall. •Weak interest in the industry among young people in the region.

General comments/Observations *(Technology Orientation)*

Theme: Regional Attractiveness

How attractive is the region to/for:

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Investors	•Great appeal (depending on the investors we are referring to). •The proximity to Copenhagen and the continent		•The proximity to Copenhagen and the continent •Business cycle	•The larger companies are not based in Skåne but in the capital. •Business cycle
Researchers	•Great appeal. Largest research facilities in Sweden: Max IV laboratory & European Spallation Source (EES) in Lund. In terms of volume, there is nothing that is comparable close to the region.	•It can be difficult convincing the industry and academy to collaborate when it comes to large-scale projects. •For a researcher, there is an identified difficulty in	•There are opportunities to be had over the next 10 years that we are unable to utilise today. •A more coherent partnership between industry and academia could generate more research funding via	

		accepting a research post in the region due to family situation. •Questions such as Who researches for whom? Who owns the results and the patent? is being discussed.	Vinnova for example (see development in the Västra Götaland region) •Industrial phD students.	
Innovators	•The region has a history of innovation with an arena that makes the region attractive. Skåne has a strength in that it is small in terms of area and that many support functions are already in place. Available networking opportunities. •Incubators - SmiLe		•If we specialise at a regional level, we give ourselves the chance of being attractive for companies to have a presence here. The capabilities that are in place in the region need to be identified and it is key not to spread ourselves too thin. •The proximity to Copenhagen and the continent	
Inventors				
Entrepreneurs		•Global skills shortage, where the industry may be hit harder.	•If we specialise at a regional level, we give ourselves the chance of being attractive for companies to have a presence here. We need to	

			identify the abilities that we possess and not spread ourselves too thin. •RISE has chosen to relocate parts of its business to the region as it is a region undergoing development. •The industry has the opportunity to attract skills such as game developers who do not regard the industry as their workplace today.	
Multinationals	•The proximity between Malmö and Kastrup is an appealing attribute for the region •A region in development is a region that appeals. •Innovation work is prioritised in the region, which contributes to bringing the multinational companies here.	•Many foreign-owned, multinational companies struggle to highlight the appeal of Skåne.	•If we specialise at a regional level, we give ourselves the chance of being attractive for companies to have a presence here. The capabilities that are in place in the region need to be identified and it is key not to spread ourselves too thin.	•If we can provide multinational companies with tools to highlight the appeal of Skåne, this could have a major impact. One way is to generate the potential for live test beds, where companies can develop, and then spread the message about innovative environments in Skåne.
Indigenous enterprises				

ICT Professionals				

General comments/Observations *(Regional Attractiveness)*

Theme: Policy

What is the basis of policy in the region?

	Regional	National	European
RTD	•The open Skåne 2030 – Skåne´s regional development strategy (RDS); the strategic environmental programme •Climate Cooperation Skåne •Strategy for the sustainable goods and logistics region Skåne •Regional Cluster Development programme 2017-2021	•Regulatory letter for the financial years regarding appropriation 1:3 - RISE Research Institutes of Sweden AB •Government letter 2017/18:262	
Innovation	•RDS; the strategic environmental programme •Climate Cooperation Skåne •Strategy for the sustainable goods and logistics region Skåne • Regional Cluster Development programme 2017-2021 •An International Innovation Strategy for Skåne 2012-2020 •Research Policy Region Skåne •Vinnova	•Regulatory letter for the financial years regarding appropriation 1:3 – RISE Research Institutes of Sweden AB •Research policy national level	
Enterprise	•RDS •Climate Cooperation Skåne •Strategy for the sustainable goods and logistics region Skåne •Regional Cluster Development programme 2017-2021 •An International Innovation Strategy for Skåne 2012-2020 •Vinnova	• Regulatory letter for the financial years regarding appropriation 1:3 – RISE Research Institutes of Sweden AB •Efficient, high-capacity and sustanable freight transport – a national freight transport strategy •For sustainable digital transformation in Sweden – a Digital Strategy •Industry 4.0/	
Entrepreneurship	•RDS •Strategy for the sustainable goods and logistics region Skåne	•Industry 4.0 •Directive Ministry of Enterprise and Innovation	

	•An International Innovation Strategy for Skåne 2012-2020 •Regional Cluster Development programme 2017-2021		

What are your views on the effectiveness of these policies?

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
En internationell innovationsstrategi för Skåne 2012-2020 An international innovation strategy for Skåne 2012-2020	•There is a driving force in the region for innovation with the potential for companies to receive support and funding to back their innovation work. •The strategy has three smart goals that are just about achievable. There is a certain point to the strategy not being all too governing as this allows for some reactivity. •The strategy delivers a common theme for how the various actors involved are to work with innovation in the region. •Having RIGHT as the underlying factor makes it easier to reach companies.	•The current international innovation strategy does not set goals that are sufficiently clear and measurable resulting in poor goal achievement. •The strategy has not been utilised by stakeholders as we have not identified the link between the Region and entrepreneurs hip. Funds need to be allocated in order to invoke a response from the companies. •The strategy is restrictive	•One successful aspect of the strategy is the work that is being conducted with clusters in the region. It is not the strategic goals in themselves that are achieved but the way of working that has been transferred to the work with clusters. •The current international innovation strategy does not set goals that are sufficiently clear and measurable resulting in poor goal achievement.	•The best before date expires once the strategy is written. The identified areas of strength have regressed since Region Skåne highlighted them as strengths. This is an area that the Region is incapable of controlling. •The strategy is restrictive when it comes to skills, which has been allowed for in the future strategy. •Sweden is at the forefront in terms of innovation, but at the same time the region has regressed in terms of position on the international stage.

		when it comes to skills.		
Regionalt klusterutvecklingsprogram 2017-2021 Regional cluster development programme 2017-2021	•Provides a direction and clarity in what we should be working on and how. Clarify the frameworks and areas in which we should concentrate. •Here we are one step closer to the entrepreneurs than the strategy above. •Long-term - guaranteed 5-year funding - which is unique in the world. The long-term work is a strength for Skåne when comparing to other European regions. •Is the policy obsolete as soon as it is written? No, it is not obsolete but may well look the same for 20 years to come. Provided that industries are organised in the same way as they are today.	•In 2-3 years time, the clusters will look different, where the number of clusters and their inclusion may change.	•With governance from Region Skåne, the various clusters can develop a better collaborative understanding, and thereby actualise the designated S3 areas.	•That the cluster initiative in the region is not sufficiently inclusive. There are several companies that could be involved in clusters. •There are intra-regional differences in Skåne; some parts of the region are at risk of being left behind. •Public funding that is too large and targeted can have an overbearing effect.

General comments/Observations *(Policy)*

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Theme: Triple Helix

Triple Helix actors	
Region Skåne	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.
Skåne's 33 municipalities	Skåne County is the tenth largest county geographically in Sweden and home to just over 1.3 million people.
Universities in the region	Malmö University, Kristianstad University, Lund University, Swedish Agricultural University, SLU Alnarp, World Maritime University (WMU) in Malmö
Higher Vocational Education (HVE)	Higher Vocational Education is a post-secondary form of education that combines theoretical and practical studies in close cooperation with employers and industry. Programmes are offered in specific fields where there is an explicit demand for skills.
Cluster initiatives	Cluster initiatives play an important role as growth engines and promoters of innovation regionally, nationally and internationally.
Skåne County Administrative Board	Authority working on behalf of the Swedish government and parliament. It invests SEK 4.5 billion and passes 70,000 governmental resolutions in Skåne's interest every year.
Tillväxtverket – Swedish Agency for Economic and Regional Growth	National authority with regional presence in nine locations. Vision: "A Sweden with more companies that want to grow and have the capabilities and courage to do so".
Almi	Almi Företagspartner AB is owned by the state and is the parent company of a group comprising 16 regional subsidiaries and the sub-group Almi Invest. The regional subsidiaries are 51 per cent owned by the parent company and 49 per cent by regional owners and offer loans and business development. Almi Invest AB is wholly owned by the parent company and conducts venture capital activities.
Vinnova – Sweden's Innovation Agency	State innovation authority based in Stockholm.
Boverket – National Board of Housing, Building and Planning	Boverket is the authority charged with community planning, construction and housing.
Business Sweden	Business Sweden is commissioned by the Government to help Swedish companies grow global sales and international companies invest and expand in Sweden.
RISE	Sweden's largest research institute
The Research and Innovation Council in Skåne FIRS	Aims to improve the conditions for research and innovation in Skåne by encouraging increased and more in-depth interaction between politics/public activities, academia and the business sector.

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Authorities	•Energimyndigheten – The Swedish Energy Agency – is pressing ahead for the energy transition into a modern and sustainable, fossil free welfare society.
	•Transportstyrelsen – The Swedish Transport Agency – the Swedish maritime authority
The industrial private sector	The region works with certain anchor companies. The big companies do not need our support. But the smaller companies need the larger companies.

How would you define the level of engagement between the Triple (Quadruple) helix partners in the region?

