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Introduction

The seafood sector is becoming more and more important in the present context of growing world population and consequent increase in food demand. Seafood not only represents the main source of proteins for millions of people in the world but also generates a lower carbon footprint than animal production in land. Atlantic countries have a strong stake in the growth of the seafood sector, both in terms of production and consumption. In 2017, United Kingdom, France and Spain were ranked in the top five of the main EU aquaculture producers. EU aquaculture is characterised by its high specialisation at regional and country level and is strongly influenced by geography and the natural habitat of the species, which makes the Atlantic Ocean a major asset for its coastal regions.

In order to continue to meet the growing demand for aquaculture products, while balancing with sustainability goals and the preservation of natural heritage, the seafood industry needs to respond to different challenges and opportunities requiring innovative solutions.

The **SAFER Project** was started in 2017 to respond to these challenges in the Atlantic area. SAFER aims to **boost the adoption of technology and transnational cooperation and to improve the innovation performance of the seafood sector** in the Atlantic regions and here are some of the results and perspectives of the project.

Methodology

SAFER (Smart Atlantic Seafood Clusters) is developed in three complementary actions:

1. A unique innovation services platform available online and designed for stakeholders from the seafood sector. It provides a catalogue of more than **80 services** for effective organisation, governance, and innovation best practices in the Atlantic.
2. **Seven living lab pilots** in the Atlantic area developed to apply these tools in different companies involved at different steps of the seafood value chain and foster innovation adoption.
3. The production of **recommendations for the Regional Innovation Smart Specialisation Strategies (RIS3)**, which will help the transfer of services to other businesses and local actors in the Atlantic.

Promoting innovation throughout the seafood value chain

Inspiring technology and collaboration within the seafood sector is at the heart of the SAFER project. The implementation of pilots is the most effective and tangible opportunity to illustrate the benefits of the innovation platform and its potential to be replicated by seafood actors in the future, across the Atlantic and beyond. The SAFER project jointly implemented 7 living lab pilots of innovative Industry 4.0 technologies, all based on a tailor-made approach of the 5 Atlantic regional nodes' needs and expectations.

The pilots implemented are **a good example in terms of sustainability**. They helped to reduce the environmental impact, i.e., the marine water treatment pilot minimises the marine water demand due to lower water exchange requirements with the surrounding media. They also helped to reduce the impact on the carbon footprint through a more effective management of stocks, logistics and production processes as it is the case of the Manufacturing Production Control Systems implemented in Ireland, France and Portugal.



Setting up ropes for mussels. Photo by Mytilmeer.



Oyster bag tag. From ERNACT and Wisar Lab video.

Regional Smart Specialisations: an ocean of potentialities for research & innovation in the seafood sector

The SAFER pilots, in addition to concretely contribute to the transfer of innovation from one company to another, also offers an interesting source of information in the development of regional policies, in particular the so-called Regional Smart Specialisation Strategies (S3).

Smart Specialisation Strategies are a tool to support investments in key regional sectors with a competitive potential. Given the bottom-up approach of S3s, they implicitly support the creation of partnerships among different territorial actors of specific sector of specialisation, such as academia, business, and research centres for the development of a long-term sustainable growth.

The seafood sector features prominently in the Smart Specialisation Strategies of Atlantic Regions. The analysis of the S3s of Atlantic Regions showed that 15 Atlantic regions selected fisheries and aquaculture as a S3 in the period 2014-2020. Among these regions, Cantabria Region (Spain) directly used SAFER as a mean to gather regional stakeholders of the seafood value chain and support the seafood chapter of its new regional S3 in 2021-2027.

It can be observed a general maintain of the seafood sector in the Atlantic regions' S3 for the new Multi-Annual Financial Framework (2021-2027), though not all the Regional Smart Specialisation Strategies have not been published yet. The regions share the view that the sector has economic, social, and environmental potential for regional growth given the increasing global demand for seafood products and high-quality healthy food.

In this context, SAFER will remain pertinent to support further guide the implementation of S3 related to the seafood sector.

Conclusion and perspectives

Seafood is a strategic blue economy sector for Atlantic regions and plays a vital role in the present context of increasing food demand and need for sustainable and resilient food systems. However, the sector must face several challenges to compete at the global scale while at the same time protecting the marine environment and avoiding additional pressures on already fragile ecosystems.

Hence, **innovation is key to modernise this traditional sector and improve its sustainability, competitiveness and resilience**. The SAFER project, answering to these challenges and using the resources shared by a transnational network of different stakeholders, unlocked the innovative potential of the sector in Atlantic regions by testing and implementing living lab pilots which successfully helped mature established businesses to adopt technology and increase, in this way, final product quality, ensuring product traceability and reducing industrial costs. All these technologies promote the improvement of processes and products which comes at a crucial moment and paves the way for the sustainable transition of the Atlantic seafood sector.

SAFER 2.0 current and future actions

SAFER is **exploring the concept of Industry 5.0 in the seafood sector**. Industry 5.0 is a new concept which provides a vision of industry that aims beyond efficiency and productivity as the sole goals and reinforces the role and the contribution of industry to society.

It places the wellbeing of the worker at the centre of the production process and uses new technologies to provide prosperity beyond jobs and growth while respecting the production limits of the planet. This is of special relevance to the seafood sector where a sustainable management of sea resources is crucial.