

IDENTIFICATION OF MARITIME TECHNOLOGY DEVELOPMENT
MECHANISMS IN THE CONTEXT OF LATVIAN SMART SPECIALISATION
AND BLUE GROWTHE. Pudzis¹, A. Adlers¹, I. Pukite¹, S. Geipele¹, N. Zeltins²¹ Riga Technical University,
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Recognising the fact that economic realities change the world faster than global politics, in 2010 the European Commission approved the strategy for smart, sustainable and inclusive growth, called EUROPE 2020, in order to promote greater economic independence and achieve a more sustainable future. The strategy puts forward three mutually reinforcing priorities: (P1) Smart Growth: developing an economy based on knowledge and innovation; (P2) Sustainable Growth: Promoting a more resource efficient, greener and more competitive economy; (P3) Inclusive Growth: Promoting a high-employment economy delivering social and territorial cohesion.

In the context of EUROPE 2020, the Smart Specialisation Strategy in Latvia (RIS3) has been set up and introduced as a strategic document for the development of support mechanisms of high value-added economic growth, including the maritime technology sector.

The present study explores the mechanisms for the introduction of Blue Growth and RIS3 Strategies, which should be used to develop the maritime technology industry by assessing the efficiency of these mechanisms. Thus, the study addresses the issues of the implementation of modern technologies in the coastal municipalities and planning regions of Latvia.

Keywords: *Blue Growth, maritime technologies, Smart Specialisation*

1. INTRODUCTION

European governments have developed different development strategies in compliance with the European cohesion policy reformed by the European Commission and the overall sustainable development of the European Union (EU) in the medium and long term in order to become part of the world of technological advances,

use renewable resources efficiently, create additional added value, promote the development of interdisciplinary areas and support social innovation.

Global economy has started to show signs of recovery and yet policymakers and business leaders are concerned about the prospects for future economic growth. Governments, businesses and individuals are experiencing high levels of uncertainty as technology and geopolitical forces reshape the economic and political order that has underpinned international relations and economic policy for the past 25 years. At the same time, the perception that current economic approaches do not serve people and societies well enough is gaining ground, prompting calls for new models of human-centric economic progress [1]. Consequently, relatively new economies, such as the Latvian economy, should adapt to the common global and European trends in order to maintain their competitiveness on the international scene.

The aim of the research is to examine the available information on the implementation mechanisms of the marine technology industry intended for the use of marine and coastal resources in Latvia for the efficient implementation of RIS3 in the context of Blue Growth. To achieve the set aim, the following tasks are put forward: to study the concept of blue growth, its role in political documents and the impact on economic and environmental development, as well as identify the growth opportunities of the maritime technology industry in Latvia.

The methodology of the research: within the framework of the research, qualitative research methods have been used – the analysis and synthesis, induction and deduction, logically constructive, historical approach methods, information analysis and compilation, comparison, expert interviews and focus group method. The research is based on the information collected after a detailed analysis of documents (EU level planning documents, national planning and policy documents, regional and local planning policy documents) and information obtained in interviews and focus groups with national, regional and local experts.

The goal of the Smart Specialisation Strategy (RIS3) in Latvia is to increase the capacity for innovation as well as create an innovation system that promotes and supports technological progress in the national economy. Consequently, the choice of a national economic transformation strategy is closely related to the overall level of economic development and the competitive advantages (existing and potential) both at the national and regional levels [2].

The National/Regional Science and Innovation Strategies for Smart Specialisation (RIS3) are integrated, place-based basic transformation documents, with five distinctive elements:

1. Strategies focus on policy support for national investment priorities, challenges and knowledge-based development needs, including ICT activities;
2. Strategies are developed for strong and competitive national strengths and national excellence potential;
3. Strategies support technological and practical innovation and promote investment in the private sector;
4. Strategies provide full stakeholder involvement and encourage innovation and experimentation;
5. Strategies are evidence-based and include monitoring and evaluation systems.

In 2013, Latvia approved the Guidelines for the Development of Science, Technology and Innovation for 2014–2020 that comply with the objectives of EU-ROPA 2020 Strategy for the development of a national/regional science and innovation strategy for smart specialisation and the objectives of the National Development Plan (NAP) for science, technology and innovation development policy.

In Latvia, there is also a national industrial policy “The Guidelines for the National Industrial Policy for 2014–2020”, which envisages stimulating structural changes in the economy in favour of the production of goods and services with higher profitability, including increasing the role of industry, modernising industry and services, and diversifying the export basket.