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Government → Industry	•Is the public sector being used as a strategic partner to strengthen the companies? Naturally, as Region Skåne is funding SMTF. •For example, Region Skåne is looking at food waste to influence the industry accordingly. •Region Skåne responds to manufacturing companies in a variety of contexts, for example via the skills council.	•The maritime sector has been left behind. Could this be because as an industry it does not have to be described as it is today? Certain industry expressions are reactive.	•Should Region Skåne be more business-oriented? And we are not referring to an industry day as the answer. Does the Region need to create a better understanding in its day-to-day work, for example, by sitting on a range of corporate boards?	•It is not part of Region Skåne's brief to work close to companies as SMTF conducts this work on behalf of the Region, for example.
University (HEI) → Industry				

Government →University (HEI)				
Government →University (HEI) →Industry	•There are some researchers that work closer to the business sector than others, but they are few in number. •The clusters facilitate contact between the industry and academia/the Region. RISE is the meeting place.	•The actors have different target scenarios, where those in research do not see any benefit in talking to the business sector. Which in itself is a symptom of the fact that the academic world is not sufficiently close to reality and that they are too remote from business. •Research must be objective and must not be influenced. •Researchers manage their research in line with their funding. •Some inherent doubts concerning innovations that (in the short term) could lead to costly changes for the public sector(region)	•The potential is huge. •Region Skåne wants to incorporate application into its research projects and involve the business sector at an early stage of the process. There is an growing demand for this from the business sector. •Researchers manage their research in line with their funding. •That the authorities attach more clarity to the universities and act as bridges between the business sector and the universities without governing the research too much.	•Universities are taking up too much space and they are failing to keep pace with the demands of the business sector. •“Should you research what society needs or what the researchers want?” “Should you educate yourself in what society needs or what you want for yourself?” •A certain risk of corruption in the peripheries between the public sector (the region) and the business sector.

Government→University (HEI) → Industry → Civil Society				

General comments/Observations *(Triple (Quadruple) Helix)*

Theme: Entrepreneurial environment (1 of 3)

Describes the region's entrepreneurial environment

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•Verksamt.se •Almi •Ung Företagsamhet (UF) – Junior Achievement	•Identifying the right way to proceed and being guided through the maze by various support functions. There is no seamless solution to the right guidance, although verksamt.se is one attempt. But there are not many who know about those who start-up a business.	•Skåne Startups. •The greatest impact can be created by supporting existing companies to tackle ideas that have been deprioritised by the companies due to lack of time and so on.	
Ease of starting a business in the region	•Skåne is generally in the top three in Sweden for most new start-ups per capita. •Support systems are in place at the start, not specifically for the manufacturing industry but covers the need.	•Business concept potential •Who is the one starting the business, and who is behind it?		
Enterprise supports available for start-ups	•Support systems are in place.	•Hard to find the right path in the support system		

Enterprise supports available for growth	•Support systems are in place. •Support is always available, and a lot of work and time may be required from the company to find the support that is available.	•Difficulty navigating through the various support functions		

Theme: Entrepreneurial environment (2 of 3)

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Enterprise support available for internationalisation	•Clusters and Business Sweden that can help with contacts, support in applications, agreements and book meetings and create connections with business organisations in other countries.	•The support is difficult to navigate. There is no direct seamless solution between the actors, without any opportunity to move on.		
Availability of finance for start-ups	•Almi •A long-term sound business concept has greater potential for funding.	•Many companies are looking for funding, but not everyone is looking for funding that has gone through the steps that are required before it becomes a reality.		•Region Skåne needs to adopt a more active role. Today, there is no all-encompassing strategy for how the Region is to work with funding. •There is a high risk involved here which means more limited opportunities for funding than for growing.

Availability of finance for growth	•Business technology network •Tillväxt Malmö – Growth Malmö – business advice that helps companies grow •Business development checks (Tillväxtverket – Swedish Agency for Economic and Regional Growth) •Almi •Possible wealthy people in the region.	•Many companies are looking for funding, but not everyone is looking for funding that has gone through the steps that are required before it becomes a reality.	•New bank regulations	•Region Skåne needs to adopt a more active role. Today, there is no all-encompassing strategy for how the Region is to work with funding. •Existing bank regulations.
Availability of finance for internationalisation	•Export credits •Almi invest – venture capital for your company	•Many companies are looking for funding, but not everyone is looking for funding that has gone through the steps that are required before it becomes a reality. •Unclear what opportunities are available to companies to apply for funding.		•Region Skåne needs to adopt a more active role. Today, there is no all-encompassing strategy for how the Region is to work with funding.

Theme: Entrepreneurial environment (3 of 3)

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Entrepreneurship education at primary level	•Initiative during the school years such as Snilleblixtar(Flashes of genius) Blixtlåset (Young innovators), Ung företagsamhet (Junior Achievement) – initiatives that all aim to enhance the creativity and entrepreneurship of young people.	•Weakness not to see entrepreneurship as a profession.	•By utilising the creativity and entrepreneurship of young people at an early stage you create the platform for future innovations.	•It is up to each school and individual enthusiasts when it comes to what they want to get involved with.
Entrepreneurship education at second level	•There is no dedicated education on Entrepreneurship taught at upper secondary level. However, Ung företagsamhet (Junior Achievement) is a well-developed concept in many schools.	•Weakness not to see entrepreneurship as a profession.	•At upper secondary level, the focus is more about entrepreneurial learning to improve knowledge about running companies and developing •By utilising the creativity and entrepreneurship of young people at an early stage you create the platform for future innovations.	•How do people in the region benefit from those who show an interest in entrepreneurship?
Entrepreneurship education at higher level	•There are individual courses at universities designed for university students to study to	•Weakness not to see entrepreneurship as a profession. •There are no targeted courses	•A basic education with an add-on covering entrepreneurship creates the right	•In Sweden there is no option of studying a university programme and then working in another area in the

	develop their business acumen. • Although there is no direct entrepreneurial programme at the university, there are several different, specific courses in entrepreneurship.	that are designed to inspire and provide the knowledge to start a business.	conditions for innovation.	same way as you can in other countries. Here, a comparison was made with England.
Entrepreneurship education for entrepreneurs	• Incubators and Science parks • Almi for entrepreneurs			

General comments/Observations (*Entrepreneurial environment)*

Theme: Innovation ecosystem

How would you describe the region's innovation ecosystem?

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•Region Skåne works with innovation for operating companies via IUC South and SMTF. •SMTF is part of the research institute RISE, where all disciplines are centralised at a joint office in Skåne. Attractive and unique in comparison with the rest of Sweden. •Region Skåne maintains a high level when it comes to cluster work and policy formulation, which are two crucial •Region Skåne has funded the Maritime Knowledge Centre in Malmö for a long period of time, which has now begun to deliver innovations. – "We need to let innovation run its course". aspects for successful innovation work in the region. •Science parks & Incubators; Krinova. •Big Science Sweden	•Understanding each other's worlds. Linked to Triple Helix – how does the region get this to work? •Innovation must run its course. •The research process is too long in Sweden, too little takes place that might be of interest the business sector. Sweden and Region Skåne need to be better at not being afraid to take the steps to close a deal even if the area has not been fully explored.	•Is it necessary for all municipalities to have their own innovator? •In comparison with other countries, Sweden needs a subsidised business-driven corporate innovation process. Denmark is the early runner, together with Germany and China.	•Sweden is at the forefront in terms of innovation, but at the same time the region has regressed in terms of position on the international stage. (What position is being referred to?). •The region has many active development projects in progress over a long period of time in comparison with our neighbouring countries that are more proactive and make things happen. We are weak in terms of commercialisation

	•Innovation checks as instruments for promoting innovation.			
What is/are the mechanisms for doing research in the region?	•Research is conducted primarily at universities, and at RISE (Research Institute of Sweden), as well as at the two major research facilities ESS and Max IV.	•The researcher is not interested in running a business but wants to research. •The region has several active development projects that extend over a long period of time.	•Innovative procurements. •The innovation strategy for Skåne should be followed by a Tech Transfer that leads to business. •"Learning by doing" and that we learn from what goes wrong. This would enable faster processes, "fail forward". •Huge potential realised with the investments in the research facilities in Lund: ESS and Max IV	
What is the commercialisation process for research in the region?				
How easy is it for industry to engage with research centres?	•There is good potential at a regional level, as high-level research is being conducted in the region. •There are opportunities for students to engage in work-based training.	•The research is conducted too remotely from the companies. Colleges/universities need to come to terms with the "right" questions where possible •Difficult to involve companies if there are no secure	•Clusters help create meeting places between researchers and the business sector that generate the opportunities for collaborations. There is tremendous potential for facilitating these meetings, and the parties frequently	•If there are no incentives to invest financial resources on the exchanges between research and the business sector, the chance of collaborations between research and the business sector will probably not be feasible.

		purchases in the future.	engage in interesting discussions and collaborations.	
How easy is it for HEIs to engage with research in industry?	•No obstacles, it is relatively easy and the will is there from both industry and colleges/universities.	•Find meeting places for the parties to get together. It is difficult to get the business sector to come and listen to the researchers, and vice versa.	•Clusters help create meeting places between researchers and the business sector that generate the opportunities for collaborations. There is tremendous potential for facilitating these meetings, and the parties frequently engage in interesting discussions and collaborations.	

