
Regional Innovation Strategy Schleswig-Holstein RIS3.SH

Update 2020

Summary Report



July 2022

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1 Background, task, and definition of innovation

With the "Regional Innovation Strategy Schleswig-Holstein: Path to Smart Specialization" (RIS3.SH) adopted in 2013, the state of Schleswig-Holstein can look back on an impressive strategic discourse. Dynamic changes in technology, markets, and society continuously raise new questions and demand innovative solutions. Thus, the **innovation strategy has been defined as an agile system that responds to changing conditions**. Besides the importance of consolidating the proven and strategically effective approaches, it is vital to address new topics and set new political accents. In this way, additional forces are mobilized and bundled, especially where major challenges, but also future-oriented markets, arise. Schleswig-Holstein's innovation strategy is embedded in the strategic frameworks of both the federal government and the EU and defines specific regional priorities.

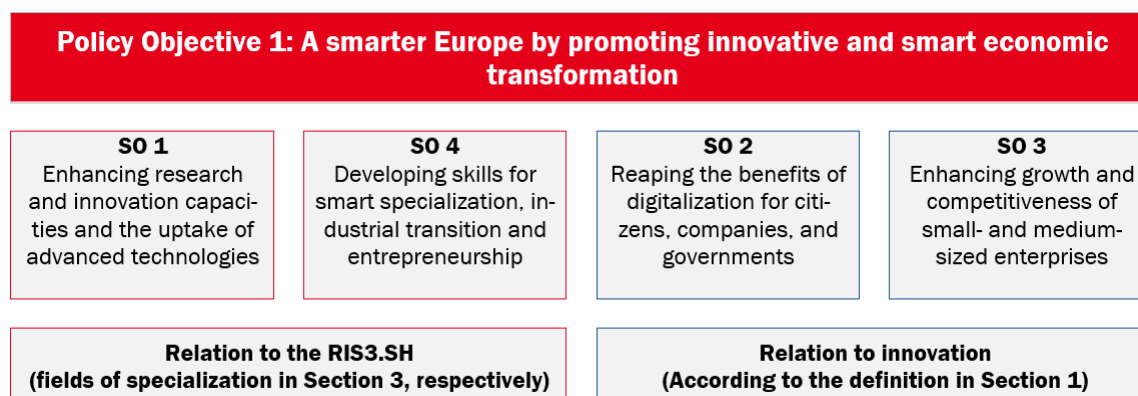
Within the regional innovation policy of the European Union, the approach of smart specialization has become a central component in recent years. As part of the updated smart specialization strategy, it will be even more important for Schleswig-Holstein to make use of those innovation potentials that build on existing structures of knowledge and economic skills (unique selling propositions) and that can thus stimulate sustainable economic growth. In the funding period 2021 - 2027, the federal states were required to update their existing **Regional Innovation Strategies for Smart Specialization**. The focus no longer lies on the identification of (new) fields of specialization, but rather on the progression of existing priorities and instruments and, above all, on the stabilization and consistency of the "entrepreneurial discovery processes (EDP)" and governance structures for the implementation of the RIS3 strategies throughout the entire funding period.

The **EU Commission** aims to strengthen the rule that Member States cannot claim expenditures for specific objectives if they do not fulfil basic prerequisites. In the context of Regional Innovation and Smart Specialization Strategies (RIS3), this is called "**good governance of the national or regional strategy for smart specialization**" and applies to the specific objectives 1 and 4 of the policy goal of "a smarter Europe by promoting innovative and smart economic transformation" (Figure 1).

The **updated Regional Innovation Strategy Schleswig-Holstein for the funding period 2021 - 2027** refines the existing innovation strategy of the federal state of Schleswig-Holstein. For this purpose, the fields of specialization will be further developed in terms of content and regarding promising applications and future markets (promising key enabling technologies). Schleswig-Holstein seeks to define the framework conditions in such a way that enables the companies in the federal state to increase their competitiveness and create jobs and training places while simultaneously conserving natural resources. Schleswig-Holstein's economic structure depends on small- and medium-sized enterprises (SMEs), which lend stability and strength to the region. However, especially for small- and medium sized enterprises and the handcraft industry it is vital to reduce bureaucratic obstacles and ensure an efficient policy support in the process of coping with key challenges – such as securing skilled labor, succession in companies (demographic change will increase the need for successors and make it more difficult to find new ones), digitalization, and strengthening research, development, and knowledge transfer. **A particular emphasis is put on activating small and medium sized enterprises for research activities, boosting the start-up and entrepreneurial culture, creating new forms of knowledge transfer, and increasing the dynamics of digitalization and new technologies for environmental and**

climate protection in connection with the energy transition. It is necessary to both support and develop traditional industries and expand promising future fields.

