

Functional review of Blue Growth RIS3 steering process & operational structure

Analysis of the state of the play in Schleswig-Holstein (WP 2.1)

Smart Blue Regions Project Report

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LIST OF ABBREVIATIONS

ERDF	European Regional Development Fund
EU	European Union
GDP	Gross Domestic Product
GMA	Gesellschaft für marine Aquakultur (Society for Marine Aquaculture)
ICT	Information and Communication Technology
ISIT	Fraunhofer Institute for Silicon Technology
IT	Information Technology
ITFSH	Innovation and Technology Forum Schleswig-Holstein
MCN	Maritimes Cluster Norddeutschland (Maritime Cluster of Northern Germany)
OP ERDF	Operational Program of the European Regional Development Fund
R&D	Research and Development
RIS-SH	Research and Innovation Strategy of Schleswig-Holstein
SH	Schleswig-Holstein
SME	Small and Medium sized enterprises
WTSH	Wirtschaftsförderung und Technologietransfer Schleswig-Holstein (Agency for Business Development and Technology Transfer Schleswig-Holstein)

INTRODUCTION

The government of Schleswig-Holstein has agreed on the Regional Innovation Strategy Schleswig-Holstein (RIS-SH) on December 10th 2013. The RIS-SH contains the results of a SWOT analysis to identify potentials and challenges regarding innovation. Moreover, specialisation fields are defined. Innovation activities should focus on those. A general vision is presented from which aims and recommendations for action are derived to enhance the regional innovation process. Finally the strategy includes statements for a monitoring and evaluation scheme. The RIS-SH is the basis for the EU funding policy of the European Regional Development Fund (ERDF) during the program period of 2014-2020.

1. Analysis of regional context/analysing the innovation potential

The RIS-SH is based on a profound analysis of strengths, weaknesses, opportunities and threats (SWOT analysis) within the innovation policy of Schleswig-Holstein. Some essential results are presented here:

Strengths:

- SH has a well-developed basic infrastructure for research and development (R&D) (three universities, four universities of applied sciences, one art and one music academy as well as three private/ state-approved universities of applied sciences)
- Several renowned and in parts internationally excellent non-university research institutes are located in SH (e.g. in fields like power electronics, material sciences or ocean research).
- SH features grown structures of international cooperation between scientific institutes in the German – Danish border region (e.g. cooperation agreements between the Universities of Kiel and Flensburg and the University of Southern Denmark in Sonderborg).
- SH shows a strong positioning and a very dynamic development regarding the use of renewable energies for energy supply; having expertise especially in energy production by wind and biomass.
- Within the years 2007-2010 SH reached in average 46,4 start-ups per 10.000 workers, thus Schleswig-Holstein shows a high start-up dynamic compared to Germany as a whole (40,3 start-ups per 10.000 worker)¹
- SH hosts some well-developed clusters: the region shows strong positioning with high competencies in business and research within the fields of maritime economy, life sciences/ medical technology, renewable energies, food industry and ICT industry.
- Strong cross-innovation exchange relations exist between the technology fields of health sciences and medical technology & ICT, biotechnology & nanotechnology & materials technology as well as between maritime economy and technology & civil security research.

Weaknesses:

- SH is characterised by a low level of funding acquisition regarding national and European programs (programs of the national government, European research framework).
- SH suffers a very low and even declining patent intensity per 100.000 inhabitants.
- The economic structure is on one side characterised by a high number of small and medium sized enterprises (SME) (99,53% SME in SH; 99,35% in Germany) and on the other side by a high percentage of service oriented enterprises with discontinuous innovation activity and without their own R&D facilities.
- Large enterprises only run subsidiary plants in SH. Strategic decisions are taken in the headquarters outside the region. The plants in SH are rarely equipped with their own R&D department. Most of them serve as production sites only.

¹ In the original document it says 40,3% which is obviously wrong.

- R&D expenditures in the private sector in SH reach 0,57% of the gross domestic product (GDP) (2009). This result represents only 29,8% of the federal level.
- The share of personnel employed in R&D is 0,28% of the work force only, a value below average (Germany: 0,86%, EU27: 0,58%).
- A low participation of enterprises from SH participating in R&D-project funding of the national government underlines the lack of large and research oriented enterprises, being able to serve as project partners for universities and research institutes.
- There are only a few spin-offs from universities and no spin-offs at all from research centres run by large enterprises.

Opportunities:

- The availability of high-performance and application oriented public R&D infrastructure is an important link within the value chain of innovative clusters.
- SH has positioned itself as location for excellent research in selected fields (e.g. successful participation in national competitions like the German Initiative of Excellence) to enhance its attractiveness for outstanding researchers.
- The international expansion of using renewable energies offers possibilities for economic growth and start-ups in SH and contributes significantly to further job creation.
- Spin-offs from universities and R&D institutions contribute to the economic use of research results and create jobs for highly skilled workers.
- Thematically focused technology and start-up or innovation centres provide good conditions for newly founded enterprises in knowledge intensive fields.
- Successful cluster and network structures are important platforms to establish cooperation and thus play a major role in expanding interconnections within supply chains and in enhancing innovation opportunities.
- Connections between clusters are important for enterprises to open up new fields of application and to enhance cross-industry innovation opportunities.

Threats:

- There is an increasing competition (national and international) challenging every university (financing, program supply, research infrastructure etc.).
- An intensified location competition in research can be recognized concerning future issues (e.g. location competition in the field of offshore wind energy is currently dominated by the universities of Munich and Stuttgart).
- A further shortening of innovation cycles is challenging particularly SME because of their restricted resources.
- The focus on research and knowledge intensive products and services raises the requirements employees have to meet. Thus the competition between enterprises to hire the best qualified specialists intensifies.
- The lack of private or public venture capital for (more risky or radical) R&D projects prevents growth and innovation.
- Brain drain: many academics leave SH to settle down in urban growth centres.
- The supply and regional binding of specialists in Schleswig-Holstein is a challenge because of a cyclical requirement by regional enterprises depending on market conditions.

