Diagnosis and local fisheries' ecosystem characterization: common challenges, capacities and opportunities of local fishery ecosystems in the Atlantic Area.

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CONTEXT & OBJECTIVE

01

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THE FISHINN PROJECT

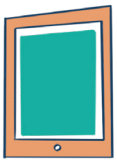
Fisheries play a crucial role in the socio-economic advancement of coastal communities in the Atlantic Area. However, according to the EU Blue Economy Report 2021, the fisheries' ecosystems are progressively losing competitiveness as a result of different factors, such as the COVID crisis, Brexit, a lack of qualified workers and generational replacement, fuel price, global supply chain disruptions, quota regulatory uncertainty, climate change, and marine pollution. Meanwhile, the demand for food fish worldwide is expected to increase by 14.8% (OECD-FAO Agricultural Outlook 2021-2030).

The overall objective of the Fishinn project is to **increase the competitiveness and resilience of the ports that form four local fisheries ecosystems** and value chains, in the Atlantic Area by reinforcing local actors' **collaboration and innovation capacities**. In order to stimulate the creation of new economic activities and to transition towards smart, circular and efficient business models as well as innovative solutions in local fisheries ecosystems to reverse their decline, knowledge exchange among stakeholders across different territories will be supported by technological centres and clusters. To increase the resilience and competitiveness of fisheries ecosystems, this project will address the following key challenges:

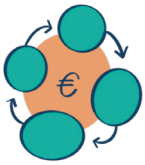
This project will be carried out in 3 steps:

1. Diagnosis and local fisheries' ecosystem characterisation.
2. Benchmarking of innovation-based solutions.
3. Elaboration of innovation roadmaps.

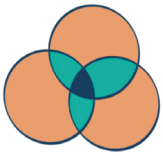
Cooperation and innovation



Digitalisation



Transition towards a circular economy



Co-existence with other blue economy sectors

This deliverable is the outcome of the first phase of the overall project, a process that lasted 10 months.

OVERVIEW OF THE PROJECT

Project Information

- **EU Programme:** Interreg Atlantic Area Programme 2021-2027
- **Acronym:** FISHINN
- **Code number:** EAPA_0021/2022
- **Title:** Innovation roadmap for local fisheries ecosystems recovery.
- **Type of project:** Traditional
- **Start date:** 01/11/2023
- **End date:** 31/10/2026
- **Duration in months:** 36

Area of Intervention

- **Programme Priority:** Blue innovation and competitiveness.
- **Programme specific objectives:** RS01.1 Developing and enhancing research and innovation capacities and the uptake of advanced technologies.
- **Fields of intervention:** 029 Research and innovation processes, technology transfer and cooperation between enterprises, research centres and universities, focusing on the low carbon economy, resilience and adaptation to climate change.

Total Budget

PARTNER	TOTAL BUDGET (€)	FUNDING AMOUNT (ERDF)
TOTAL BUDGET	1.235.480,00 €	926.610,00 €

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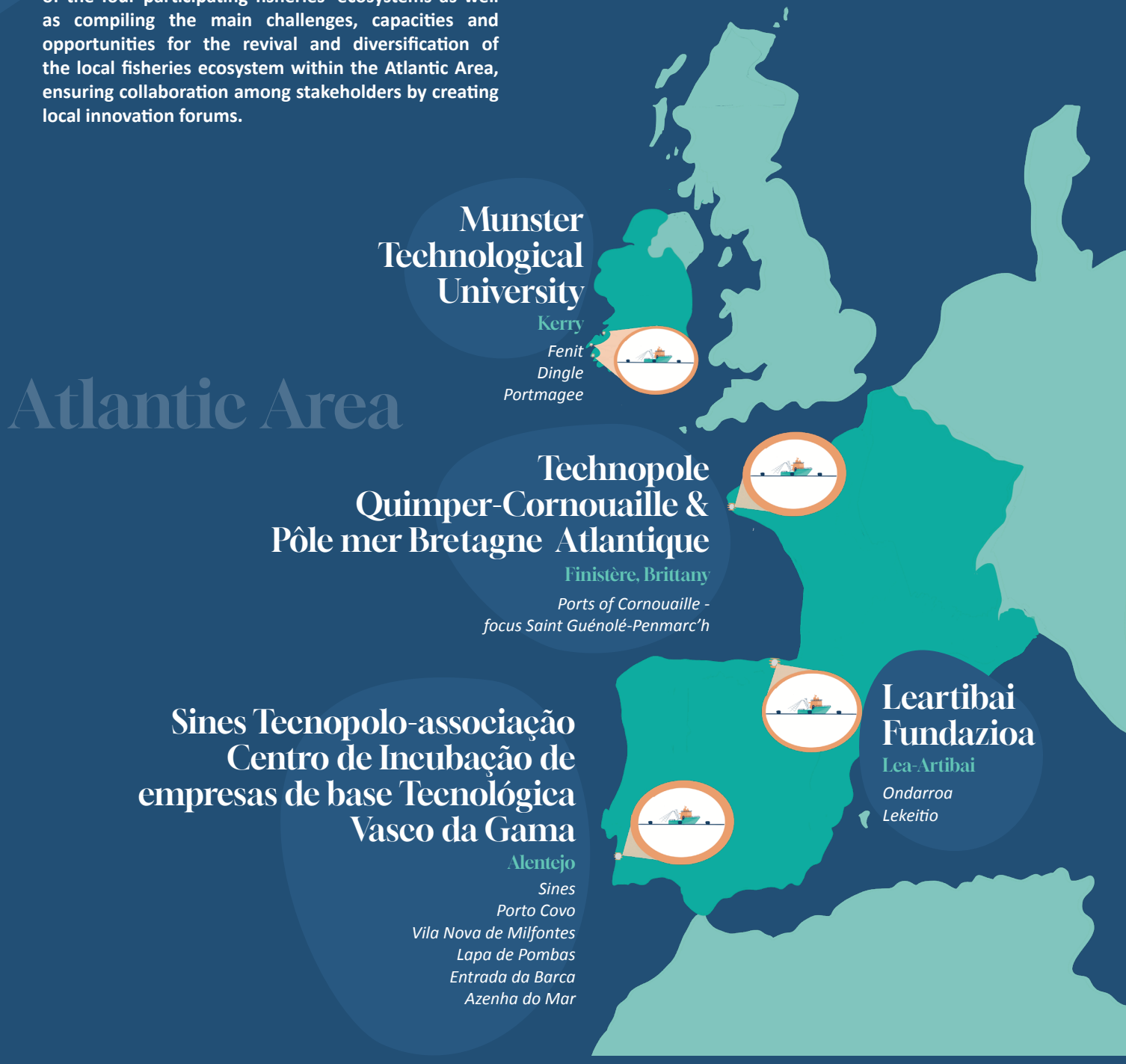
CONTEXT & OBJECTIVE OF THE DIAGNOSIS OF THE ECOSYSTEMS