Figure 1: Political Objective 1 and its specific objectives in relation to innovation and the RIS3.SH

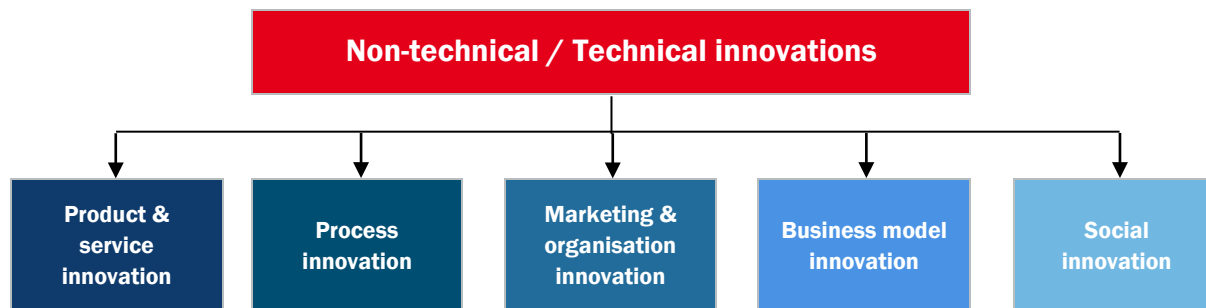


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Innovations are **crucial for increasing competitiveness and solving social challenges**. In general terms, innovations can be characterized as "novelties" with respect to products (including services), processes, or organizational forms that firstly address a technical, economic, organizational, or social problem in a targeted manner; and secondly prove themselves in a competitive market environment (profitability).¹ In the current policy debate, the term *innovation* is usually defined very broadly. In fact, this understanding not only encompasses new product features (**product innovations**), but likewise includes internal changes in processes (**process innovations**), new forms of work and process organizations, and new management systems (**organizational innovations**), as well as the development of new business models, new market structures, or market accesses (**business model innovations**) (Figure 2). In connection with new social challenges, non-technical innovations (e. g. **social innovations**) have also been increasingly discussed in recent years as a means of reducing or solving these problems. So-called *social innovations* play a special role. These belong to the group of non-technical innovations (although technical components can also play a major role here) but are strongly oriented toward increasing the common good (though commercialization need not be ruled out).

¹ OECD und Eurostat (2018): Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation. <https://doi.org/10.1787/9789264304604-en>.

Figure 2: Holistic understanding of innovation in the RIS3.SH



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Innovation processes are often complex and thus cannot be carried out by independent actors. Therefore, instead of conducting internal research and development (R&D), companies often purchase new technologies and machines to increase efficiency and productivity. Furthermore, companies (especially small- and medium-sized enterprises) must be supported in the uptake of existing innovations (support in an innovation context, strengthening the absorption capacity, innovation uptake).

In accordance with the Oslo Manual, all forms of technological and non-technological innovations are to be defined as eligible for funding in the updated Regional Innovation Strategy Schleswig-Holstein that

- are new to organizations and companies, and/or
- are applied for the first time within the state of Schleswig-Holstein.

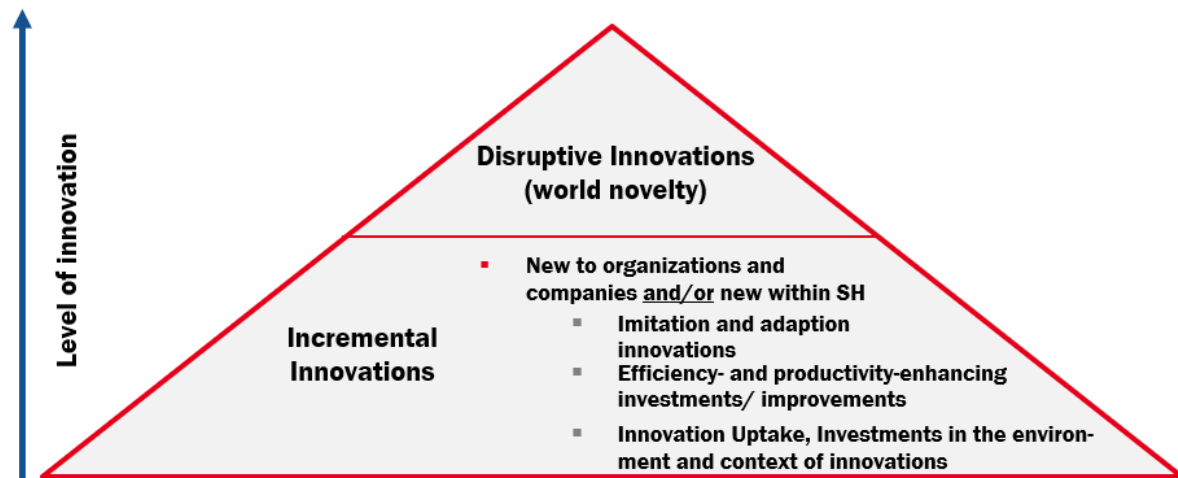
A supporting clarification is provided by the Oslo Manual.² A novelty falls under the definition of innovation that

- involve at least one recognizable variation on what already exists (at least one copycat or an adaptation innovation); and/or
- realize productivity, efficiency, and cost advantages; and/or
- facilitate the absorption and uptake of innovations and take place in an innovation environment or context (for example, change of generations, start-ups; see Figure 3).

It can be assumed that innovations with a higher degree of novelty and innovation measured against the previous state of the art also have a stronger effect on growth and employment. The exact degree of innovation is defined in the respective guidelines for a funding instrument.