The following areas of smart specialisation are identified in Latvia:

1. Knowledge-intensive bioeconomy;
2. Biomedicine, medical technology, biopharmacy and biotechnology;
3. Smart materials and engineering technologies;
4. Smart energy;
5. Information and communication technologies [3].

In the following sections, the authors of the study will assess EU-level policies and the strategic vision of Latvian regions (including municipalities) in coastal economic and technological development, as well as identify available funding sources for promoting economic activity.

2. THE ANALYSIS OF BLUE GROWTH IN PLANNING DOCUMENTS

Behind the new growth theory there is an idea that each country or region should look for its technological development path. It is necessary to achieve technological progress appropriate for a specific level of environment, nature and human resource knowledge, since the adaptation of technologies in other regions means the repetition of old, already used ideas. New growth theory is based on a knowledge-based economy, in which the main resource is a person who is well trained, ready to learn new knowledge, as well as expresses his own initiative and is ready to share innovative ideas [4]. Blue Growth is one of the EU policies promoting the use of the above-mentioned human resources, technologies and knowledge-efficient use in coastal areas. This policy is an integrated approach to stimulate the marine economy, which, like the Smart Specialisation concept, pays significant attention to innovation, the formation of new companies, the bottom-up approach and the development of value chains. Creating the so-called blue value networks requires:

1. Development of networking between suppliers and promoters;
2. Infrastructure sharing;
3. Promotion of blue clusters and networks.

The stimulation of the above-mentioned activities should be initiated by the private sector. The following activities are expected from the public sector:

1. Competence development and knowledge sharing;
2. Use of marine clusters to promote Smart Specialisation;
3. Promotion of cross-border cooperation and

4. Promotion of Collaborative Laboratories.

The concept of Blue Growth has been developed by the European Commission (DG Mare) with the aim to exploit Europe's oceans and coastal areas for job creation and economic growth. It is a way to innovate the development of marine activities that are often dependent on each other, which in turn relies on shared knowledge and infrastructure sharing. The introduction of the concept is an essential innovation in the context of all sectors and cannot be implemented in the context of individual sectors.

In total, six Blue Growth functions are identified:

1. Maritime transport and shipbuilding;
2. Food, nutrition, health and ecosystem services;
3. Energy and raw materials;
4. Recreation, work and living;
5. Coastal protection;
6. Maritime monitoring and surveillance [5].

In 2014, the European Commission developed the Sustainable Blue Growth Agenda for the Baltic Sea Region, which provides a strategic approach to the use of existing marine and coastal resources based on the following pillars:

1. Consistent approach to innovation to increase sustainability;
2. Knowledge and skills, the development of clusters;
3. Financial access to maritime sectors [5].

By examining political documents and the rationale behind their development, it can be concluded that the sustainable use of the economic potential of the seas and oceans is one of the key elements of the European Union's maritime policy, which recognises ocean energy as one of the five areas for the development of the marine economy that could contribute to job creation in the coastal area.

In turn, according to the long-term thematic planning of Latvia for the development of the Baltic Sea coastal public infrastructure, developed in 2016, the coastline is described as a unique, diverse, sustainable and economically active space with clean water, air, beach, less-changeable landscapes and a quality living environment [6].

At present, humankind is facing the problem of a shortage of resources and a worsening environment. Thus, there has been a rapidly growing interest in the analysis and modelling of biological systems [7].

The authors of the present research maintain that the main areas of economic activity in the Baltic Sea coast of the planning region of Riga are the following:

1. Tourism and recreation, including health resort;
2. Port activities, including the reception and maintenance of yachts, as well as the construction of ships and the related equipment;
3. Fisheries, fish processing, in particular its traditional forms;
4. Use of renewable energy resources (wind, water, waves, biomass, etc.).

Thus, it can be concluded that in Latvia and in the planning region of Riga, maritime technologies are the most capable ones in promoting the renewable energy sector.

When one thinks of renewable energy, generally wind, solar or hydro power comes to mind. But forward thinkers, especially those within the livestock industry, have made remarkable strides by developing ways to use feedlot waste. Home-grown energy, as it is sometimes called, is making some farmers energy self-sufficient by using cow manure or household waste to produce biogas to generate heat or electricity [8].