The importance of the SWOT analysis for Blue Growth

In general, the results concerning the innovation location SH can be transferred to the Blue Growth sector in SH:

Strengths: SH has pronounced scientific competencies in “blue” fields. The cluster of maritime economy is well developed and there are strong cooperative relationships with partners in the Baltic Sea Region.

Weaknesses: The lack of large enterprises having their own research departments and being able to push innovation within their industries, affects the “blue” sectors to the same extent as others.

Opportunities: The availability of public research institutes in combination with well-developed cluster structures provides opportunities for innovative enterprises, especially for those in “blue” sectors.

Threats: For “blue” sectors, as for all others, international competition increases. Specialists are hard to find outside of urban centres and difficult to attract to those areas. This is a disadvantage of SH compared to other German and European regions.

2. Setting out the RIS3 process - functional processes on the public side

Each region has its unique innovation system. To develop a targeted strategy based on this specific innovation system is the task a RIS3 process is supposed to perform. The strategy should be adjusted to regional resources and enhance “smart specialization”.

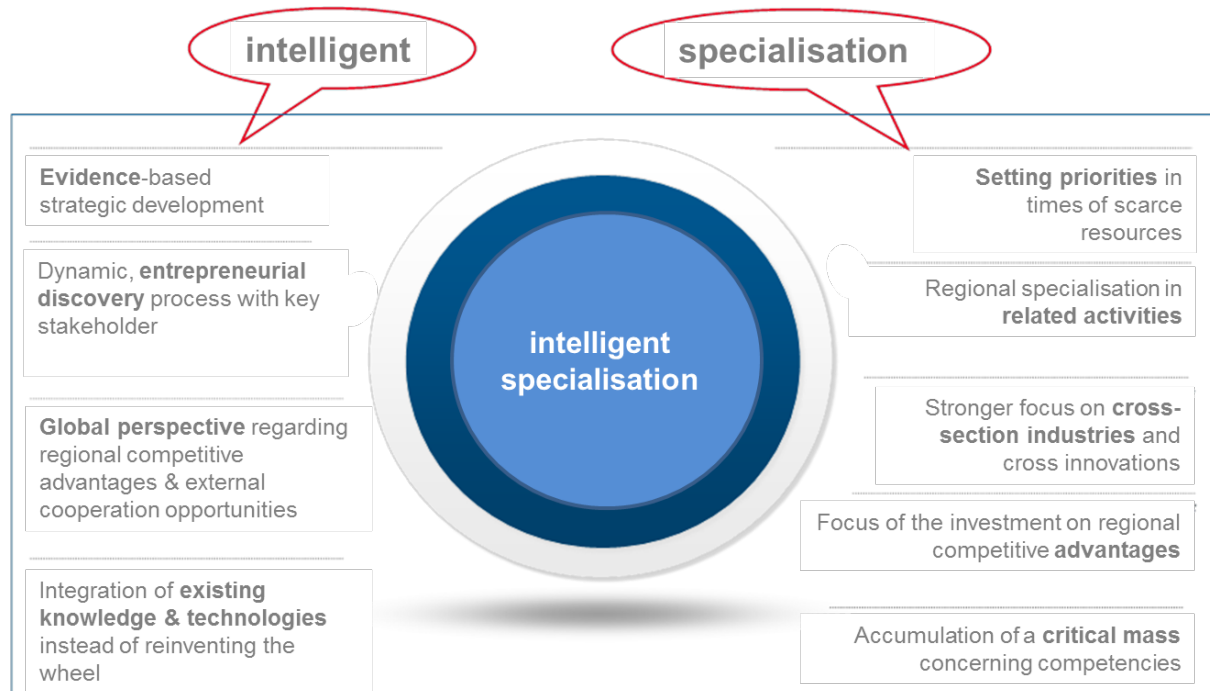


Figure 1. key components of smart specialisation; Prognos AG 2012, based on RIS3 guide of the European Commission

The RIS-SH has been elaborated within an intensive discussion process with different stakeholders in Schleswig-Holstein.

- At the beginning of the process, an assigned consultancy conducted 50 expert interviews with representatives of selected enterprises, universities, business development agencies and chambers of industry and commerce.
- The result of these interviews was a key issues paper, which was discussed during an innovation conference with 150 participants from all over the state of Schleswig-Holstein.
- In the following, an online survey was conducted...
- ...before the final coordination meeting of the government took place.
- At the end, the state government of Schleswig-Holstein officially agreed on the presented strategy.

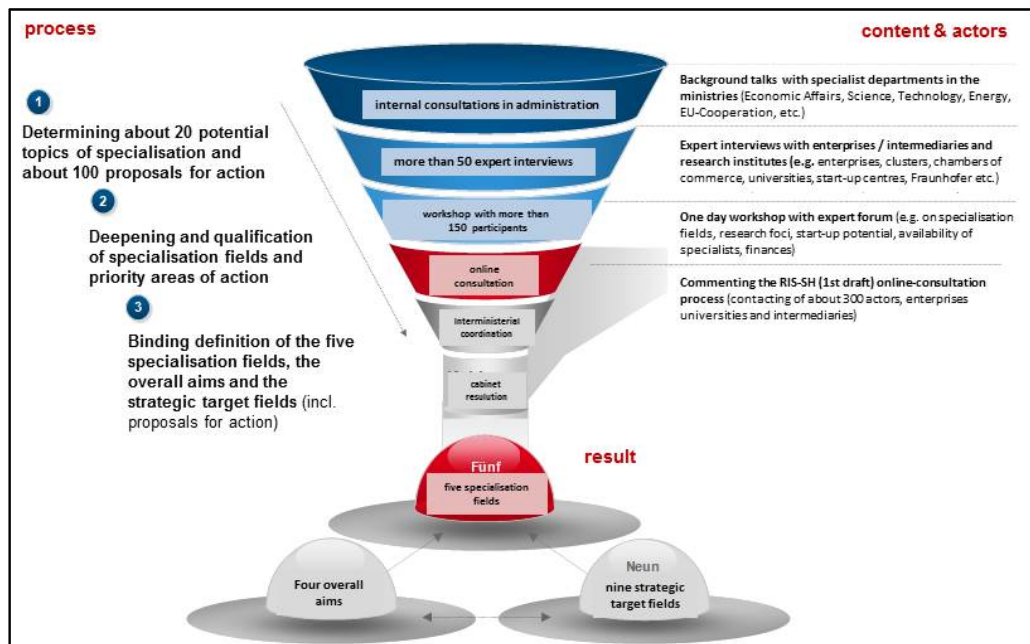


Figure 2: multilevel consultation process to determine specialisation fields and priority areas of action within the RIS-SH; Prognos AG 2014