² Especially regarding investments in the context of innovation see OECD und Eurostat (2018): Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, pp. 90-91. <https://doi.org/10.1787/9789264304604-en>.

Figure 3: Visualization of eligible innovations in the updated RIS3.SH



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2 Performance capacity of the innovation site Schleswig-Holstein: Strengths-Weaknesses-Opportunities-Threats-Analysis (SWOT)

With its universities, Hochschulen and non-university research institutions, the state of Schleswig-Holstein has a well-developed network of scientific and research facilities. These include various Fraunhofer institutions, GEOMAR Helmholtz Centre for Ocean Research, Helmholtz Centre Geesthacht (hereon) or the Christian-Albrechts-University in Kiel, the University of Lübeck and the University Hospital Schleswig-Holstein, which are internationally renowned research institutes. High research competencies exist, among others, in the areas of maritime economy, life sciences, or energy transition research and environmental technologies. In addition, Schleswig-Holstein has a dense network of start-up and transfer centers. The infrastructure consists of 17 technology and start-up centers, numerous coworking spaces and industry-related competence centers. In the context of technology transfer, a key actor is the **Wirtschaftsförderung und Technologietransfer Schleswig-Holstein GmbH (WTSH)**.

In 2018, the total **research and development ratio** (total research and development expenditures by gross domestic product) in Schleswig-Holstein was 1.64% (Germany: 3.13%, European Union 28: 2.12%). With a research and development ratio of 0.86% (Germany: 2.16%, European Union 28: 1.41%), the private research and development intensity in 2018 corresponded to 39.81% of the national and 60.99% of the European Union 28 value.³ These figures illustrate a high catch-up potential for Schleswig-Holstein, especially through a sustainable activation of companies in conducting research and development and innovation activities. The figures also reflect the structural absence of large companies and the small-scale industry structure in Schleswig-Holstein: 84.90% of private research and development expenditures in Schleswig-Holstein were made by companies with fewer than 2,000 employees. Compared with the national level, companies with 500 to 1,999 employees invest above average in research and development in Schleswig-Holstein. To enable further catching-up processes in Schleswig-Holstein, an important field of action is thus an even stronger activation of small- and medium-sized enterprises in conducting research and development and innovation activities.

The **Regional Innovation Scoreboard** of the European Commission classifies Schleswig-Holstein as a **Strong Innovator**; Schleswig-Holstein's reported innovation performance in 2019 was around 93% relative to the European average. The gap can be closed through more innovation-related cooperation between small- and medium- sized enterprises (around 63%) and an increase in research and development spending in the corporate sector (around 74%). There is also scope for action regarding tertiary education (only around 46% of the European Union average). The share of employees with a university degree in Schleswig-Holstein is only 11.7% (Germany: 16.8%). The weakness in research and development spending and human capital is reflected in the innovation output: per 100,000 employees, around 36 patents were registered in Schleswig-Holstein in 2017. In Germany, the patent ratio is around three times higher (just about 108 per 100,000 employees).

Opportunities for Schleswig-Holstein arise from the high innovation and growth potential at industry interfaces (for example in the fields of specialization) and from a dynamic increase of the

³ In the higher education and government sector, 0.79% of gross domestic product was invested in research and development in Schleswig-Holstein in 2018 (0.34% and 0.45%, respectively). This puts Schleswig-Holstein below the national level (0.98%) and above the European Union average (0.71%).

research and development ratio and research and development personnel in the private sector in recent years. Figure 4 provides a condensed overview of the **strengths**, **weaknesses**, **opportunities**, and **threats** (SWOT) for Schleswig-Holstein.