The production of renewable biological resources can bring various benefits. Those are:

1. Energy: Biogas contains mainly CH₄ (60 %–70 %), which is the same energy carrier as in natural gas. Thus, biogas and natural gas can be used for the same application. Methane can be burnt for cooking or lighting the house. It can also be used to power combustion engines, drive a mechanical motor or generate electricity [8];
2. Economy: energy savings, new product offerings, adoption of a certain market niche;
3. Carbon credit: Methane captured from anaerobic digestion of livestock manure may be qualified to receive carbon credit if it is collected and prevented from discharging into the atmosphere. According to the Second Assessment Report (1996) of the Intergovernmental Panel on Climate Change (IPCC), the Global Warming Potential of methane is equivalent to 21 times that of carbon dioxide. This means that in terms of global-warming potential, reducing one metric ton of methane gas emissions has the same impact as reducing 21 metric tons of carbon dioxide emissions [8].
4. Agriculture: In a biogas plant cow dung and other organic waste are converted to liquid slurry. The liquid slurry can be easily brought to places that need organic fertilizers. The most important benefit is that the slurry is a very effective fertilizer that can improve the growth of the crops. Nitrogen is one of the major nutrients required for plant growth [9].
5. Health: The process involves the killing of various types of bacteria, resulting in the improved hygiene environment and reduced health risks;
6. Environment: Reducing environmental pollution by chemicals.

To understand the feasibility of the implementation of the Blue Growth Policy in Latvia, the subsequent sections describe the development planning documents, which, in the course of implementation, could promote coastal economic development, as well as determine the financing possibilities for such initiatives.

3. RESEARCH ON THE ECONOMIC AREAS OF BLUE GROWTH AND LATVIA'S RIS3 IN PLANNING DOCUMENTS

In the largest region of Latvia – in the planning region of Riga – smart development is defined as flexible – knowledge-based and ready for change. The strategic goal is also defined as a knowledge-based “green” innovative economy, and two priorities are set:

1. Globally competitive industries (specialisation, knowledge, research, technology and continuity);
2. Smart development (education, cooperation, information, sustainable energy systems) [10].

In the planning region of Riga, the Blue Growth potential in RIS3 areas is based on the points of contact between the various planning documents and the aided economic areas mentioned therein. The synergy between RIS3 areas and maritime resource-related economic sector with great potential for development mentioned in the Baltic Sea planning documents is demonstrated in Fig. 1.

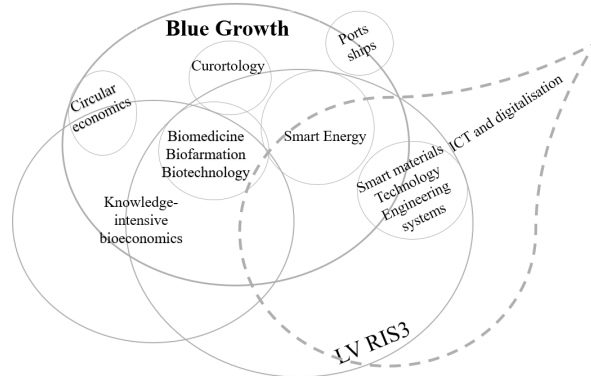


Fig. 1. Synergy between RIS3 and the Blue Growth area [made by the authors].

According to Fig. 1, it can be stated that in Riga Planning Region, in RIS3 context, the areas of Blue Growth are knowledge-intensive bioeconomy (also known as the blue bioeconomy), biomedicine, biopharmacy, resort development and active tourism, smart energy and materials, as well as new technologies.

As there is no Blue Growth Strategy in RIS3 context in Riga Planning Region, such a concept should be implemented on the basis of international, national and local planning documents, whose hierarchy and thematic link are developed and demonstrated in Fig. 2.

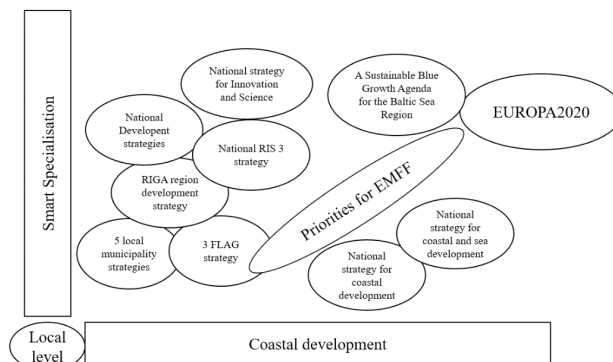


Fig. 2. Two-dimensional scheme of Smart Specialisation and Coastal Development Documents [made by the authors].