3. Understanding of the target group

Scientific institutes on one hand side and enterprises on the other are the main actors in implementing RIS-SH.

Science in Schleswig-Holstein

The state of Schleswig-Holstein currently maintains nine public universities: the universities of Kiel, Luebeck and Flensburg, the universities of applied sciences in Kiel, Flensburg, Luebeck and Heide, as well as the Muthesius Arts Academy in Kiel and the Music Academy in Luebeck.

Besides those institutions of higher education Schleswig-Holstein hosts several non-university research institutes. Of particular relevance for innovation policy are the following:

- Helmholtz-Centre Geesthacht – Centre for material and coastal research
- GEOMAR Helmholtz-Centre for ocean research Kiel
- Leibniz Research Centre Borstel – Centre for Medicine and Biosciences
- Fraunhofer Institute for Silicon Technology (ISIT) in Itzehoe
- Fraunhofer Institute for Marine Biotechnology (EMB) in Luebeck
- Fraunhofer Project-Group for Medical Imaging (MEVIS) in Luebeck
- Alfred-Wegener-Institute (Helmholtz-Centre for polar and ocean research; branch offices on the islands of Sylt and Helgoland)

The universities and non-university research institutes cover the whole range between basic research, highly practical orientation and knowledge and technology transfer. They are key actors of the innovation system in Schleswig-Holstein. The geographical distribution of the public research infrastructure in Schleswig-Holstein is presented in the following map:

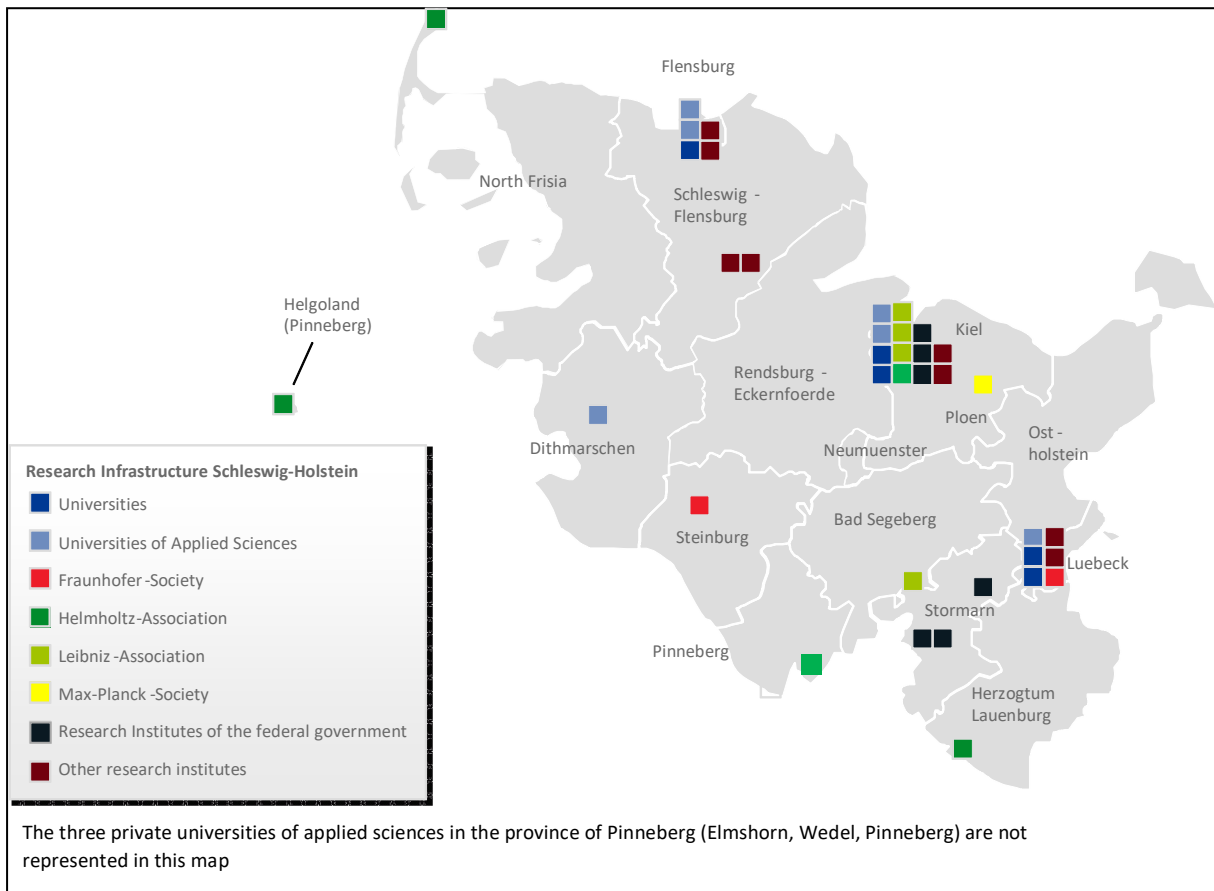


Figure 3: Public research infrastructure in Schleswig-Holstein; Prognos AG 2013 based on information by the regional government