Figure 4: Strengths-Weaknesses-Opportunities-Threats-Matrix Schleswig-Holstein

Strengths	Weaknesses
<ul style="list-style-type: none"> Well-developed basic research and development infrastructure: three universities, six Hochschulen and two private/ state-approved Hochschulen. Several renowned, in part internationally outstanding, non-university research institutions (e. g. various Fraunhofer facilities, GEOMAR, Helmholtz-Zentrum Geesthacht) and universities (CAU Kiel, University of Lübeck, UKSH) High level of research expertise in the fields of maritime economy, life sciences, or energy transition research and environmental technology Dense network of start-up and transfer facilities (technology and start-up centers, competence centers, WTSH, coworking spaces) Sophisticated cluster structures in the fields of specialization Positive development in the acquisition of national subsidies Companies with 1,000 to 1,999 employees are the most important actors in the private research and development sector (they conduct 30.52% of all private research and development expenditures). With a research and development ratio of 0.26%, this class is also above the national research and development ratio of 0.18% Share of university graduates in STEM subjects (science, technology, engineering, mathematics) is 17.4% and thus above the national average of 13.6% 	<ul style="list-style-type: none"> Research and development ratio (as % of gross domestic product) and research and development personnel are below-average in all sectors, weaknesses especially in the private sector (Schleswig-Holstein: 0.86% of gross domestic product; Germany: 2.16% of gross domestic product) Below-average employment share in knowledge-intensive industries and services (Schleswig-Holstein: 24.51%; Germany: 31.45%) Ratio of employees with a university degree in Schleswig-Holstein (11.7%) is considerably lower than in Germany (16.8%) Low rate of first-year students (3.6 per 1,000 inhabitants, national average is 5.2 per 1,000 inhabitants) Small number of engineering graduates and low promotion rates Lack of large research companies with an antenna function to absorb supra-regional knowledge and diffuse it throughout the federal state Below-average investment in venture capital from 2011 to 2018 (Schleswig-Holstein: 0.13% of gross domestic product; Germany: 0.24% of gross domestic product) Below-average start-up intensity in technology- and knowledge-intensive industries Low patent activity and intensity (Schleswig-Holstein: 36.27 per 100,000 employees; Germany: 107.93 per 100,000 employees) Expandable digital infrastructure
Opportunities	Threats
<ul style="list-style-type: none"> High growth and innovation potentials at industry interfaces (cross-innovation, interdisciplinary research), especially between fields of specialization Alternation of generations /company takeovers in the context of successions may spur process innovations Dynamic development of research and development ratios and research and development personnel in the private sector Attractiveness of the university cities of Kiel, Lübeck and Flensburg Multiple future topics and application markets in the defined fields of specialization Energy transition and digitalization as drivers for innovation and growth Re-localization of production activities within the EU & increasing need for co-localization of research and development & production High innovation potential among small- and medium-sized enterprises Growth potential in export business: new middle class can lead to increased demand from emerging markets (direct access to North Sea and Baltic Sea, Lübeck is Germany's largest Baltic Sea port) 	<ul style="list-style-type: none"> Increasing national competition between universities and Hochschulen (financing, third-party funding, provision of research infrastructure, students, etc.) Intensification of locational competition in research on future topics (for example energy transition, digitalization) and increasing pressure to innovate Non-university research institutions are often insufficiently embedded in the regional innovation system Demographically induced decline in skilled workers Focus on research- and knowledge-intensive products and services intensifies competition for highly qualified specialists/managers Geopolitical dependencies due to cyclical development of the global economy and economic development in important trading regions (for example China or the USA) Innovation-inhibiting regulations (for example by the federal government or the European Union)

3 Fields of specialization in Schleswig-Holstein: Strengthen, focus, and promote existing capabilities

The updated **strategy for smart specialization** does not only improve existing strengths of Schleswig-Holstein's innovation system, but also aims to establish further growth potential by identifying future trends and key technologies (**Key Enabling Technologies**). In the course of the strategic process, these two components are being analyzed and sharpened in a participatory process including the central stakeholders of Schleswig-Holstein's innovation system. The result will be the progression and focusing of the existing fields of specialization. Table 1 summarizes the evaluation criteria pertaining to the definition of the fields of specialization.

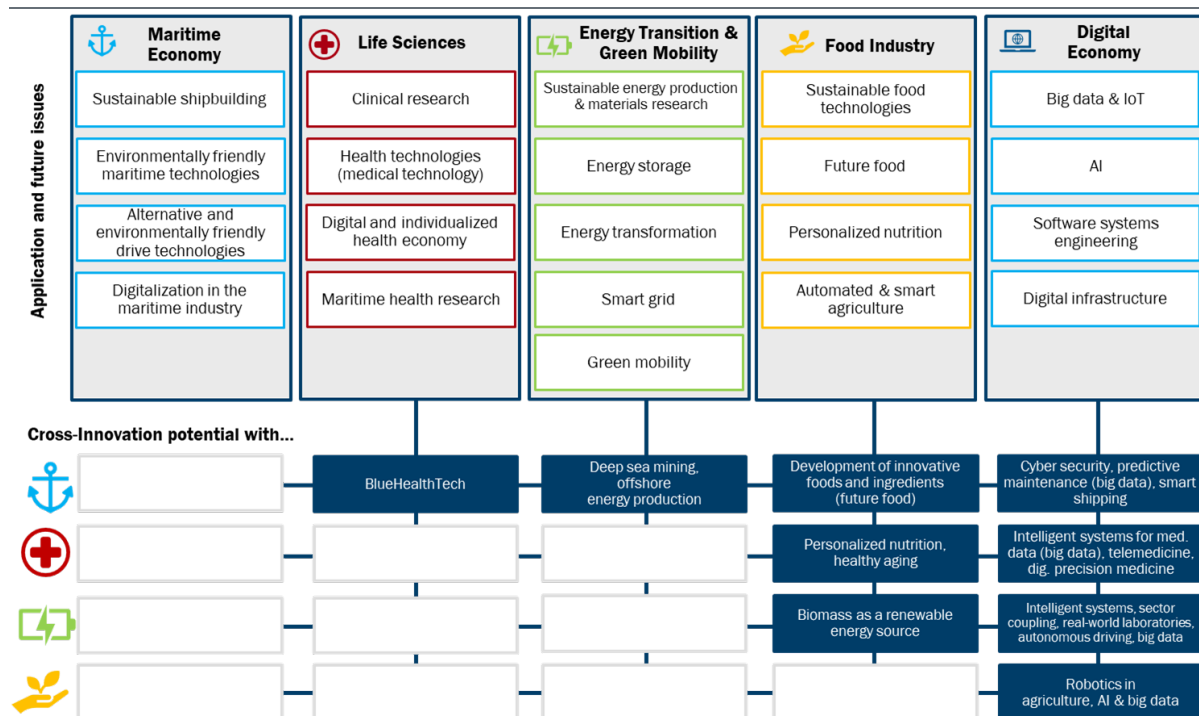
Table 1: Evaluation criteria for the definition of the fields of specialization