According to the two-dimensional scheme of the Smart Specialisation and the Coastal Development Documents developed by the authors (see Fig. 2), it is evident that the highest planning document is EUROPE 2020, the basic principles of which are further integrated into Latvian policy planning documents, according to which each local government integrates these directions and priorities into its municipal planning documents of local significance.

It is also important to note that in the city of Riga by smart specialisation one understands Riga's striving to become a "Smart City", which envisages transparent planning, sustainable mobility, zero-residual technology, ICT, circular economy and energy efficiency measures.

Exploring the development strategies of other coastal municipalities in Latvia, for example, in Kurzeme planning region, the following development priorities should be noted:

1. Developing a city/village as a resort, supporting micro, small and medium-sized businesses, as well as their diversification and tourism development in the area;
2. Developing seafront port services and shipping;
3. Developing communications systems;
4. Developing waste management, with particular attention being paid to waste collection and disposal;
5. Developing interest-related education in the field of natural sciences;
6. Developing an economically active environment;
7. Providing creative and professional growth opportunities in the field of production, which, inter alia, envisage lifelong learning, focusing resources on the development of the industry;
8. Creating new value, introducing innovative solutions and more efficient use of local resources;
9. Promoting the development of coastal business;
10. Promoting the use of local natural resources in business;
11. Developing a new or significantly improved service or activity and the application of new methods, processes or solutions to the production or commercialisation of products or services.

Taking into account that at present there is available financing by the EU Structural Funds, the authors have selected and summarised Smart Specialisation (RIS3) and Blue Growth implementation measures supported by the EU Structural Funds in Latvia, which may be used for the development of the Marine Technology Sector (see Table 1).

According to the information provided in Table 1, it can be concluded that efficiently working with planning documents, exploring the areas to be supported and drawing up high quality project applications, there are ample opportunities to achieve the goals set in the development of the field of marine technology, including the implementation of innovative solutions. Support is available for research and production development, as well as for the training of stakeholders, the restoration and development of objects that, in a broader context, will ensure the growth and

sustainable development of Latvian economic areas, increasing the competitiveness of the country, the commercial return of scientific achievements and scientific excellence, promoting cooperation between entrepreneurship and public sector, developing staff competence and promoting job creation, as well as ensuring an interdisciplinary approach to decision making.

Table 1

RIS3 and Blue Growth Implementation Measures Supported by the EU Structural Funds in Latvia [selected and compiled by the authors on the basis of publicly available data on project selection www.esfondi.lv]

1	Postdoctoral research support
2	Development of R&D infrastructure in Smart Specialisation areas and institutional capacity building of scientific institutions
3	Support for the development of new products and technologies within the competence centres
4	Support for the improvement of the technology transfer system and innovation vouchers for SMEs
5	Support for the introduction of new products in manufacturing
6	Support for training of employees
7	Innovation motivation programme
8	Support for ICT and non-technological training as well as training to promote investor attraction
9	Promoting the establishment and development of SMEs, in particular, in processing industry and RIS3 priority sectors
10	Promoting international competitiveness
11	Cluster programme
12	Promoting energy efficiency in public and residential buildings
13	In compliance with the integrated development programmes of the municipality, promoting energy efficiency and use of renewable energy resources in municipal buildings
14	Promoting energy efficiency and the use of local RES in district heating
15	Preserving, protecting and developing a significant cultural and natural heritage, as well as developing related services
16	Developing the natural object protection and sightseeing infrastructure, habitat restoration
17	Promoting the reuse, recycling and recovery of different types of waste

The Smart Specialisation Strategy developed by the European Commission is a strategic approach to economic development, which envisages support for research and innovation. The Smart Specialisation Strategy envisages the development of a vision, the availability of competitive advantages, the choice of strategic priorities and the choice of a policy that maximises the knowledge-based development potential of the region. EU Structural Funds for research and innovation by 2020 will be invested in Latvia in compliance with Latvia's RIS3.

4. DISCUSSION AND RESULTS

In the course of the study, the authors organised focus groups to find out the views of industry experts on coastal growth. Expert interviews were also conducted. Overall, during the study, opinions of representatives of ministries and municipali-

ties as well as industry-leading researchers were heard. The opinions of experts from 25 different institutions were summarised.

Summing up expert opinions on coastal growth in the context of Smart Specialisation, the authors made a summary of interviews.