To conclude, the research competencies in Schleswig-Holstein are focused on:

- Ocean research/ Maritime Technology
- Biotechnology, Medical Technology respective Life Science
- Microelectronics, Micro System Technology and Nanotechnology
- Renewable Energies
- Food Industry and
- Information & Communication Technology

Enterprises in Schleswig-Holstein

The business landscape in Schleswig-Holstein is dominated by small and medium size enterprises (SME). Some industries are characterized by a high degree of specialization and show a dynamic development process. Those industries are the main points of departure to develop specialisation fields in Schleswig-Holstein. Basically those industries are:

- Medical Technology, Pharmaceuticals and Healthcare (Life Science)
- Energy Economy
- Agriculture and Food Industry
- Vehicle construction (including ship yards)
- (high quality) business services (including ICT/ Software)
- Logistics
- Tourism

4. Developing a shared vision

Within the development process of RIS-SH, a shared vision and derived guidelines have been discussed with the stakeholders. Finally it was agreed on the following one:

Vision for an innovative state of Schleswig-Holstein

“Schleswig-Holstein addresses the global challenges of climate change, energy transition and demographic change with innovative solutions and thus evolves to become one of the most important European drivers for innovation until 2020. Thereby Schleswig-Holstein ensures economic growth, attractive jobs as well as sustainable development.”

Guidelines of the innovation strategy of Schleswig-Holstein

- Creation of an innovation and technology friendly social climate, open for technical issues.
- Growth of regional value creation by fostering a systematic and holistic innovation policy.
- Continuous development of a dialogue between enterprises and science, involving effective institutions and complex thinking people.
- Better connection of existing networks for efficient, trust based business relations. Strengthening the exchange of knowledge within and between the networks. Further extension of the networks.
- More application oriented foundation in research and science as well as in structural funds related to innovation policy.
- Moral support of the innovation process through better administrative services and more service orientation of all parties involved.
- More transparency and better compatibility between different units, departments and ministries concerning funding policy within the state and beyond.
- Development and strengthening of a mutual and cross departmental linking of different funding threads in innovation policy.
- Enhancing the cause and effect orientation of innovation policy support measures.
- Better involvement of economic, ecologic, social and global perspectives and sustainability principles within innovation policy.

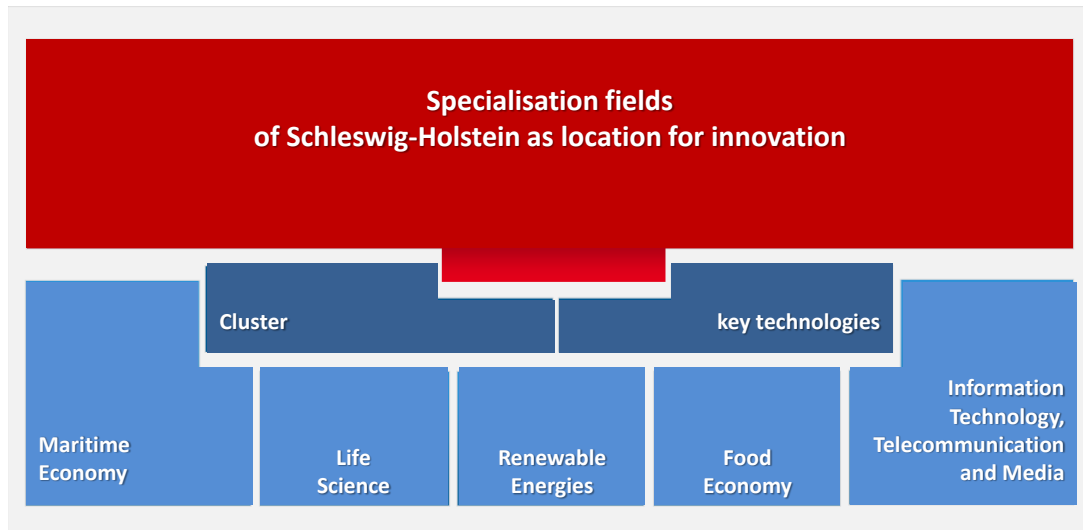


Figure 4: Specialisation fields within RIS-SH; Prognos AG 2013

5. Identifying the priorities

In the process of developing a strategy of “smart specialisation” Schleswig-Holstein has defined five fields of specialisation, on which innovation policy should focus:

- Maritime Economy
- Life Sciences
- Renewable Energies
- Food Industry
- Information Technology, Telecommunication and Media

Specialisation field Maritime Economy

Schleswig-Holstein, together with the Free and Hanseatic City of Hamburg and Lower Saxony, constitutes an important geographical hotspot in maritime economy. Accounting for more than 1.700 enterprises, about 47.000 employees and a yearly turnover of approximately 8,5 billion Euro, the maritime economy is the driving force behind the economy of Schleswig-Holstein.

The economic heart of this cluster in Schleswig-Holstein is the shipbuilding industry, comprising specialised ship yards and maritime suppliers. Of particular relevance in this context is the extraordinary knowledge and technology intensity of this industry. In-house research and technology transfer is every day business within the maritime cluster of Schleswig-Holstein. Thus, many parts of the shipbuilding industry in Schleswig-Holstein can be referred to as high-tech.

The development of maritime technologies in Schleswig-Holstein is mainly driven by specialised shipyards (ship building technologies, production development technologies, environmental technologies, energy and drive technologies, ICT) and maritime suppliers (naval technology, environmental technologies, ICT, energy and drive technologies).

In the field of offshore technology Schleswig-Holstein demonstrates also a high technological potential, e.g. concerning offshore energy (energy technologies, foundation technologies, ICT, transport and handling technologies/ logistics, surveillance technologies) as well as maritime environmental and polar technologies.

Finally marine aquaculture is another important technology in Schleswig-Holstein (blue biotechnology, process technologies, medicine technology, pump technology, environmental technology). For further development and application of maritime technologies, ship building and maritime equipment, it is furthermore important to have a highly specialized sector of engineering within the region.