General comments/Observations (*Innovation ecosystem)*

Theme: Clusters and Networks

This theme has two aspects:

- *Clusters* refers to groups of **sectors/industries** (e.g. ICT cluster, biomedical cluster, pharmaceutical cluster, etc.)
- *Networks* refer to **connected groups** such as Chamber of Commerce, specific sectoral networks (active engagement and sharing of knowledge between members evident), or **business associations** (e.g. Women in Business Network, Small Firms Association, etc.).

*NB: choose the specific cluster your region is analysing energy/blue sector/maritime**

Theme: Clusters and Networks (1 of 3)

Describes clusters and specifically energy* clusters in the region

Swedish Marine Technology Forum: SMTF	**Strengths** - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•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 Sweden's largest research institute RISE, Research Institutes of Sweden under the Maritime Research section.	•Being part of RISE involves both potential and difficulties. SMTF has grown slower but at the same time they have a different proximity to the actors involved. •We acquire marine technology but the owners of needs are shipowners or offshore. •Funding is a difficulty, ensuring a long-term	•Large-scale industry in Sweden •Being part of RISE involves both potential and difficulties. SMTF has grown slower but at the same time they have a different closeness to the actors involved. •SMTF's members leverage the most when they themselves are engaged and	•Invisible industry.

	•Cutting edge skills in maritime and green technology. •National cluster	perspective in a project format.	active in projects and SMTF is not.	
Support from government	•Region Skåne has a productive and proactive cluster strategy in the Regional Cluster Development Programme 2017-2021.	•The cluster strategy is not sufficiently inclusive. •Long-term funding from a policy perspective. •Funding from multiple regions. •Demarcation between different clusters.	•A national cluster strategy	•Region Skåne is surrounded by water on three sides but has no maritime strategy. •SMTF is dependent on support from Region Skåne •Absence of a national cluster strategy
Nature of cluster participants	•Manufacturing industry with a focus on the blue sector	•Exposed sector that is finding it increasingly tougher in particular with the recruitment of skills.		

IUC Syd	**Strengths** - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•IUC Syd contributes by enhancing competitiveness and renewal capacity for industrial and technology companies in Skåne. •IUC Syd is a meeting place and member organisation that is designed to strengthen the competitiveness of the members on the regional, national and international stage. •IUC Syd possesses a wealth of knowledge in business and skills development. Which there is a need of at many of the manufacturing companies in the region. •The national IUC network gives IUC Syd the opportunity of learning from what works in other regions. At	•Lack of time. To reach out to everyone and provide information on what we can contribute. •The short-term perspective of working in a project format. •All companies in the region do not see the long-term value of participating in, and investing some of their time in the cluster.	•That IUC Syd becomes more independent and enables our members to become more involved in influencing the projects. •E-mobility •Circular economy	•Funding opportunities from the public sector dissipate, which would reduce the possibility of the initiatives that the cluster contributes to today, where minor funds are multiplied many times over through the initiatives and the long-term impacts at the companies.

	the same time, it allows IUC Syd the opportunity of being part of national support projects.			
Support from government	•Region Skåne has a productive and proactive cluster strategy in the Regional Cluster Development Programme 2017-2021.	•The cluster strategy is not sufficiently inclusive •Long-term funding from a policy perspective •Funding from several different regions	•National cluster strategy •Funding from several different regions	•Absence of a national cluster strategy •Demarcation between different clusters.
Nature of cluster participants	•Manufacturing industry and technology companies in Skåne			

Theme: Clusters and Networks (2 of 3)

Swedish Marine Technology Forum: SMTF	**Strengths** - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Level of cooperation between cluster participants		•SMTF has difficulty in knowing how much cooperation is taking place between its members.	•There is interest in activities such as breakfast meetings on the part of the members. •There is interest in cooperation even though the members are today competitors. •Facilitates meetings between Triple Helix actors.	
Level of Internationalisation of cluster participants	•The cluster does not work with internationalisation, but the maritime technical cluster is international.	•There are difficulties in that the customers are not located in Sweden. In business terms, we should be in a different place/country: where the business is taking place.		

Level of integration of the cluster within the regional innovation system	• Participates in Region Skåne's cluster strategy and cluster programme.		•Possible addition to the membership that municipalities have in IUC Syd.	•The division into SMTF and IUC Syd? There is a willingness for the cluster structure to develop.
Influence of the cluster on R&D activities	•It is strong. The cluster should increase the degree of reserach and development- that is evident in the membership. SMTF is a competence enhancement in the members´ innovation phases.	•Finding the right contacts.	•Increase interest by clarifying the cluster's way of working. •SMTF sees that there is a clear will and a need for the members to be part of the cluster. •Funding opportunities for innovation- there are really no restrictions and many members can afford to invest.	• SMTF should cover the distance between business and research, but there are limitations that make it difficult.

IUC Syd	**Strengths** - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Level of cooperation between cluster participants	•Opportunities for collaboration and the exchange of experiences are created through the networks and the meeting places that IUC Syd offers its members.	•IUC Syd has difficulty in knowing how much cooperation is taking place between its members.	•Facilitates meetings between Triple Helix actors .	

Level of Internationalisation of cluster participants	•IUC Syd creates the opportunity and redirects to the right actors. IUC Syd can learn lessons and acquire contacts. •By way of example, IUC Syd can offer companies to other countries.		•The potential for internationalisation is facilitated through cluster cooperation with other countries and participation in international projects.	
Level of integration of the cluster within the regional innovation system	•IUC Syd maintains a high level in Region Skåne with 10 active member municipalities and some 140 member companies. •Participates in Region Skåne's cluster strategy and cluster programme.	•The cluster is in place and a difficulty is created in that the Region is investing more and more into the cluster; is this effective? •Including the municipalities in the cluster, in their everyday life, is not that obvious that this should be a central tool for them. In the majority of municipalities, they are not talking about clusters and they are not familiar with the regional cluster development programme.	•Difficulty in clarifying the cluster strategy from the Region, there is an opportunity to clarify it Smart. •Highlight the clusters as the key partner to work with innovation. •Is it the case that the cluster is responsible for the assignments that the municipality has with the business sector and skills development?	•The division into SMTF and IUC Syd? There is a willingness for the cluster structure to develop.

Influence of the cluster on R&D activities	• Collaborations with the universities in the region, close partnerships and joint activities with RISE and runs the network organisation Big Science Sweden, which works to improve the delivery capacity of Swedish manufacturing companies to the European research facilities. Improved learning and knowledge are created through these collaborations, which will benefit the member companies.	• Does not conduct its own research, but can only connect with other actors.	• There is huge potential through the collaboration with Big Science Sweden and RISE, where the entire Swedish and European research area are opened up for the member companies of IUC Syd.	

Theme: Clusters and Networks (3 of 3)

Teknikcollege	**Strengths** - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•Currently 8 municipalities with 11 certified training courses. 11 new courses to be added up until 2023. •Works with education for young people, adults and those outside the labour market. •Quality-assured collaboration between educational coordinators, the business sector and local authorities	•To encourage municipalities and municipal politicians to not be afraid of investing in the Technical college in times of major savings	•Every year, run the innovation competition Blixtlåset, a competition in innovation for high school youth. •In-service training through Snilleblixtarna's Friends in creative and innovative power with regard to technical and scientific solutions	•Too few applicants resulting in the closure of the Industrial Engineering programmes in upper secondary school. •There is overproduction for certain courses that is detrimental to the Technical college. •The free school choice is a restriction
Support from government	•A regional steering group and 6 local steering groups		•Equipment that the Technical college can contribute with that improves technical know-how	
Network participants	•167 collaborative companies that have signed letters of intent		•The panel consists of entrepreneurs who engage in the competition as well as representatives from LTH, MAU and BTH.	

Internationalisation of the networks in the region				

Big Science Sweden	**Strengths** - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•High level of expertise in business development and technology.	•Companies with the appropriate skills can be tricky to identify.	•Huge innovative potential in collaboration with research facilities.	•Works solely with technology that is relevant to research facilities.
Support from government	•Considerable support from other regional actors and financiers.		•Great potential for innovation in collaboration with the companies in the region.	
Network participants	•Universities, companies, clusters and industry organisations.	•Virgin ground. The initiative has only been running for a year, even though it has grown robustly.	•Huge potential once the entire European research market with all its research facilities are opened up to Swedish SME companies.	•That the funding/investment of Big Science Sweden drops or ceases, which makes it difficult if not impossible for the members to find a way of delivering to the research facilities.
Internationalisation of the networks in the region	•Collaboration in place with research facilities and ILO organisations in Europe.	•Time-consuming and resource-intensive collaboration with ILO. Cooperation with facilities for the core business.	•Great potential for innovation when launching relevant projects and sourcing funding.	•Unlimited opportunities create the need for prioritisation. Resource-intensiveness creates long-term development.