As a result of the interviews, summarising the information provided by the leading employees of ministries, it can be concluded that coastal growth is considered in the context of implementation support of Latvia's RIS3 provided under the thematic objective "Strengthening of Scientific Research, Technological Development and Innovations" of the Operational Programme "Growth and Employment". Criteria of all measures of the thematic objective include the provision that investment complies with the areas of the Smart Specialisation Strategy. The monitoring system of the Smart Specialisation Strategy has been developed for monitoring the implementation of Latvia's RIS3.

Coastal growth is planned on the basis of planning documents, in which the Baltic Sea coast is defined as a space of national interest in the Latvian sustainable development strategy "Latvia 2030". The Baltic Sea coast is one of the regional policy target areas defined in the Regional Policy Guidelines for 2013–2019, as well as the coastal spatial development policy (refers to Riga Planning Region and Kurzeme Planning Region) is defined in the Coastal Spatial Development Policy Guidelines.

The focus is placed on the implementation of Specific Support Objectives related to the implementation of support for innovation. In this context, support is provided to Competence Centres with a total funding of 64.3 million EUR, as a result of investment eight competence centres will be established in all areas defined in RIS3 Strategy, Technology Transfer and Innovation Vouchers with a funding of 40.5 million EUR, the production of new products with funding of 60 million EUR and other programmes (motivation programmes, support for training of employees).

The aim of the ministries is to ensure that the financing is invested wisely, reasonably and has the economic impact. The funding of 200 million EUR is also intended for small businesses, which could create companies with high value added products. Representatives of the ministries also rely on the targeted research activities of the National Research Program for conducting research useful for the national economy. At the same time, the Investment and Development Agency of Latvia (LIAA) is developing a knowledge base to become a mediator between science and business. The development of people's skills is also essential; therefore, the ICT training carried out by the Latvian Information and Communication Technology Association is essential. It should not be forgotten about training that develops management skills, improves marketing knowledge etc. Thus, it is also intended to train LIAA staff that could help develop skills for attracting investors, as well as provide the necessary training for labour force.

Apart from specific training, a motivation programme is also important, such as "Idea Cup" (implemented by the Ministry of Environmental Protection and Regional Development), "Business Express", various networking seminars, mentoring, "Become an Entrepreneur in Five Days", etc.

However, the responsible national agency indicates that Horizon 2020 programme includes the following priorities: addressing societal challenges, including

sustainable agriculture, marine and maritime and inland water research, bioeconomy, secure, clean and efficient energy, smart, green and integrated transport, climate change, resource efficiency and raw materials as well as inclusive, innovative and secure societies, leadership in enabling and industrial technologies, innovation in small and medium-sized enterprises (SMEs). The opportunities for SMEs in Horizon 2020 envisage participation in all forms of research, development and innovation focused on the application and commercialisation of results. The participation of SMEs is envisioned in joint research, development and innovation projects, SME Facility, Innovations for Young Entrepreneurs – Eurostars and other events. The program has three phases: Phase 1 – Concept Development, Phase 2 – Innovation, R&D Activities, and Phase 3 – Commercialisation.

Industry-leading researchers point out that a model has been developed to help create high added value for renewable bio-resources, but it is unclear how in the national way it would be implemented in life. Institutions, actively operating in several projects related to the use of marine resources and the promotion of the national economy, have the opportunity to actively participate in the integration of new innovative approaches in Latvia, including the implementation of good practices of Blue Growth.

Evaluating the views of representatives of local governments, the information has been obtained that in Riga large potential in knowledge-intensive economy and technology is created by universities and research institutes located in Riga, but stimulation of commercialisation of discoveries is weakly influenced. In Riga, it is planned to build business clusters, industrial clusters.

In the districts that are far from the capital and the local economy is related to the sea and marine resources, the development of knowledge-intensive economy and technology has not had visible impact and significance so far; however, various conferences and discussions focus on the use of existing but under-utilised resources. For example, it has been discussed that seaweed is used in cosmetics and medicine, and even in souvenir production and related technologies.

From other marine resources, fish stocks are decreasing, the coast itself is not used due to the Northern Vidzeme Biosphere Reserve and the 300-metre restricted area. These are the reasons why tourism is not feasible, for example, the infrastructure construction process. Traditionally, in districts, it is difficult to deal with private property issues, as well as the desire of the people to live in peace and tranquility. In the district, there is a positive view of the activities planned for the commercialisation of knowledge in the period of 2014–2020, but the representatives of the districts admit that there is currently no information on this issue.