For the future of Schleswig-Holstein it will be important to expand existing competencies, particularly within the future markets of offshore technologies, production of subassemblies and marine technology. The locational advantages of Schleswig-Holstein concerning wind energy plants and an effective grid development, offer the opportunity to link competencies of the maritime economy with new fields in energy economy and renewable energies (inter alia onshore- and offshore wind energy plants, energy management and energy efficiency).

Significance of this specialisation field for blue growth

All sectors of the maritime economy in Schleswig-Holstein contribute to blue growth.

Specialisation field Life Sciences

The Cluster Life Science comprises medicine technology and biotechnology/ pharmaceuticals. In cooperation with Hamburg and under the umbrella brand “Life Science Cluster Nord”, the cluster developed dynamically within the last years and increased the international competitiveness of the region.

With a total of about 500 enterprises, the value chain is represented well within the “Life Science Cluster North”. Concerning medicine technology Schleswig-Holstein is by now one of the top 3 locations in Germany. The sector consists of 150 enterprises, employs about 11.000 people and achieves a turnover of more than 2.8 billion Euro.

Schleswig-Holstein and the Free and Hanseatic City of Hamburg interact closely in the fields of medicine technology and biotechnology/ pharmaceuticals. Key technologies are imaging techniques, operation technologies, laboratory equipment as well as diagnostic and therapeutic methods. Particular competences exist in the fields of cell technology and molecular markers as tools for research, production and therapy.

High potential of development exists in the field of imaging processes. A variety of existing linkages between business and science underline this assessment (e.g. cooperation between the University of Lübeck and Philips Research Hamburg or the competence centre molecular imaging (MOIN CC), as well as the “Initiative Bildgebung e.V.”(action group: imaging processes).

Additional research competences in Schleswig-Holstein can be clearly recognized in the field of infection research (Small Molecules). The Research Centre Borstel (Leibniz-Centre for Medicine and Biosciences) and Marine Biotech (GEOMAR | Helmholtz-Centre for Ocean Research, Kiel) should be mentioned in this context.

Significance of this specialisation field for blue growth

In the context of blue growth, primarily marine biotechnology has to be mentioned. There are several application opportunities as for instance the research on pharmaceutical substances from the sea.

Specialisation field Renewable Energies

The state of Schleswig-Holstein is a pioneer concerning expansion and development of renewable energies. Thus, the state contributes substantially to the implementation of national and international targets in climate and energy policy. Priorities of the cluster renewable energies in Schleswig-Holstein are wind energy and the energetic use of biomass, as well as the field of energy distribution and storage.

The wind energy sector is mainly represented by SMEs located on the west coast of Schleswig-Holstein. This region ranks among the most important locations for wind energy in Germany. In addition Schleswig-Holstein hosts internationally operating wind energy enterprises. Those maintain not only research and development departments (inter alia REpower Systems² in Husum and Rendsburg) but also production facilities (inter alia Vestas, Nordex) in the state. The wind energy fair HusumWind is another important sectoral advantage of the region. Based on estimation, conducted by the wind industry itself, investments in wind energy reach around 2.5 billion Euros and create about 7,000 jobs directly and indirectly.

The energetic use of biomass has developed dynamically during the last years. The energy cluster in Schleswig-Holstein consists of about 100 enterprises and institutions, being engaged in the production of bioenergy. Until 2012, more than 5,200 new jobs have been created within the bioenergy sector in Schleswig-Holstein. Approximately 3,000 of these employees are working in biogas plants, being responsible for operation, construction, maintenance and repair.

The Fraunhofer Institute for Silicon Technology (ISIT) is technologically of particular importance, because of its competence centre for power electronics. The institute provides positive impetus in developing technologies for renewable energies, for instance by developing inverter modules for wind turbines.

According to a study (EPINION 2012)³, six universities in Northern Germany and the University of Southern Denmark are involved in major research programs concerning power electronics. The research focus is on semiconductor devices, power transformers, high-frequency transformers, electromagnetic sustainability simulations, thermic management of power energy components and the integration of renewable energies in power grids.

Significance of this specialisation field for blue growth

Concerning blue growth, offshore wind energy is the most important element within this specialisation field. In addition, research on energetic and substantial use of algae becomes more and more substantial.

² Change of name in 2014: Senvion

³ EPINION (2012): Power Electronics – Volume and demands for research in Schleswig-Holstein & the Region of Southern Denmark

Specialisation field Food Industry

The Food Cluster traces back to the traditionally strong importance of agriculture in Schleswig-Holstein, and still is a major sector of the state. Achieving a turnover of 6.3 billion Euro, employing 21,600 people (15.6 % of all employees in manufacturing industries) and reaching an export quota of about 21 %, food industry is the third largest sector within manufacturing in Schleswig-Holstein.

The technological engine is the food production, reaching a share above average in Schleswig-Holstein. The sector particularly focuses on conservation and refrigeration technologies. Relevant complementary technology sectors that should cooperate with food industry are mechanical engineering (production, plant and process technologies: represented inter alia by the university program “Food Processing” at the University of Applied Sciences Lubeck) and green biotechnology.

The processes of food production are increasingly oriented to sustainability criteria. Energy efficient and cost saving production processes, as well as warranty and assessment of food quality and security become more and more important in the field of food technologies.

Significance of this specialisation field for blue growth

“Blue” elements in food industry can be found in aquaculture as well as in research on algae in the food chain.

Specialisation field Information Technology, Telecommunication and Media

The economic focus of the IT and media cluster is on technology and innovation oriented IT-sectors (inter alia software development) and service oriented media activities (publishing houses, advertising agencies, internet services and printing offices). The cluster is characterised by very small enterprises: About 9,000 enterprises and a workforce of 24,000 people make up the IT-sector, while 10,000 enterprises and 15,000 employees are operating within media. Those numbers underline the unambiguous economic importance of this cluster for Schleswig-Holstein.