Evaluation criteria	Explanation
Knowledge, technology, and innovation focus	Degree of knowledge, technology, and innovation focus of the relevant industries within a field of specialization
Relevance of the fields of specialization	Delimitation and strategic relevance of the field of specialization within Schleswig-Holstein
Economic core	Economic relevance and concentration of the central industries of a field of specialization
Cluster and Research structures	Critical mass of actors, density, and excellence of the existing research landscape within a field of specialization
Future and growth potential in the fields of specialization	Future topics and application markets of a field of specialization, relation to global megatrends and current social challenges

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Based on the quantitative analyses and the entrepreneurial discovery process, **application, and future issues** (promising key enabling technologies) are identified for Schleswig-Holstein's five fields of specialization. Considering the strategic focus, the updated RIS3.SH incorporates the further development of existing fields of specialization, namely **renewable energies** and **information technology, telecommunications, and media** into the main focus areas **energy transition and green mobility** as well as **digital economy**. Figure 5 summarizes the identified application and future issues with high potential for future value creation within the fields of specialization. In these areas, Schleswig-Holstein is endowed with economic and scientific competencies translating into reliable and robust development opportunities.

Figure 5: Application and future issues in Schleswig-Holstein's fields of specialization as well as cross-innovation potentials



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Schleswig-Holstein will continue to strengthen the innovation capacity of the **maritime industry** along the entire value chain, especially focusing on cross-sectional technologies. Within the maritime economy, this applies not only to shipbuilding but also to maritime technologies. Among the cross-sectional applications, sustainable drive systems in the shipping sector and digital maritime applications constitute seminal fields. In the future, Schleswig-Holstein will continue to use its natural location to test research results directly in application.

Life sciences in Schleswig-Holstein are characterized by companies with strong research departments and a dense network of research institutions, academic medical centers, and (technical) Hochschulen. Further growth opportunities arise both within the life science sector and through an increasing focus on interdisciplinary exchange (for example with the food and digital sector). In that regard, a wide range of application and future markets like **clinical research**, **health technologies** (medical technology), **the digitalization of the healthcare system**, and **personalized medicine** is present.

Climate change, energy transition, and the necessary reduction of greenhouse gas emissions are key drivers for the specialization field **energy transition and green mobility**. The sustainable production, storage, and distribution of electricity and fuels will be one of the major global challenges in the upcoming years, both technically and economically. Due to the natural conditions and the high natural production capacities, Schleswig-Holstein remains a crucial actor in the transformation of the energy and mobility systems. Nevertheless, the focus of the

specialization field of renewable energies has evolved and shifted (also due to inhibitory regulatory framework conditions and a sluggish grid expansion). Therefore, there is a need for a change from the sectoral view to an energy transformation. This is clearly reflected in the new denotation of the specialization field. In order to make even more extensive use of the good natural conditions for the generation of clean energy, it will be necessary to place a greater emphasis on a systemic approach and to exploit the new industrial opportunities arising from this. In addition to **materials research** and **renewable energy production**, key future issues and application markets are given by **energy storage** and **transformation**, as well as the **digitalization** of the energy and mobility system. Taking up this systemic notion, **sector coupling**, referring to the intelligent interlinking of the energy, heat and mobility sectors and the implementation of renewable energies in these sectors, acts as a connecting factor. Therefore, integrating alternative drive technologies (for example, electromobility, hydrogen) and autonomous driving for application fields outside of shipping (for example, rail sector), marks a conducive expansion of the field of specialization by a mobility component.

In the wake of climate change, Schleswig-Holstein's **food industry** faces the challenge of rendering food production more environmentally friendly, resource-efficient, and taking even greater account of environmental aspects. Furthermore, to be competitive, the industry needs to continue to find economically successful process and product innovations. In this context, the use of new resources as **food technology substitutes** is increasingly coming into focus (**Future Food**). In addition, the food industry also has a wide range of cross-innovation potential, especially with the life sciences (**personalized nutrition**) and the digital economy (**automated and smart agriculture**).

In terms of cross-innovation and cross-sectional potential in all fields of specialization, the **digital economy** has emerged as the primary enabler and hinge alike: As a cross-sectional technology, it is the technological driving force underlying research and development processes and innovations in other sectors of the economy. Examples include cyber security and autonomous driving in shipping, the digital and individualized healthcare industry (e-health), the development of intelligent energy and transportation networks, and automated agriculture. This outstanding position as a cross-sector industry is taken into account by expanding the field of specialization beyond the previous industry definition. To meet the high and heterogeneous demands from diverse industries, it is crucial to develop further research priorities and competencies within the digital economy of Schleswig-Holstein in the upcoming years. In this regard, **Big Data & Internet of Things, Artificial Intelligence, Software Systems Engineering**, and the expansion of the **digital infrastructure** are key applications and future markets.