General comments/Observations (*Clusters and Networks)*

Theme: Regional Technological Development (RTD)/Innovation Funding

Describes the funding measures that support RTD in the region

	Strengths - Capacities & capabilities	**Weaknesses** - Issues that need to be addressed	**Opportunities** - Potential for innovation/S3 focus	**Threats** - Constraints to be addressed
Overview	•There is capacity and expertise in the region through long-term work with funding instruments for entrepreneurs.			
Funding Instruments available for entrepreneurs	•Investments and loans to companies via ALMI Invest and ALMI business partners. •Bank loans are a possibility with some restrictions. •A range of business development checks - vouchers - for SME development	•The regulations of the private banking sector following the financial crisis.	•ALMI Invest as a public venture capital company is able to invest in private companies, with a clear exit plan to allow them to fund investments for growth in the region. •Possible spillover effects within strength areas in the region.	•It is difficult to invest in winners through business development checks and other instruments.
Funding Instruments available to support ICT businesses	•Individual, sporadic initiatives/investments from the regional budget, although rarely for ICT business, but rather for business with ICT needs.	•Lack of long-term perspective with short-term budgets.	•Funding instruments for ICT can work for all S3 areas in the region. It is possible to strengthen S3 overall by investing in ICT.	•Less money in the system.

Funding Instruments available to support incubators/accelerator programmes	•Sweden has a national incubator programme. The region finances selected incubators. Municipalities finance local/sub-regional science parks and incubators.	•The geographical location of an incubator governs some funding, as municipalities are major funders.	•In the directives for the funding instruments, you should be able to highlight initiatives within S3 priorities. •The purpose is to get incubator companies to contribute with their knowledge within the S3 areas of the region.	•Difficulties with long-term funding. Can be problematic with directives that govern local development, rather than in relation to S3 priorities.
Current tax incentives to support R&D, ICT R&D, other R&D…				
Describe the availability and accessibility to regional, national and European funding for RTD	•Structural funds available to some extent.			

General comments/Observations (*RTD/Innovation Funding)*

Theme: Smart Specializations

1. What are the region's Smart Specializations?

Skåne's S3 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.

2. How are these Smart Specializations developed?

The S3 are developed in the process of shaping the current International innovation strategy for Skåne, as well as in separate position papers.

3. What is the sustainability of these Smart Specializations?

The International innovation strategy for Skåne runs from 2012- 2020.

4. What Smart Specializations should the region focus on in the future?

The future S3, developed in the process of a new sustainable growth and innovation strategy, will most likely be similar to the current S3.

5. Why these Smart Specializations?

The updated S3 for Skåne have great potential today and in the future, both in terms of growth and skills that enhance productivity. The S3 are areas of expertise that actors in Skåne jointly can develop together.

6. What are the Strengths, Weaknesses, Opportunities and Threats for these Smart Specializations?

n/a – will be developed in the process of developing the new sustainable growth and innovation strategy for Skåne

Part 2: Innovation capacity and needs of SMEs in Transition in Energy (or Blue Sector)

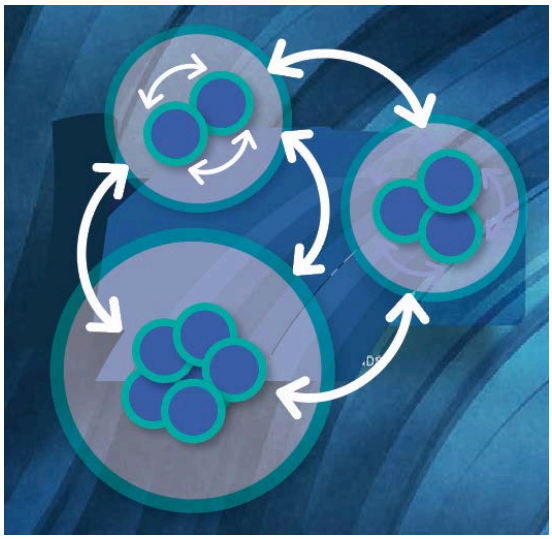

Illustration: Manickam (2018)

The interview schedule has been adapted from a doctoral thesis on cluster developments by A. Manickam in which qualitative systemic developments were captured. The focus of the thesis and the current research is to gain insights into stakeholder perceptions of dominant urgent challenges, initial conditions, potential opportunities for innovation and underlying processes constraining and supporting developments.

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Interview Questions: SMEs in Energy (or Blue) Sector

Topic	Question	Sub-question/detail	Answers
Defining who you are	What is your core activity in energy innovation?	• Details of business	Type of Business: … Size of staff: … Other: …
		• Geographic Scope	Local: Yes/No Regional: Yes/No International: Yes/No
		• Type of energy innovation	Product innovation: Yes/No Process innovation: Yes/No Service innovation: Yes/No Other: ….
		Details of energy innovation	1. … 2. …?
	Who is involved in energy innovation?	• Inside company	1. … 2. …
		• Outside company	1. … 2. …
Defining urgent challenges	What are 3 urgent challenges your company is facing?		1. … 2. … 3. …

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	What possible solutions for the challenges?		1. … 2. … 3. …
Defining path dependency	Which 3 factors, e.g. historical, geographical, cultural aspects, are important for your business?		1. … 2. … 3. …
	Which 3 factors are limiting your success?		1. … 2. … 3. …
Defining future strategies	How are you preparing for the future?		1. … 2. …?
	What is needed to be competitive for the future?	• New competences (training)	1. … 2. … 3. …
		• Research & innovation	1. … 2. … 3. …
		• Additional finance	1. … 2. … 3. …
		• New networks & collaborations	1. … 2. …

			3. …
Defining direction	Which developments in energy transition seem promising for your company?		1. … 2. 3. …?
	Which developments are inevitable for your company?		1. … 2. … 3. …?
Leveraging innovation potential	Are you considering exploiting new ventures?	• New markets	Yes/No
		• New technologies	Yes/No
		• New products	Yes/No
		• New partners	Yes/No
		• Other…?	1. … 2. …?
Defining innovation steering	Who is driving or pushing innovation?	• Customers	• Yes/No
		• R&D	• Yes/No
		• Policy	• Yes/No
		• …?	• Yes/No
Defining emergent patterns	What is significantly different in the last three years?	• New partnerships & collaborations	1. … 2. …
		• Scope (local, regional, EU,	1. … 2. …

		international, etc.)	
		• New (digital) communications	1. … 2. …
		• Knowledge sources and sharing	1. … 2. …
		• Innovation processes and solutions	1. … 2. …

Part 3: Job Forecasting and Skills Gap Analysis

The JOES was developed to study labour market developments through expected job vacancies and skills needed for the future of SMEs. The research group Human Capital at Hanze University of Applied Sciences Groningen developed this tool, led by Professor H. van Lieshout

[PASTE JOES – here]

Part 4: Conclusions

This part of the report captures the key findings of the regional innovation analysis and the implication for the future policy strategies. The following aspects to be presented in this part of the report:

- **Introduction**

  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 this Regional Innovation Analysis carried out in Skåne in 2019.

- **Highlights of the analyses and Key Conclusions of Parts 1-3:**

  - ***Part 1 - Regional Innovation Ecosystems***

  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. 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 increase demand for services such as retail, health and education; services that generates demand for labour.

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

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; mainly manifested through differences within the region when it comes to labour market development. The eastern parts 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.

The SWOT analysis 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 inshoring production, a current trend in many other regions, there may well 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.

- ***Part 2 – SME innovation capacity and needs***

There is clearly a skills gap identified by the interviewed SMEs, and future plans for the region must take this skills gap into consideration. Although new technology enabling automation of the manufacturing process could ease the pressure, modern technology still needs modern operator skills.

The interviewed SMEs underline that modern operator skills takes time to form and foster. In addition to influencing young people to choose a technology-oriented education, many interviewed companies highlighted the importance of further education of current employees. Several companies also opened up for a greater business cooperation within the region.

- *Part 3 – Job Forecasting and Skills Gaps*

The future skills gap is also identified in the job forecasting (JOE) carried out in Skåne. So far, only one company has been targeted, and although this traditional manufacturing company in transition stands as a good example, there is a need for a deeper analysis before doing an actual job forecasting.

- **Discussions of the Findings**

As stated, the Regional Innovation Analysis has highlighted the need of a new or updated S3-strategy that addresses the skills gap as a barrier to innovation and growth in small and medium-sized enterprises. This can be particularly important for the restructured manufacturing industry in Skåne.

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 Programme 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 Programme 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.

Only one company has been involved in a job forecasting process (JOE) in Skåne. The process has worked well, but has taken a lot of time and effort. The SME interviews has also worked well, and they have been handled very efficiently. A combination of an SME interview and a light version of a job forecasting process could well be an alternative for future work.