Concerning technologies with importance for the information and knowledge society, Schleswig-Holstein has particular competencies in software development and shows expertise in the field of service oriented media, inter alia in the area of internet services.

Strong technologies can particularly be found in markets like software systems engineering (modular redesign of outdated software), (industrial) imaging and image processing, data protection technologies (IT security & safety) as well as in the field of specific, fast-growing markets as e.g. maritime IT, software for renewable energies, medical information/ eHealth and eGovernment.

Furthermore, following national and European activities and objectives, Schleswig-Holstein has developed a broadband strategy. The core of activities is a sustainable expansion of an efficient communication infrastructure in form of fibre optic networks. The aim is to provide the whole state with broadband internet of at least 100Mbit/s until 2020.

Significance of this specialisation field for blue growth

Key reference for blue growth can be seen in IT-solutions for shipbuilding, e.g. IT for use on a ship’s bridge.

6. Defining an action plan with a coherent policy mix

In the context of RIS-SH, a policy-mix has been developed, to be able to implement the defined strategies. The policy-mix consists of nine sets of measures:

1. Targeted expansion of the regional research infrastructure

The planned measures are:

- Safeguard and further development of an attractive, appropriate research infrastructure for universities and non-university institutes.
- Establishment and expansion of laboratories for applied R&D projects to enhance knowledge transfer from universities.
- Moral support of excellent researchers in establishing new and internationally visible research groups and special research areas in Schleswig-Holstein.
- Intensification of cooperation between universities and universities of applied sciences, to combine different cultures.

2. Expansion of thematically focused competence centres at universities and research institutes

The planned measures are:

- Further development and expansion of thematically focused competence centres at universities and research institutes.
- Coordination of strategies for competence centres and cluster initiatives.
- Enhancement of application oriented R&D cooperation by supporting joint projects with enterprises (especially SME), using research funds from the federal government and the EU.
- Constant quality assessment of competence centres and their thematic focus through periodic, external innovation audits.

3. Intensification of communication in the context of knowledge and technology transfer

The planned measures are:

- Appropriate further development of transfer structures and expansion of the transfer network.
- Enhancement and further development of the WTSH (business development agency of Schleswig-Holstein) as key contact for enterprises concerning innovation issues.
- Improvement of the matching between R&D supply and demand.
- Strengthening of human and material resources for tasks in knowledge and technology transfer, R&D cooperation, inventor and start-up consulting.
- Support of concepts to convince private investors to fund research in Schleswig-Holstein.
- Enhancement of technology and start-up centres, as well as expanding their connections with neighbouring universities and research institutes.
- Strengthening of fund scouting, particularly on the national and EU level.

4. Sharpening the locational profile by targeted development and strengthening of clusters

The planned measures are:

- Development of an integrated strategy to enhance sustainable clusters within the state.
- Appropriate support of the cluster management during their development phase and afterwards when shaping their profile.
- Establishment of a cross-cluster coordination platform to enable content-related steering and implementing of superordinate cross-section tasks of the clusters.
- Support of the clusters in establishing international contacts.
- Enhancing coordination between cluster initiatives and other activities within the state (e.g. export and trade fair support, funding of research institutes and universities, promotion of competence centres).
- Establishment of a continuous monitoring of the clusters.

5. Increased funding of start-ups from science

The planned measures are:

- Dealing with the topics start-ups and structures and framework conditions for enterprises in schools to raise awareness.
- Enhancing spin-off activities from universities and non-university institutes by providing new strategic concepts and start-up friendly framework conditions.
- Targeted development of knowledge and technology transfer supply by universities and non-university institutes for company founders.
- Support of new entrepreneurs by providing appropriate financing offers to take advantage of market opportunities.
- Increased application of public funding for start-ups through targeted involvement of private investors.

6. Strengthening of business related innovation support

The planned measures are:

- Support of R&D activities in enterprises.
- Opening of funding programs for service oriented innovation.
- Support of (further) qualification in the field of innovation management.
- Awareness rising in public & publicly funded institutions for supply and competences of enterprises in the context of procurement.

7. Realisation of the energy transition and development of the bio economy

The planned measures are:

- Increasing R&D activities in the context of sustainable production, distribution and storage of renewable energies.
- Supporting the market launch of energy efficient technologies and environmental innovations, inter alia by supporting demonstration and pilot projects.
- Expansion of the value chain in renewable energies.
- Expansion of the competencies in the field of renewable energies/ energy efficiency at universities and research institutes in Schleswig-Holstein.
- Development of Schleswig-Holstein as a maritime oriented location for bio economy.

8. Securing the supply of experts

The planned measures are:

- Update of the expert initiative “*Zukunft im Norden*” (engl. Future in the North) as a state wide, life-phase oriented expert initiative covering the following core issues: quality of education, systematic, life long and in-service learning, acquisition and binding of experts
- Increasing the share of those groups, that have been underrepresented in the labour market so far, e.g. female and elderly employees.
- Enhancing diversity management, gender mainstreaming and human resource management in SME to develop a pool of experts and to diversify possible strategies for recruiting (more recruiting of migrants and experts from other EU countries).
- Continuous and adequate development of qualification and further training offers.
- Early binding of potential future employees during their phase of academic training, by establishing suitable cooperation between universities and enterprises.

9. Cross-border cooperation in innovation policy

The planned measures are:

- Support of cross-border cooperation with the region of Syddanmark concerning the fields of renewable energies and power electronics.
- Promotion of cross-border cooperation between cluster initiatives (especially in the field of medicine technology within the Hansebelt region).
- Linking institutions from Schleswig-Holstein with partner organisations in other countries to enable continuous “learning through cultural exchange” (INTERREG “Regions of knowledge” approach).
- Enhancing the visibility of the state of Schleswig-Holstein and its R&D actors by establishing and intensifying location marketing.

Those measures are not bound to any specific specialisation field, but they are supposed to characterise innovation policy as a whole. They are thus also to be used for all institutions, research centres and enterprises dealing with blue growth topics.