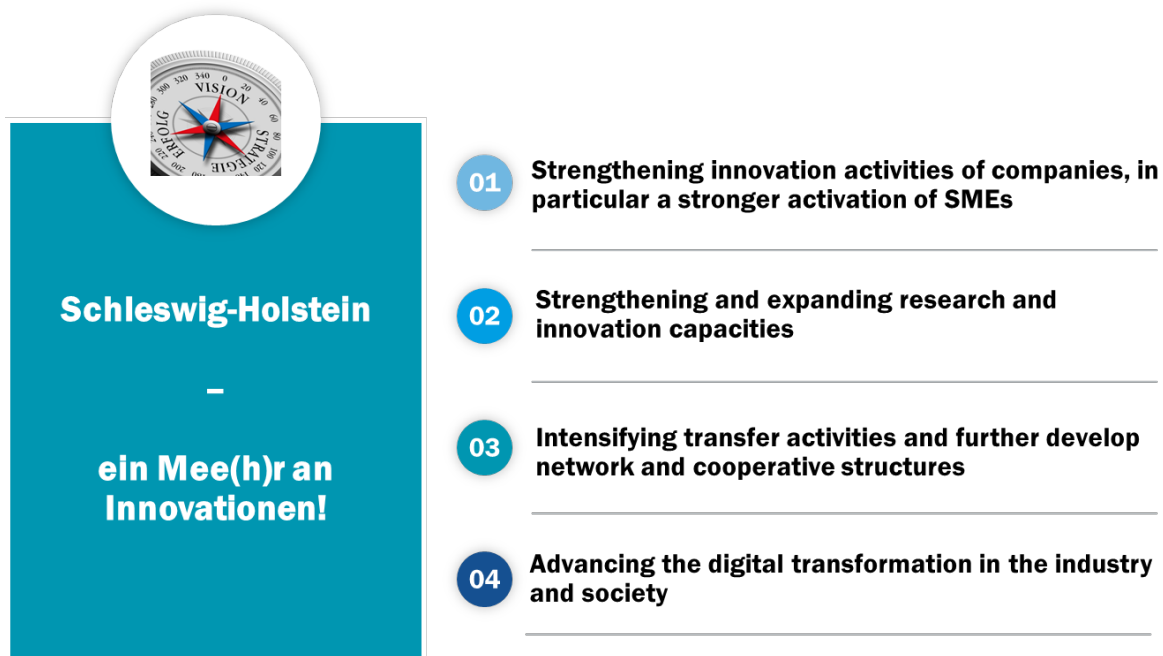
Prospectively, innovations will increasingly arise at the intersections between industries and fields of specialization. Therefore, cross-industry innovation will become a strategic imperative. By linking actors from different business and research sectors, new impulses for knowledge generation are stimulated, which in turn can result in competitive advantages for companies (especially small and medium sized enterprises). In sum, the promotion of cross-innovation potentials represents a focal point of the updated Regional Innovation Strategy Schleswig-Holstein. The cross-innovation potentials between the fields of specialization are also shown in Figure 5.

4 Vision and strategic approach

Vision

A shared vision for Schleswig-Holstein's future constitutes a significant foundation for the updated Regional Innovation Strategy Schleswig-Holstein. It is a key factor for sustainably implementing the strategy by involving key actors of the innovation system. Through an intelligent and dialog-oriented innovation policy under the guiding slogan **"Schleswig-Holstein – ein Mee(h)r an Innovationen!"**, the Schleswig-Holstein state government wishes to contribute to the realization of the following vision for the regional innovation strategy for intelligent specialization: Schleswig-Holstein is a state of innovation characterized by groundbreaking ideas and new ways of thinking and acting in order to mutually shape the future in a global community. The state's stakeholders are opening new perspectives for upcoming social and technological challenges by developing intelligent, resource-saving and climate-friendly solutions.

Figure 6: Vision and fields of action in the updated RIS3.SH



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Strategic fields of action

In four strategic fields of action, the Regional Innovation Strategy Schleswig-Holstein sharpens the overarching vision in areas that are particularly significant for the **implementation of technical and non-technical innovations**. The four strategic fields of action reflect the identified challenges

for Schleswig-Holstein. They cut across economic sectors and focus on the political target areas for strengthening Schleswig-Holstein as a location for innovation and science. The defined fields of action in Schleswig-Holstein are summarized in Figure 6.