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

Many of the interviewed SMEs highlighted the importance of further education of current employees. This is important both in terms of keeping up with market development as well as to foster staff development. Today, there is an increased mobility on the labour market, which needs to be embraced, and further education of current employees in an efficient manner is one way of doing that. Many SMEs turn to staffing agencies or increase the use of consultants, but then risk losing the in-house raising of competence. However, many SMEs often lack funding or educational resources for further education of current employees. This is definitely an area where the national or regional government could step in and create conditions that makes it easier for SMEs to access commissioned education or co-fund specialist training.

The majority of manufacturing industry businesses in Skåne are small firms that often find it difficult to focus on RTD innovation. Some of the interviewed SMEs has mentioned extended RTD cooperation between companies, and that regional clusters and networks should facilitate this kind of cooperation.

Another kind of cross-company cooperation that many SMEs has mentioned has to do with marketing the manufacturing industry and with raising awareness of job opportunities within the sector. Targeting for example young people and newly arrived immigrants, could raise the interest in working in the manufacturing industry, but few companies can do this alone. Companies in a region like Skåne, could join forces and, together with local schools and technical colleges, market job opportunities in the manufacturing industry. But many companies must at the same time improve working environment, management and carrier paths within the company. It not, they will find it even harder to find new, qualified staff.

The up-coming work in the Right-project, especially the projects developed within work package 4, will be important. There is clearly a need for developing new skills training and innovation facilities.

- **Inputs for new strategy and policy for Skills Education and SME 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 center. 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 in to consideration to provide input to new strategies and policies for the future.

GENERAL QUESTIONS TO CONSIDER FOR THIS SECTION:

- Do the Regional Innovation Ecosystems SWOT analyses, and that from the SMEs resonate with that of current Smart Specialization Strategies (S3) or its equivalent for the region as a whole? The energy (blue) sector?
- Are there differences in the views between policy/experts and SMEs?
- What do the Job Forecasting indications mean for the sector and the region's S3?
- Do the Skills Gaps identified by the iconic SMEs resonate with future plans for the region?
- What new skills trainings and innovation facilities need to be considered?
- What are strengths and good practices in the region that could be useful to support regional strategies?
- Are there threats (constraints) that could be better solved as an interregional North Sea challenge?
- Lessons learnt from the research experience
- Limitations and future research recommendations/plans

Appendix 1 – contact information

IUC Syd and Region Skåne

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Appendix 2 – Regional Innovation Ecosystems Mapping

The Regional Innovation Ecosystems has 2 parts. Part A are general information on the socio-economic and governance aspects of the region. Part B is an analysis of the various aspects of the innovation ecosystems through identifying their Strengths, Weaknesses, Opportunities and Threats as shown in the format. Experts from the economic and innovation policy departments can be invited to do this exercise. An analysis of the initial findings would then be presented to a panel of experts who represent a broader range of expertise, including t experts from policy, industry and academia involved in the regional development and the energy (or maritime sector). The aim of the panel discussions is to explore the initial findings and to expand and validate the findings and to reflect what implications these have for Smart Specialization Strategies (or its equivalent) and the future skills needs of the region.

Appendix 3 – SME analysis format

Please add the information from the individual interviews into this one format given below. Indicate [1], [2], [3], etc. next to the answers so that the answers are identifiable from each interviewee.

For e.g.:

• Type of energy innovation	Product innovation: [1], [4]
	Process innovation: [2], [4], [6]

• New competences (training)	1. data analysis skills - 3 companies [2], [6], [1] 2. network analysis – 2 companies [1], [3] 3. working in teams – 1 company [2]

FORMAT SME INNOVATION CAPACITY AND NEEDS:

Format: Compilation of SME interviews			
Topic	**Question**	**Sub-question/detail**	**Answers**
Defining who you are	What is your core activity in energy innovation?	• Details of business	Types of Business: [1] We manufacture products for the healthcare industry, e.g. pacemakers and catheter balloons. 98 per cent of what is produced is for export to various parts of the world, e.g. Australia, North America and South America. The entire organisation is localised in Torekov.

			[2] Our work involves fitting out ships, including electricity, ventilation and insulation. Our head office is in Billinge in Skåne, and we have an office in Norway, two in China and one in Landskrona (warehouse, workshop). We're a small company whose work is largely project management. [3] We install piping within the industry. The company is made up of two different companies: a parent company that operates worldwide, though chiefly in southern Sweden, and a subsidiary that is purely a staffing company within the industry, involving welders and similar jobs. [4] The company has developed from a manufacturing industry into a partner in the field of retail. We design, create and install flexible shop ceilings with accessories, light and lighting for customers all over the world. Our work involves machining and refinement of sheet metal. Electric radiators represent 10% of the business's turnover. 90% of turnover is produced in-house. We buy in some raw materials and components, which we then process in-house. [5] Our business concept is based on being competitive within Swedish industry. We help customers with design, project management and product production – we're involved throughout the cycle. We increasingly use robotic technology in order to be efficient. Our business concept has been the same ever since we started. [6] We've been in existence since 1893, and are one of Sweden's oldest companies. Our engineering department was hived off from Höganäs AB to form Höganäs Verkstad AB in 2005. In partnership with our customers Höganäs Verkstad AB will manufacture, install and maintain engineering products and technical solutions. We will offer mechanical

			engineering, welding, sheet-metal work, surface treatment and industrial maintenance of the right quality. [7] We are a mechanical engineering company with two branches of business: a welding plant and a processing plant. We have no products of our own, and carry out single-item or small-quantity assignments – subcontracting. We have a high level of specialisation, and have quality requirements that call for various forms of certification. [8] We're located in Helsingborg, and are a subcontractor that does advanced technical welding. All products present requirements in some way. The company is 70 years old.
			Size of staff: [1] 87 [2] 16 [3] 43 [4] 65 [5] 27 [6] 75 [7] 15 [8] 46
			Other: [1] Our leadership used to be less modern, with a focus on management of the company. We are now a development company for our

			customers, and this imposes major new requirements with regard to our current organisation. Technological developments affect us, but not that much, as the sector is conservative rather than fast-moving. Average product life is 15 years. When a product is developed on behalf of a customer it is the customer who owns the product. Our project teams are versatile, and consist of engineers in the fields of materials, processes and design. [2] We're undergoing a generational change, and have never been as big as we are now. At head office we have project managers, and we have fitters/craftsmen on site. [3] A problem for us is that we're losing staff to customers. It's been really hard finding skilled staff for the past 7-8 years – something I think is a general problem throughout Sweden. [4] We are driven by objectives in order to do good and profitable business. When the technology advances we see a need to be at the cutting edge. Approximately 20 employees work in administration: in the office, as sellers, in project management, the design department, buying, finance etc. The remainder work in production. [5] --- [6]

			We have various roles within the company such as machinist, sheet-metal worker and service technician, and our work also involves order management, offer management, finance and management. [7] For the manufacture – mechanical engineering – we have to be able to do turning and milling. We are craftsmanlike in our manufacture. The focus is on skilled craftsmanship, and to an equal degree on programming, in order to automate and manufacture several components. On the welding side we're seeking staff with a high degree of professional skill. We also do in-house training, and raise the skills level to the right level. [8] There are various roles within the company. We have 12 salaried employees. Manufacture is divided into different departments such as welding, assembly and mechanical engineering. Each area/product is managed by a supervisor.
		• Geographic Scope	Local: [1] Our production facilities are solely in Torekov. Some parts are manufactured at our associated companies in Poland and Hörby. Approx. 60% of production is made up of our own products. [2] Yes

			[3] Yes, it's now 100% in Skåne, but six months ago we also had jobs in Denmark. [4] We operate here as a single unit, but install our products all over the world. [5] We're extremely local. What's furthest away for us is in Lund – the rest is in the immediate vicinity. This is a conscious choice on our part. [6] Yes – as our biggest customer is in Höganäs we have to be where the customer is. The service component of the business is local, within driving distance for our service vehicles. [7] Yes [8] Geographically we're localised in Helsingborg, but we have customers all over the world. We currently export 90%.
			Regional: [1] Yes

			[2] Yes [3] Yes, though not currently. [4] Yes [5] No [6] Yes [7] Yes, nearly all our customers are regional. We have business from coast to coast in Skåne. We have a small number of customers in other parts of the country. [8] Yes, in part
			International: [1]

			Yes [2] Yes [3] Yes, though not currently. [4] Yes [5] No [6] Yes, we have a customer in Norway. We're growing, and are increasingly establishing ourselves. [7] Yes, we also have international projects now and then. [8] Yes, in part
		• Type of innovation	Product innovation: [1] Yes [2]

			No, we don't have any production of our own, but buy in furniture etc. from other suppliers localised all over the world. [3] Our approach is solution-focused – we never say never, but just resolve what needs resolving. Our actions are based on customer enquiries, and don't relate to what our competitors are doing. We must, however, keep up with technical developments and refine our technology. We compete with ourselves, as we love new technology. [4] Yes. We produce 90% of turnover here. We use key ratios, which means 25% of turnover must come from new products. [5] Yes, but we don't put ourselves in a product- or process-related niche. We plan everything involved and do not, for example, restrict ourselves to the process industry. Are approach is as broad as possible. [6] No, none of our own. We provide technical expertise combined with machinery and staff. When we get a drawing from a customer we ask ourselves whether we can cope with it. If we can, we build what the customer is after. This can be either a one-off product or repeat business.