Some examples should be highlighted:

Ad. 1. expansion of the research infrastructure: there are concrete plans for expanding institutions in the field of marine technology.

Ad. 2. expansion of competence centres: One of the respective competence centres to be named in the “blue” context is the GMA (*Gesellschaft für marine Aquakultur*; engl. society for marine aquaculture).

Ad. 4. expansion of clusters: The MCN (*Maritimes Cluster Norddeutschland*; engl. Maritime Cluster of Northern Germany) is expanding across several northern German states (Schleswig-Holstein, Mecklenburg Western Pomerania, Hamburg, Bremen and Lower Saxony).

Ad. 7. establishment of bio economy: in the context of developing bio economy, Schleswig-Holstein focuses on maritime bio economy, as a contribution to foster blue growth.

7. Monitoring and evaluating

To monitor and evaluate the RIS-SH process, the state of Schleswig-Holstein has developed the following governance structure.

Elements of this structure are:

- The Innovation and Technology Forum Schleswig-Holstein: This event should take place once or twice a year, being open for all stakeholders of the innovation process in Schleswig-Holstein.
- The steering committee of the Innovation and Technology Forum: This small board consists of one representative of each group of stakeholders: universities, research institutes, chambers, unions, environmental agencies and the involved state ministries.
- The involved ministries are additionally part of the interministerial working group, established to exchange and match their positions.

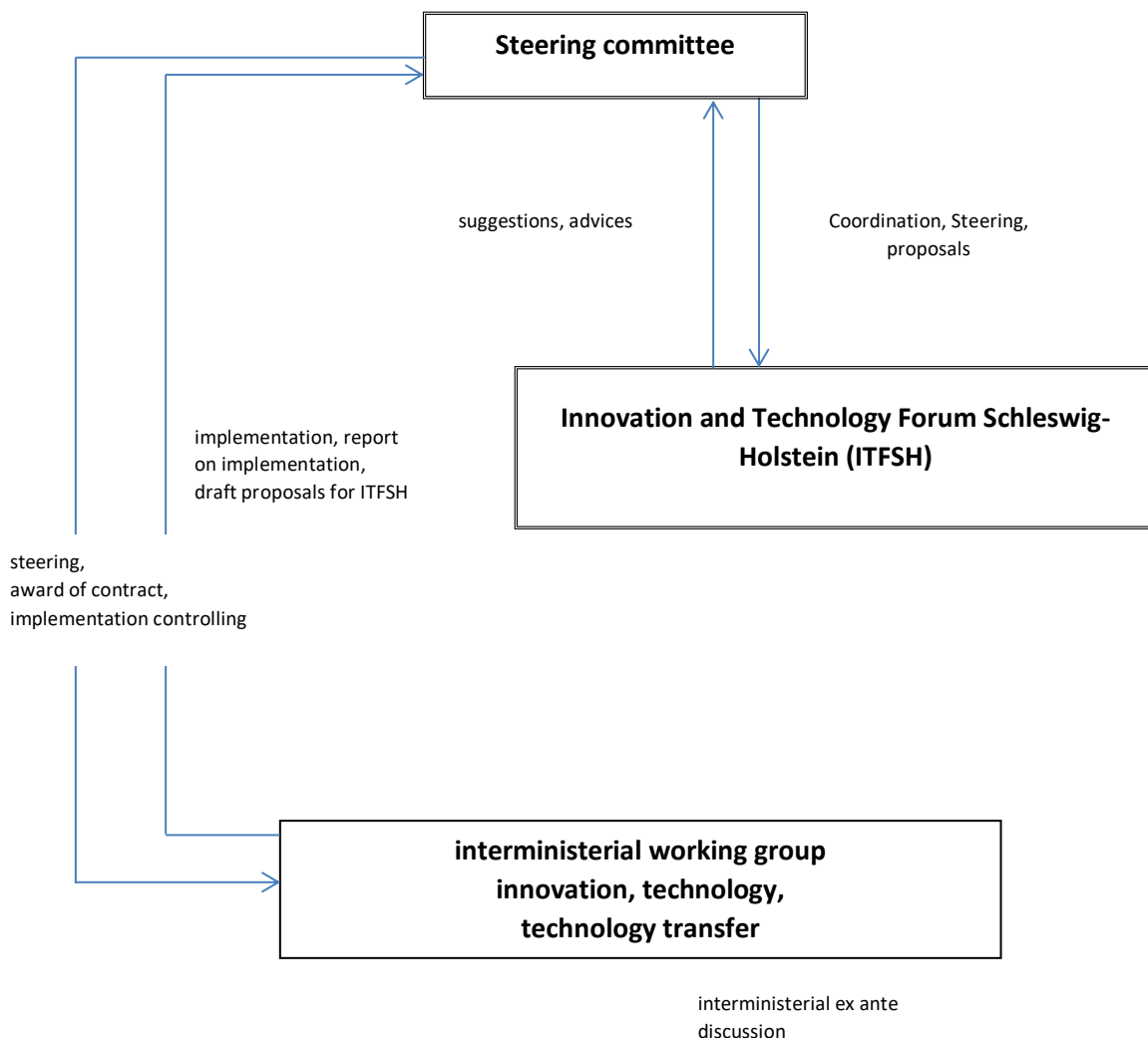


Figure 5: Developing and implementation scheme for technology transfer in Schleswig-Holstein; Rainer Wolff

Tasks of these structures are particularly:

- Monitoring and evaluation of the RIS-SH.
- Coordination between different ministries to improve and intensify cooperation.
- Collection and preparation of information concerning the innovation landscape in Schleswig-Holstein.
- A comprehensive strategic establishment of cluster and network activities.
- The assessment of new cross-sectoral issues/ technologies concerning their relevance for the state of Schleswig-Holstein.
- Implementation of a recurrent implementation controlling, carried out by the interministerial working group, in combination with a continuous development of working programs.