Field of action 1: Strengthening innovation activities of companies, in particular a stronger activation of small- and medium-sized enterprises

To sustainably increase the research and development intensity of companies, Schleswig-Holstein must succeed even more in anchoring innovation activities and strategies in the DNA of local companies and improving the overall conditions for companies. Therefore, the Regional Innovation Strategy Schleswig-Holstein designs an innovation support in a more application-oriented and systematic way. In addition, innovation support is oriented at the entire innovation process and explicitly includes both **technical** and **non-technical innovations** (field of action 1.1). Against this background, it is important to promote a broad awareness of the importance of systematic innovation processes in companies. Continuous innovation processes must increasingly be understood as necessary means for increasing the company's own growth potential and ought to be enshrined in the company culture.⁴

There is additional potential for increasing private research and development activities in Schleswig-Holstein by **activating companies** that have not yet innovated. **The focus particularly lies on small- and medium-sized enterprises.** Aiming to minimize the existing barriers to innovate among companies that have not yet innovated and to promote further incentives for private innovation projects, Schleswig-Holstein is establishing a **low-threshold innovation support** for innovation projects by small- and medium-sized enterprises. The goal of entry-level funding for innovation projects is to support the planning, development and implementation of application-oriented and technology-oriented research and development projects that are closely related to the defined fields of specialization (field of action 1.2).

In addition to the activation of additional companies, another focus of Schleswig-Holstein's innovation policy is to **increase the number of start-ups**. Schleswig-Holstein continues to build a start-up-friendly environment in which innovative founders and new business models are promoted and a supportive environment of equity capital and experienced mentors is expanded (field of action 1.3). In addition to the low-threshold funding for innovation projects in small- and medium-sized enterprises, the **low-threshold funding for innovation projects in start-ups** also plays an important role in Schleswig-Holstein's funding strategy.

Field of action 2: Strengthening and expanding research and innovation capacities

Universities, Hochschulen, and non-university research institutions are the foundation for a broad regional knowledge base (especially in the fields of specialization) and **focal points** for regional learning and innovation processes. Therefore, Schleswig-Holstein continues to support the **expansion of research infrastructures** at universities, Hochschulen, and non-university research institutions. The thematic focus particularly rests on the identified fields of specialization and key technologies. In addition to universities and Hochschulen, the expansion explicitly includes the settlement of additional non-university research and development institutions with basic funding from the federal government (field of action 2.1).

⁴ The relevance of private innovation activities for the innovation system in Schleswig-Holstein is highlighted by the company innovation funding of approximately €70 million provided by the state in the past funding period (ProNord funding database, as of 17.8.2020).

Moreover, the Regional Innovation Strategy Schleswig-Holstein focuses on the **further development and intensification of regional cooperation** between existing universities, Hochschulen, and non-university research institutions (field of action 2.2). Basic research at publicly funded research and development institutions being associated with high risks, uncertainties and costs is a fundamental source of knowledge creation and a prerequisite for innovations in companies. Important knowledge carriers such as GEOMAR, the Helmholtz-Zentrum Geesthacht, or the Fraunhofer institutions EMB and MEVIS are not yet sufficiently integrated into the regional networks in Schleswig-Holstein. On these grounds, a stronger regional cooperation between public research institutions offers considerable innovation potentials for Schleswig-Holstein, particularly the fields of specialization. A variety of **cross-innovation potentials** arise through increasing cooperation between the fields of specialization. In the future, cross-sectoral cooperation will serve as an enabler for growth and innovation processes in various industries in Schleswig-Holstein.

The performance of the existing research and development infrastructure and its network structures are continuously evaluated to ensure a transparent monitoring. This is the basis for identifying the strengths and weaknesses of the research infrastructures and, building on this, to achieve an **impact-oriented increase** in quality by continuous adjustments. Consequently, Schleswig-Holstein will conduct a continuous benchmarking of research infrastructures and an ongoing development of new research and development topics in Schleswig-Holstein's fields of specialization and key technologies (field of action 2.3).

Field of action 3: Intensifying transfer activities and further develop network and cooperative structures

Schleswig-Holstein's innovation policy supports the constitution of **new structures for the knowledge and technology transfer**. In that regard, the path taken by the former Regional Innovation Strategy Schleswig-Holstein is being consistently continued. The basis is a continuous, mutual exchange between the stakeholders, in which an interdisciplinary approach is embraced. Thus, an intensified transfer, not only between companies and research institutions, but also between research fields and economic sectors, is called for. In addition to an interactive matching platform, physical locations fostering a continuous interpersonal exchange are being created in the form of **open spaces, hubs, and real-world laboratories**. Another specific focus is on strengthening the transfer of knowledge and technology between companies and (technical) Hochschulen (field of action 3.1).

Schleswig-Holstein has established sophisticated **cluster structures** in each field of specialization. These clusters link companies, research institutions, and intermediaries in the respective field of specialization and represent a core component of knowledge and technology transfer in Schleswig-Holstein. Schleswig-Holstein continues to support the mutual integration between the regional industry and research institutions in clusters and networks. Novel incentives are used to develop **application-oriented networks** and to support the **initiation of cross-cluster projects** (field of action 3.3).

Strengthening transfer activities is not limited to the existing research capacities in Schleswig-Holstein; national and international cooperation needs to be equally considered in order to ensure transfers of new knowledge to Schleswig-Holstein and to avoid lock-in effects (field of action 3.4). In particular, the **Hamburg metropolitan area** offers Schleswig-Holstein a wide range of promising opportunities and potential for expanding national cooperation (see for example the Hydrogen Strategy for Northern Germany). The research institutions and large companies located in Hamburg especially provide a variety of opportunities to benefit from the knowledge and

expertise circulating there. For this reason, the **commercial areas on the edge of Hamburg** should also be revitalized, and the innovation systems of Schleswig-Holstein and Hamburg should strengthen their linkages.