			[7] Our approach is twofold: 1. We work in close collaboration with our customers in order to develop and modernise their industries. We propose development together with the customer, and create the product together. 2. We keep updated through other organisations such as RISE Research Institutes of Sweden, the Swedish Maritime Technical Forum, IUC Syd and the Association of Swedish Engineering Industries. EES and MAX IV in Lund are Sydspets companies. We deliver to them, and we follow developments with their help, as they offer the possibility of skills development. [8] We're a subcontractor, but we nevertheless do product-development work. Our skills are in the field of pressure-bearing products. All welding thus requires licences, and this can be seen as a form of product development or service development. The major cost is for preparation of the protocol required for a welding permit.
			Process innovation: [1] Yes, we have engineers and specialists who are involved in the development of process innovations and validation work. [2] Our work involves developing and simplifying our project-management and logistics processes. For example, we look at various

			programs that can simplify the flow between project managers. [3] Yes, we train our welders internally when we need them. [4] Yes [5] Yes [6] No [7] Yes [8] No, apart from the above.
			Service innovation: [1] Yes [2] Yes [3] Yes

			[4] Yes [5] Yes [6] No [7] No [8] Yes, as part of product development in the form of the welding service.
			Other: [1] [2] The market has flourished, but our company's development has remain unchanged over the years. [3] We're increasingly following the research. If new technologies develop we have to keep up. [4] We've developed everything we produce as regards appearance and composition. For us and our customers to be at the cutting edge

			in the field, an internal driving force is constantly needed. [5] We're constantly working on development. [6] We introduced welding robots two years ago. After being entirely manual we became more automated. We provide expertise and modern methods of manufacture. We develop by keeping up to date in terms of tools and by using staff with the right skills. [7] [8]
		Details of energy innovation	[1] [2] [3] [4] [5] [6] [7] [8]
	Who is involved in energy innovation?	• Inside company	[1] 1: For our own part of production we collaborate with a specific university.

			Otherwise we collaborate with various universities and colleges of higher education. Nolato also has its own development centre in Hörby, facilitating its own analyses. 2: We have complicated products that require our production staff to be involved in the development of processes. [2] 1: It is the CEO and the management group who are involved; we discuss development in the field of innovation every day here at head office. 2: [3] 1: The three of us in management. Our welders get involved in the next stage. 2: [4] 1:

			A number of players – you have to be at the forefront in all areas, regardless of your role within the company. 2: [5] 1: All parts of the company are included in the development work. For example, the older members of staff possess valuable knowledge, and it's important to take advantage of their experiences in the development work. Our employees represent a broad age distribution: from 19 to 68. 2: [6] 1: It's mainly an internal driving force. To a certain extent developments are affected by customer enquiries, creating certain requirements. 2: [7] 1:

			It's mainly an internal driving force. To a certain extent developments are affected by customer enquiries, creating certain requirements. 2: [8] 1: CEO, production manager and 5-6 other salaried employees. 2:
		• Outside company	[1] 1: We bring in specialists during the process-development phase, e.g. validation consultants. 2: [2] 1: No, no other players. 2:

			[3] 1: Lund University's Faculty of Engineering (LTH) has sent us an enquiry about collaboration. We also involve third parties in projects in order to certify our welders, as you're not allowed to license your own welders – it has to be done by a third party. 2: [4] 1: No, no external players. 2: [5] 1: If there's an area we're not on top of, e.g. CE marking, we place it with someone else. We also outsource verification of design calculations, but beyond that we don't do any development work outside the company. 2: [6]

			1: IUC Syd. We're also interested in networking with other companies that can help us with skills development. 2: [7] 1: Our customers. 2: [8] 1: Various classification and testing associations are involved in the development work, e.g. authorised labs and supervisory companies. There can be a lot of different players, depending on the classification in question. 2:
Defining urgent challenges	What are 3 urgent challenges your company is facing?		[1] 1: We're moving from being a managing organisation to being a learning organisation, and this is creating profiling requirements.

			2: Our biggest problem is the fact that we're localised in Torekov, as this can make things difficult and expensive for employees, e.g. in terms of moving here. The trend is for fewer of our employees to live within their own municipality. 3: The offering in terms of trained staff is in general deteriorating. That's the way things are overall in Sweden, and being localised there we are very much affected. [2] 1: Finding the right staff is a challenge for us. Our project managers are nearly all engineers. The difficulty is finding the right person for the right position, and this has got harder over the past five years. The person doesn't have to be a trained engineer – it may suffice for them to be familiar with CAD or have some other useful skill. Because of the shortage of labour, new employees may ask more of the company than previously, and may want to get different things out of it – for example, at the job interview we may get asked "What does the company have to offer me?". 2: For us it's hard to find craftsmen, in that we work abroad a lot. We thus have to find employees who find travel exciting.

			3: It takes a long time for our new employees to learn our internal processes. We try to analyse matters and find solutions when it comes to our processes. [3] 1: We need a new way of proceeding with materials, and need to refine our welding technique with new solutions. We thus need technical expertise and training for our staff. Automation cannot currently replace the new technology we use – that work still has to be done manually. 2: Provision of a skilled workforce is the hardest thing for us. We look for anybody at all – there's no need to have been through upper secondary school. We use employment offices, schools etc., but it's very hard finding skilled staff. We need to create interest and make the industry attractive to young people in their 5th and 6th school years. It's an adjustment that I think will take about 10-15 years. 3: It's a challenge in that it's based on individuals, and dependent on what we enthusiasts can manage in terms of driving development of the industry. We – the industry – need to be taken seriously, and to be seen and heard on various forums.

			[4] 1: The company used to focus on emotional intelligence (EQ), but we now focus on IQ skills. We need to ensure that our staff have the right knowledge for their work assignments, and to develop our staff's skills linked to their work assignments, e.g. Excel, negotiation techniques and transport flows. 2: A priority is developments in the world around us. 90% of our customers come from retail, and we're seeing a paradigm shift within the retail trade. We're seeing a decrease in the size of shop areas, as well as fewer players. 3: [5] 1: Handling the generational transition is a challenge. By the end of this year we have to have implemented the big transition. 2: The necessity to expand and develop. 3: Company acquisitions.

			[6] 1: It's without a doubt finding professionals with training, above all in the field of plating. The industrial programme in upper secondary school has practically vanished. 2: Since because of the above we have to recruit more people without any prior skills, more internal training of new recruits is needed. 3: A further challenge is keeping the high level of skill we currently have within the company. And managing to invest in our wide-ranging business, providing a lot of equipment. [7] 1: Renewing skills – we have a high average age, and need to bring in new working capital. 2: Renewing skills – we have a high average age, and need to bring in new working capital. We need to increase our turnover in order to stay profitable.

			3: We think that part of what we're now doing will be replaced by 3D printed components. In the field of mechanical engineering we're as close to a paradigm shift as you can get.. [8] 1: The biggest challenge is of course being competitive and always being able to maintain a high level of automation in order to compete with other countries. 2: Finding companies that place their current production in Sweden is generally speaking a challenge. There is often cheaper labour abroad, e.g. in Poland rather than Sweden. 3: Another challenge is skills and automation. People will always be needed in production. As regards pressure-bearing products, a robot can deal with this area more easily, but human expertise is needed in order to maintain highly efficient, high-quality production.
	What possible solutions for the challenges?		[1] 1: One solution is recruiting over a wide geographical area – not just in Sweden. We can recruit from other countries, e.g. Spain,

			though this can involve language difficulties that we need to deal with. 2: 3: [2] 1: We need project managers here at head office, but it is a challenge for us, as it's hard to recruit project managers in Sweden. The solution may be to bring in staff from outside/abroad. 2: 3: [3] 1: It's a male-dominated industry, and we want to open it up to girls, welcoming them and showing them they are important to the profession. 2: Getting skilled staff into the industry in general. 3:

			[4] 1: New ways of working and developing the skills of our existing staff. As part of this we've commenced a project together with a cluster network. 2: 3: [5] 1: Facing up to the generational transition. 2: New skills. 3: New technology. [6] 1: We've collaborated with Lernia and the Swedish Public Employment Service, and have used as much assistance as we can.