Monitoring approach in Schleswig-Holstein:

To reach a high level of efficiency in the use of financial as well as human resources during the innovation process, Schleswig-Holstein has established a complementary approach to monitor and evaluate RIS3 and OP ERDF.

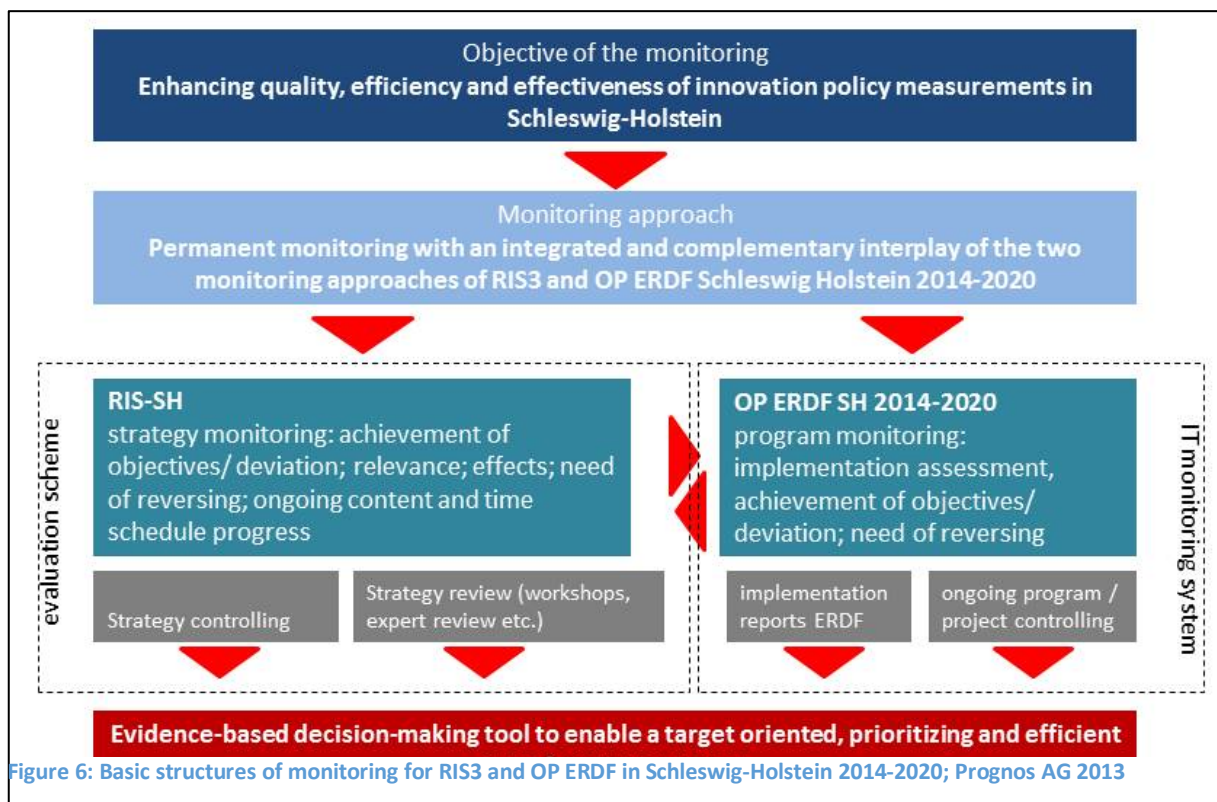


Figure 6: Basic structures of monitoring for RIS3 and OP ERDF in Schleswig-Holstein 2014-2020; Prognos AG 2013

The monitoring approach for RIS-SH is built up on two pillars: the strategy controlling and the strategy review for a deeper assessment of innovation policy measures.

Strategy controlling: is based on three categories of indicators

1. **Effect indicators** (“Wirkindikatoren”): refer to the level of the overall strategy. Data from the Regional Innovation Scoreboard is used to enable benchmarking on the European level. Examples are:
 - a. General position of Schleswig-Holstein in the Regional Innovation Scoreboard
 - b. Technological innovators
 - c. Innovations in SME
 - d. SME with innovation oriented cooperations
2. **Result indicators** (“Ergebnisindikatoren”): have been chosen to evaluate the success of the strategic orientation and the fields of activity. Data is taken from Eurostat and national statistics. Examples are:
 - a. Share of employees in R&D
 - b. Share of expenses for R&D
 - c. Share of employees in knowledge intensive sectors
 - d. Human resources in science and technology
 - e. Start-up intensity in technology and knowledge oriented sectors
 - f. Share of patents
 - g. Amount of third-party-funds
3. **Output indicators:** are embedded in the OP ERDF indicator system. Those indicators should be analysed for each specialisation field separately. Examples are:
 - a. Number of new scientists in supported institutions
 - b. Number of scientists working with improved research infrastructure
 - c. Number of enterprises working together with research institutes
 - d. Number of enterprises being supported to introduce new products
 - e. Private investments, complementing public support of innovation or R&D projects
 - f. Number of new members in clusters
 - g. ...

Strategy review: pursues the target to monitor the textual and temporal assessment of the RIS3 process in Schleswig-Holstein for future reversing and updating of the strategy. Decisions to further develop the strategy are based on special audits, assessing the fields of activity and associated measures. Possible approaches are:

- a. Stakeholder interviews (entrepreneurs, scientists,...)
- b. Regular expert interviews dealing with selected strategy areas
- c. Thematic workshops
- d. Network-analysis
- e. Special reports by scientific experts
- f. ...

The special audit topics will be chosen by a team of cross departmental experts. Possible topics are:

- a. Applied research infrastructure/ knowledge and technology transfer
- b. Cluster and network development/ cross-border cooperation
- c. Knowledge and technology oriented start-ups/ entrepreneurship
- d. Entrepreneurial innovation basis (SME)
- e. R&D for renewable energies, energy efficiency, bio economy
- f. Supply of skilled workers