Field of action 4: Advancing the digital transformation in the industry and society

To benefit from continuing digitalization, absorb global trends and ultimately develop competitive advantages, Schleswig-Holstein's employees and companies rely on interdisciplinary skills and a holistic understanding of the digital transformation. For this reason, **the field of action "Digital Transformation" is included in the updated Regional Innovation Strategy Schleswig-Holstein.** Schleswig-Holstein assists the research and industry sector to increasingly use digital technologies and solutions (including games, virtual reality, augmented reality, artificial intelligence) with the aim of defining and developing new markets (field of action 4.1). To this end, more **low-threshold support instruments** for the development of digital applications (for example artificial intelligence or big data) and products (for example software) are offered to companies.

Schleswig-Holstein is also creating new spaces to test and apply digital solutions in industries and key technologies. This requires more **digital factories** and **artificial-intelligence-application centers** in Schleswig-Holstein (digital application hubs). These hubs pool digital competencies, advise Schleswig-Holstein actors on digital challenges, and represent focal points for digital innovations. The **digital application hubs** should be designed with low thematic restrictions and address a wide range of stakeholders: founders, companies, and researchers (field of action 4.2).

Broad participation by people, research institutions, companies, and regions is an important aspect of embracing technological change and digitalization. Digitalization processes ought to contribute **to solve social challenges**, in both urban and rural areas. A prerequisite for this is the development of a high-performance digital infrastructure in Schleswig-Holstein (fiber optics, 5G, etc.) Digital and intelligent systems offer manifold opportunities to improve services of public welfare and living conditions in the sub-regions of Schleswig-Holstein. Thus, Schleswig-Holstein encourages the development of digital, linked systems (for example in the areas of education, telemedicine, mobility, logistics, energy, tourism) to resolve societal challenges and issues of general interest in urban and rural areas (field of action 4.3).

Figure 7: Summary vision and strategic fields of action in the updated Regional Innovation Strategy Schleswig-Holstein



5 Governance structures and monitoring of the updated Regional Innovation Strategy Schleswig-Holstein

Governance structures

Effective governance structures and a smooth functioning of the so-called entrepreneurial discovery process are two critical success factors for the efficacy of regional innovation strategies. Overall, the so-called "quality of regional governance" is an important variable explaining (the variance of) regional growth and innovation.

A **continuous supervision** of the updated Regional Innovation Strategy Schleswig-Holstein should still take place within an **inter-departmental working group**. In the interest of achieving an impact-oriented increase in quality, a regular and continuous exchange within the inter-departmental working group is mandatory. Strategic tasks include

- improving the dialogue and coordination between the participating departments of the state government and central intermediaries to further improve their cooperation;
- evaluating new and cross-cutting topics/technologies in terms of their relevance for the federal state of Schleswig-Holstein (see below: continuous entrepreneurial discovery process);
- regular strategy reviews on the progress of the strategy, achievement of objectives and/or need for adjustment (if necessary, with the help of external expertise); and
- overall support for the ongoing development of the innovation strategy and its implementation programs.

The **Panel for Innovation and Technology (ITF.SH)** has established itself as the key annual event to discuss and refine the innovation policy in Schleswig-Holstein. In the future, it will continue to ensure the comprehensive involvement of the relevant groups and stakeholders. Within this format, recent improvements and trends can be presented, discussed, and mirrored. The transfer of the findings from this entrepreneurial discovery process into the governance structures is ensured by the **steering committee of the ITF.SH**. Among others, the steering committee consists of chambers of commerce as representatives for the economy, business developers, universities, and (technical) Hochschulen as well as non-university research institutions. The steering group should operationally support the creation of synergies within the innovation support and within the respective fields of action of the innovation strategy.

Monitoring

The requirements of the European Commission demand a monitoring and evaluation concept to continuously measure the effects of the updated innovation strategy. An effective monitoring system can be used to for performance review purposes to contribute to a sustainable further development of the RIS3.SH. The evaluation of the Regional Innovation Strategy Schleswig-Holstein takes place on different levels, which consider different actors and aspects:

1. Monitoring of the funded activities
2. Monitoring of the indirect effects in science and economy (direct effects on the funded actors)
3. Monitoring of the macroeconomic effects (indirect effects in Schleswig-Holstein)

The first two levels demand a direct relation to the funded activities, that is, monitoring target values in a narrower sense. The third level evaluates potential impacts of the innovation strategy in Schleswig-Holstein. This dimension serves the general follow-up of socio-economic developments, not least to be able to react to relevant changes by adjusting the strategy and policy instruments. At all levels – wherever possible with reasonable effort – differentiation according to fields of specialization is required to be able to track and evaluate developments also in the light of the thematic priorities formulated within the strategy. **The data collected will be processed in a periodic report on innovation activities in Schleswig-Holstein that is published every two years.**

Imprint

Regional Innovation Strategy Schleswig-Holstein RIS3.SH
Update 2020 – Summary Report

On behalf of

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