Speaking of the Blue Growth concept, it is recognised that the concept is new and is still difficult to understand. It is believed that entrepreneurs who are informed and will identify profit opportunities will do so. All the innovations in the area would be perfect for everyone, so it is also possible to apply for support for fisheries and coastal development projects from the European Maritime and Fisheries Fund, but at present only the tourism industry is developing in the traditional sense.

As the tools to be used, it is worth mentioning programmes that support business incubators, community initiative projects.

The members of the focus group believe that, at present, the essential conditions hindering the development of Smart Specialisation in the area are the lack of research and awareness. There is no understanding of what can and should be done at sea (related to nature conservation). To activate the processes, it is necessary to maintain close cooperation and exchange of information with stakeholders at all levels, which could take place, for example, through the Union of Local Governments.

5. CONCLUSIONS

Under the influence of global processes and competition, the growth and competitiveness of enterprises are increasingly dependent on the ability to apply new knowledge, organisation and working methods, as well as the capacity to engage in the commercialisation of research projects in order to develop new products, services or processes. Companies should strive to seize the opportunities and competitive advantages that innovation can make.

Priority is given to promoting the balanced development of territories, which envisages the identification and specialisation of the resources located in the territories, setting out the opportunities and areas of economic development, including leading and perspective business areas in the municipality territories.

In the implementation of the national or regional RIS3 strategy, one-sided support for economic growth should be avoided – the economic environment promoting the economic activity and the development of human resources should be created; therefore, six business sectors that are important for coastal development are identified, but in the seacoast most opportunities for maritime technology development are identified in the area of renewable energy resources and intelligent materials, different areas of bioeconomy (e.g., biopharmacy) and information and communication technologies.

The development strategies of planning regions envisage the promotion of the merger of producers and service providers in terms of the territory, including within the industry, in order to strengthen international competitiveness. This is possible by creating clusters involving new actors, ensuring the development, production, distribution of products, thereby achieving territorial excellence and quality.

The central government and municipalities are open to knowledge-based and local marine resource-based economic development, not only by actually supporting entrepreneurs, but also by research projects, providing co-financing. However, it should be admitted that in the field of marine technology such projects have not been sufficiently implemented so far.

Taking into account that, from the perspective of the country and the region, maritime technologies are only part of the country's technological development area, there is a reason to believe that currently available public funding from the EU Structural Funds could be used for the development of specific technologies. It should be emphasised that the support of the European Maritime and Fisheries Fund, in addition to direct support to fisheries, is also aimed at sustainable development of coastal areas.

To ensure the development of the Blue Growth approach in Latvia and more

successful use of marine resources, as well as the introduction of a new development model, public authorities should cooperate with research institutes involving industry researchers, local authorities and, above all, business representatives in national-level discussions.

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JŪRAS TEHNOLOĢIJU NOZARES ATTĪSTĪBAS MEHĀNISMU IDENTIFICĒŠANA LATVIJAS VIEDĀS SPECIALIZĀCIJAS UN ZILĀS IZAUGSMES KONTEKSTĀ

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K o p s a v i l k u m s

Eiropas valstu valdības ir izstrādājušas dažādas attīstību stratēģijas saskaņā ar Eiropas Komisijas reformēto Eiropas kohēzijas politiku un Eiropas Savienības kopējo ilgtspējīgo attīstību vidējā un ilgtermiņā, lai iekļautos pasaules tehnoloģiskā progresa laikmetā, efektīvi izmantotu atjaunojamos resursus, radītu papildus pievienotās vērtības, veicinātu starpdisciplināro jomu attīstību un atbalstot sociālās inovācijas. Salīdzinoši jaunām ekonomikām kā Latvija ir jāpielāgojas kopējām pasaules un Eiropas tendencēm, lai saglabātu savu konkurētspēju starptautiskā arēnā.

EUROPE 2020 kontekstā viedās specializācijas stratēģija Latvijā (RIS3) tiek noteikta un ieviesta kā stratēģisks dokuments augstas pievienotās vērtības tautsaimniecības izaugsmes atbalsta mehānismu izstrādei, tai skaitā jūras tehnoloģiju nozarei.

Pētījumā tiek pētīti zilās izaugsmes un RIS3 ieviešanas mehānismi, kas būtu izmantojami jūras tehnoloģiju nozares attīstībai, novērtējot šo mehānismu efektivitāti. Tādējādi pētījumā tiek aktualizēti mūsdienīgu tehnoloģiju jomas ieviešanas jautājumi Latvijas jūras piekrastes pašvaldībās un plānošanas reģionos.

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