			2: We train younger staff using the older ones, applying so-called 'learning by doing', but there's a need for the younger staff to have an interest and an ambition regarding work in this field. 3: [7] 1: Shortage of skills is a problem throughout the manufacturing industry in Sweden. Certain industries, e.g. the automobile industry, take on the greater part of newly trained staff. The younger generation don't really have any interest in our industry. For us and our company there's no option but to be active and gather and employ newly trained people as soon as they become available. 2: 3D technology is an opportunity, but also a challenge for us. We have to be able to afford to invest. In part it requires new skills, but I wouldn't be surprised if it is purely and simply a matter of training, with new staff not necessarily being needed. We will of course seek such skills (basic digital skills) when recruiting. Manufacture and design get closer together through 3D technology. 3:

			[8] 1: Solutions for my part are being involved in, influencing and going out of one's way for the industry. By supporting those who are working actively on influencing the government. 2: The second challenge can be resolved with automation, and getting companies to place production of their products with us here in Skåne. Beyond this, there is not a lot we can influence. 3:
Defining path dependency	Which 3 factors, e.g. historical, geographical, cultural aspects, are important for your business?		[1] 1: We're a culturally managed group with strong values, and this affects our business choices. It creates our approach to handling of staff – and this is one of the factors for success. The company used to focus on management of the company: top-down management. 2: We only work here in Torekov, and ensure that we manage to deliver from here; this has been important to us, and we won't be moving.

			3: [2] 1: We're a family company founded by my father. That's why we're localised here in Skåne. The company started up because of the demand. 2: 3: [3] 1: The three of us who have the managerial roles within the company have all worked in the industry since we were 13. It's craftsmanship that's crucial. 2: 3: [4] 1: There's a geographical and cultural explanation for why the company is the way it now is. 2:

			3: [5] 1: What has been important is the fact that we, or rather I, have done all sorts. For example, I have a background in multinationals, and have worked in the field of service, logistics, telecoms etc. 2: We've acquired two companies and have consolidated them. It's an important aspect of why we are where we are. 3: [6] 1: The biggest factors in terms of our being the way we are is the division from Höganäs AB. 2: 3: [7] 1:

			The reason for the company's present situation is that there's a mechanical engineering cluster here. There thus have to be customers in the close vicinity. The reason is geographical, the most important factor being the proximity of paper and pulp industries that require a lot of resources in terms of service etc. When the company started up we just did maintenance work for paper mills. 2: 3: [8] 1: The company grew up in Europe, and has been affected by WW2. Geographically we're close to Denmark and Europe, which means we can be international. 2: 3:
	Which 3 factors are limiting your success?		[1] 1: We're not actually encountering any obstacles per se. We have everything in our own hands, so we can develop our processes and products. For us it's more of an adjustment issue. We're currently working on business intelligence, in order to promote our development, competitiveness and cultural adjustment. We were in great need of

			business intelligence, and we started using it three to four years ago. 2: 3: [2] 1: Economic recessions are an obstacle for us. The market affects us, and right now the market is really booming. We're well established, and it's because of the size of our company that we can cope with both recessions and booms. We depend on the knowledge we possess during both upturns and downturns in the economy. 2: Our business is needs-driven. We're currently in an expansion phase, but there's not enough space at our present head office. We're thus looking at new premises, though we want to stay here in Skåne. 3: [3] 1: Difficulty recruiting skilled staff, and the industry needing to be taken seriously.

			2: 3: [4] 1: We don't see any obstacles in our being geographically located here. 2: 3: [5] 1: We don't see any immediate obstacles. We have a lot of people applying to us. It has been and will be relatively easy for us to acquire skilled staff. 2: 3: [6] 1: It's the same as we mentioned earlier: finding the right staff and the right people for work in this field.

			2: We're a company that is poorly positioned geographically when it comes to commuting. The workshop in Landskrona, for example, is better placed, as it's within commuting distance of Malmö. The reason why we're located here is that it's just 50 metres to our biggest customer. 3: [7] 1: 2: 3: [8] 1: Apart from the above, there are high charges linked to running companies with employees in Sweden, compared with other countries in Europe. It's unnecessarily expensive for me to keep my business going. A lot is demanded of us entrepreneurs in Sweden, but this disadvantage is not compensated for to the same extent. The rules applying to us are not the same as those for our competitors in other countries. 2: 3:

Defining future strategies	How are you preparing for the future?		[1] 1: Right now we're doing a lot of work on organisation aspects: generational change and the dimensions required for recruitment of the right people. 2: We wish to collaborate more with associated companies, benefiting from each other's skills. Our plan is to double turnover by 2021. This will mean a need for major measures in order for the organisation to be adapted. [2] 1: Our ambition is to be just the right size, and to advance our skills in a strategic way. We don't want the company to be too big, as that could be a problem if there's a cooling of the economy. 2: [3] 1: We're not preparing ourselves for the future as such, but are instead taking things as they come – we're a little too small to have that insight. Other companies have criteria different from ours, and we take on the challenges that bigger companies can't cope with themselves.

			2: [4] 1: And we have a new management team, and have carried out SWOT and market research. What remains is to get it all implemented. We wish to create a consensus, so as to achieve an understanding of the whole organisation. 2: Yes, we need new skilled staff. The idea is to automate more work tasks or parts of work tasks, and this requires skilled staff. [5] 1: We have a rolling five-year plan. In my view, the first stage is to have a good plan and involve the employees, so they feel committed and involved. 2: The onus is on me to rectify things that are wrong and present quarterly updates. [6] 1:

			We're updating our technology, and are as far as possible providing our staff with skills development. 2: [7] 1: Our most active work is expanding the collaboration with other small companies in the region, as there are many such companies. Most of them are too small to individually allocate resources for necessary development. More collaboration is necessary within the industry as a whole. I also think that in the long term the industry must consolidate locally, and that there will have to be fewer, bigger companies. 2: [8] 1: We're currently working with another company. We're gathering staff in order to find out which products to work on strategically in order to be able to face the future on the basis of various scenarios. We're trying to think in terms of future development, and in my opinion the more you think about development the easier it will be to have your staff as an engine. 2:
	What is needed	• New competen	[1]

	to be competitive for the future?	ces (training)	1: In every situation we'll be investing more in assessing automation solutions for forthcoming production. We will choose whatever is the most profitable and sustainable. 2: We wish to work more on internal skills development. We used to hire staff, but that didn't always work. If we want to attract young people and get them to stay we have to provide them with challenges so they can develop. [2] 1: We could develop and divide up the organisational structure, e.g. in the field of buying. Carrying out our own production – we then know what we're delivering and when. It could also contribute to faster production and delivery times. 2: Having expertise in the company is a must – not everyone can do the work we do. We depend on our knowledge, and advance it at every stage. Our brand has been well established since the 80s. [3] 1:

			Yes, we need new staff, and then training of staff. We think in terms of our own development solutions. 2: [4] 1: Yes, we need new skilled staff. The idea is to automate more work tasks or parts of work tasks, and this requires skilled staff. 2: [5] 1: We find it relatively easy to find staff and people with the right skills. But we'd like to minimise the need for staff through rationalisation (robotisation). If you're to be up to date and competitive this is vital. 2: The staff will need training so they can deal with technical developments within the company. In order to cope with robotic technology we will need engineers. The company will manage with its existing engineers for a further year, but after that we need to recruit new employees. The company collaborates with seats of learning, and doesn't see any obstacles as regards recruitment. [6]

			1: Yes, we believe in a mixture of old and new staffing. We have to look after the older people in the company. We also have machinery that requires new technology, thus we need staff who can cope with this. 2: [7] 1: 2: [8] 1: Yes, we do always need them. Ever since I took over nine years ago we've had to give our staff a lot of training – something we certainly didn't do as much previously. Our work is of a high technical level, for which we require a high degree of knowledge and technical skills. 2: I've hand-picked my workers though my networks on various marine projects worldwide, and have recruited them in accordance with this approach. A large proportion of our staff are not stationed in Sweden full-time.
		• Research & innovation	[1] Yes, as it may be a technology the customer is looking for you have to turn to research and look at various innovative solutions.

			[2] No, not really. [3] Yes, we're increasingly following the research, so as to keep up with technological developments. [4] Yes [5] No [6] No [7] No [8] No, but developments in the field of materials for various types of environment: salt water etc. There are always developments in this area. Certain products we currently use didn't even exist a few years ago.
		• Additional finance	[1] Yes, but it's rather a matter of taking costs from one place to another.

			[2] No, not really. If the company had had 100 employees that would have been necessary. But our ambition is to be just the right size. [3] We need financial support for our internal skills development, which involves big material costs. [4] No [5] Yes [6] Yes, it may be needed. We have expensive machinery, and it's costly keeping machinery up to date. [7] [8] Yes, it is. We're currently financed from our own cash flow.
		• New networks & collaborations	[1] 1:

			We're investing in continued collaboration with the players we're already collaborating with. 2: [2] 1: Yes, important; we always need to speed up our processes. We're driven by tough deadlines, i.e. deliveries from several different suppliers who are all dependent on having their stuff delivered in time. We may have up to 30-50 suppliers for a single project. 2: [3] 1: We've (recently) been networking with Lund University's Faculty of Engineering (LTH). 2: [4] 1: We network, e.g. CEO networking. There have been organisational changes for the company in recent years, which means we don't know which networks will best suit us in future.

			2: [5] 1: Yes, IUC Syd and their forum (robotic lifting device). Networking is important to us. 2: [6] 1: Yes, within the service sector locally we see a need for a network within the same industry. It's in place, and one can always do more. 2: IUC Syd – customising training with the aid of funding from IUC Syd. [7] 1: 2: [8]

			1: Yes. We have completely new networks. We create networks through our products. We've set up a network with a company from China, and are developing collaboration with them. 2:
Defining direction	Which developments in energy transition seem promising for your company?		[1] 1: As a Swedish company in this sector we've been a little ahead of others in the industry. We were early with getting ISO 14000 certification, and this is in line with our values. We also have ISO 9001 & ISO13485 certification, which is line with the industry. It's important to have discipline and business morale, and to show that we stand for ethical business. It creates greater trust on the part of the customers we want to work with. 2: We're facing the challenge of increased price pressure. 3: We have a long-term approach, and are investing in improvement in the field of automation, collaborative robots and similar business, in order to match the competition. [2]

			1: I think that in the field of installation and fitting, things will remain the same in the future. We've been ISO-certified since 2003, but we have to work more and market ourselves better in the field of the environment so as to remain competitive. 2: 3: [3] 1: It's a challenge getting people to think outside the box. Not just our welders but the whole of society. The age of retirement is to be raised – how can we best make use of people aged over 60 with a high level of expertise? If they aren't employable they could lecture, for example, and act as mentors so as to attract young people to the industry at an early stage. We should use and take advantage of the entire skills chain in the best way possible. Those registered unemployed with the employment office can be used better within their own industry. 2: 3: [4] 1:

			2: 3: [5] 1: We're constantly considering new approaches, including robots. We need to use technology to create more efficient equipment. 2: 3: [6] 1: Nothing immediate. 2: 3: [7] 1: 2: 3:

			[8] 1: I don't know if there are major transitions in terms of the industry – it's rather a matter of which legal requirements that will apply to us in future are important. Our biggest products are based entirely on legal requirements. 2: We're constantly working in order to be involved in various areas. For example, implementation in the USA, where we're looking at the welding solutions we can offer them for 2023/24, i.e. a long way ahead. We're constantly working on what we believe in: the markets of the future. 3:
	Which developments are inevitable for your company?		[1] 1: Automation, development of production technology and manual processes that we develop in-house. 2: Keeping our production here in Torekov, which is one of our strengths. 3:

			[2] 1: No immediate ones, apart from our needing to do more work on the environment in future. 2: 3: [3] 1: Attracting people to us and making it more interesting for more people to apply to us and the industry as a whole – at an early stage. 2: 3: [4] 1: Automating parts of the process. 2: The skills requirement – recruiting the right staff to the right place.

			3: [5] 1: We need to deal with generational renewal, expansion and company acquisitions. 2: 3: [6] 1: Nothing immediate. 2: 3: [7] 1: 2: 3: [8] 1:

			2: 3:
Leveraging innovation potential	Are you considering exploiting new ventures?	• New markets	[1] Yes [2] Yes. We marketed ourselves in China/Asia before our competitors did. [3] Yes [4] Yes [5] Yes [6] No, we want to broaden the market. We've gone from three machines to twelve in order to broaden the customer base. It's the same thing with robotic welding: we need to find the next customer in this field. [7] Yes [8] Yes

		• New technologies	[1] Yes, a big focus on development of production technology. [2] No [3] Yes [4] Yes [5] Yes [6] No, we wish to complete robotisation. [7] Yes [8] Yes, from traditional to plasma welding, which was not common five years ago. New welding methods that are being developed are something we must be involved in.
		• New products	[1] Yes [2]

			No [3] Yes [4] Yes [5] Yes [6] Yes, we're prioritising faster production of the existing ones. We have many internal processes that we use to rationalise the flow. [7] No [8] No, we don't work that way at all. We're reshaping our production department so it can receive new products and requirements from customers. We can thereby develop the processes ahead of new product-development assignments from customers. We don't have any products of our own per se.
		• New partners	[1] Yes, collaboration with existing and new universities, colleges of higher education, consultants, customers etc.

			[2] Yes [3] Yes [4] Yes, e.g. through cluster initiatives. [5] No, not as things stand. [6] Yes [7] Yes [8] Yes
		• Other...?	[1] 1: 2: [2] 1: Our work in the office is area-based. As there are now more of us, we need to develop and clarify the subdivision of the office. In our company, project managers (PMs) shape

			their own job, and we currently have many different engineers employed as PMs: mechanical, technical, architectural and industrial engineers. 2: ---- [3] 1: ---- 2: ---- [4] 1: ---- 2: ---- [5] 1: ---- 2: ---- [6] 1: No 2: [7]

			1: We'll be investing in increasing digitalisation in our manufacture, as well as quality control. Even if we have a high level of craftsmanship, there are more aspects that can carried out more rationally, and this goes hand in hand with 3D technology. 2: [8] 1: 2:
Defining innovation steering	Who is driving or pushing innovation?	• Customers	[1] Yes, customers. We currently see demanding customers as an opportunity to develop our processes by taking on the challenges customers set us – it's a new approach. We don't dismiss anything, but rather see it as an opportunity to acquire new technology. [2] Yes, it's the customers. [3] Yes, it's the customers who drive development. [4]

			Yes, it's our customers who drive developments. [5] No [6] Yes, the customers. [7] No, we don't have any products for the consumer market. [8] In our case it's more a matter of political guidelines. We work a long way away from the consumers.
		• R&D	[1] Yes [2] No [3] Yes, our new collaboration with Lund University' Faculty of Engineering (LTH), for example. [4] No

			[5] No [6] Yes, for processing tools and as regards robots. [7] No [8] Yes, in part – as mentioned earlier.
		• Policy	[1] No, delimiting. [2] No [3] No, not directly, but we must respond to the political guidelines and have the requisite certification. [4] Yes [5] No [6]

			Yes [7] Yes, indirectly, e.g. environmental measures. [8] Yes
		• ...?	[1] ---- [2] ---- [3] ---- [4] ---- [5] ---- [6] ---- [7] ---- [8] ----
Defining	What is significan	• New partnership	[1]

emergent patterns	tly different in the last three years?	s & collaborations	No, not beyond what has already been presented. [2] The biggest change is the generational renewal. I've worked as CEO for 18 months. [3] The fact that we've entered into collaboration with LTH. [4] We have a new CEO, and have changed our approach – and in other areas we've replaced people and positions. We have completely new approaches in more or less all departmental areas. [5] No, no change at the moment. [6] The customers are our partnership. Robotic welding is a huge step. [7] Organisational changes in connection with the new CEO. Otherwise normal development. [8]

			Yes, difficult question. Three years is a short time for me. But within five years there have been new partnerships for our part. Both on the ownership side and as regards collaboration with customers.
		• Scope (local, regional, EU, international, etc.)	[1] No, no change. [2] No, no change. [3] No, no immediate change. [4] No real difference. [5] No, we're still really local. [6] New workshop in Landskrona. [7] ---- [8] ----

		• New (digital) communications	[1] We reorganise before we digitalise. This is placing tough demands on us in terms of the right recruitment, and in our recruitment it's important to present the right challenges. For example, when we were looking exclusively for metrology engineers we didn't get any applicants, but when we broadened the job to include Six Sigma (statistical development method) it made the job more interesting. We then got more applicants, and this led to an appointment. [2] Small changes are being carried out all the time. For example, we used to keep our diary on a board, but we now do it digitally. [3] No, no immediate change. [4] Digital developments in the retail trade. [5] We've replaced our IT system. [6] No, but in May we'll be taking part in 'kick-start digitalisation', organised by IUC Syd. [7]

			---- [8] No, at an early stage we were a long way ahead in terms of digitalisation, and we continue to use it. In other industries we're in the Stone Age when it comes to digitalisation, but in our own industry we're at the cutting edge.
		• Knowledge sources and sharing	[1] No direct difference over the past three years. [2] It's getting harder and harder to recruit suitable people. [3] We're increasingly following the research. [4] It's still hard to recruit staff. The training level of our existing staff is mixed. A university education is good, though not crucial to us. We place an emphasis on individuals' knowledge and personal qualities. Skills – finding the right ones is hard all over Sweden, not just in connection with the region. [5] We've appointed staff with new skills.

			[6] No, no major difference. If anything, knowledge and sharing experiences with regard to robotisation. [7] ---- [8] ----
		• Innovation processes and solutions	[1] We're constantly working on process development and solutions in this regard. [2] The sales process is and has been an extremely important issue for us. [3] No, no change. But there's a requirement that we're not allowed to license our own welders. [4] ---- [5] We have a lot of new equipment. [6]

			Robotisation again. [7] ---- [8] ----

Appendix 4 – Job Forecasting & Skills Gap – JOES tool

Instructions….

Please ask…. ..

….

Please send the completed Excel sheets to the research team as indicated in Appendix 1.

Appendix 5 – The Regional Report

FORMAT FOR REGIONAL REPORT
(title page/layout for report sent later – liaise with WP2 Communication)

REGION'S REPORT
Colophon

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Appendices