The main objective of this handbook is **to present a diagnosis and characterisation of the current situation of the four participating fisheries' ecosystems as well as compiling the main challenges, capacities and opportunities for the revival and diversification of the local fisheries ecosystem within the Atlantic Area, ensuring collaboration among stakeholders by creating local innovation forums.**



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PARTNERS' PRESENTATION

02

Leartibai Fundazioa,
Lead Partner (LP)

Leartibai Foundation is a non-profit organisation dedicated to the economic development of the Lea-Artibai region. The 12 town councils of the region, together with the technology centre, training centre and the local private companies, entrust Leartibai Foundation with this responsibility. And for this reason, they form part of the board of trustees of this entity.

In this sense, Leartibai Foundation works for the generation of new economic activities and the innovation and competitive improvement of the existing business fabric.

Leartibai Foundation is a supra-municipal organisation and is the driving force behind the innovation ecosystem of Lea-Artibai. It is also the agent that maintains and strengthens the relationship of the regional ecosystem with the agents of the quadruple helix of the Innovation Ecosystem of the Basque Country.

Leartibai Foundation is the agent that leads the definition and dynamisation of the regional economic development strategy. In this sense, Leartibai Foundation is currently working for the development of the strategic projects defined in the Lea-Artibai 2030 strategic plan, where one of them is the promotion of the regeneration and innovation of activities linked to the sea.

AREAS OF WORK

- The promotion of new activities: intrapreneurship, entrepreneur support, dissemination of entrepreneurial culture and new circular business models, among others.
- The promotion of innovation and competitive improvement of the business fabric of all sectors present in the territory; industry and industry-related services, wholesale trade, agribusiness, tourism, and retail trade. The Foundation helps on the design and implementation of innovation dynamics, definition of new business models, surveillance and intelligence services and advanced management services.
- Local economical development agent to boost the Lea-Artibai's Strategic Plan. Identifying, defining, and implementing the territory's strategic projects.
- Creating, keeping and attracting talent to the county for the competitiveness of the network.
- The management of the Lea-Artibai Local Rural Development Agency.

METHODOLOGY

- Continuously updating our knowledge of the map of competences of companies and entrepreneurs in our region.
- Maintaining and reinforcing our knowledge and close relationship with the agents of the quadruple helix of the Innovation Ecosystem of the Basque Country.
- Continuously improving and designing innovative methodologies at the service of companies and entrepreneurs.
- Implementing and maintaining internal systems for efficient management of innovation: The Leartibai Foundation has the UNE 166006 certification for R&D&I management: Monitoring and intelligence system.

Finally, it is remarkable that the Foundation has previous experience in European projects such as the **INTERREG ATLANTIC AREA PROGRAMME 2014-2020** with the **CIRCULARSEAS** project, which aim was to transform ocean plastic waste into eco-innovative or green products or components in maritime industries by combining 3D printing technology and the use of marine plastic waste and biodegradable, renewable and highly functional polymers. For more information: https://circularseas.com/

Associated partners:

Leartiker S.Coop *(private organisation)*
Basque Government - Department for fisheries and aquaculture *(public body)*
Innobasque-Basque innovation agency *(not-for-profit private organisation)*
AZTI Foundation (Marine and Food Research)*(not-for-profit private organisation)*

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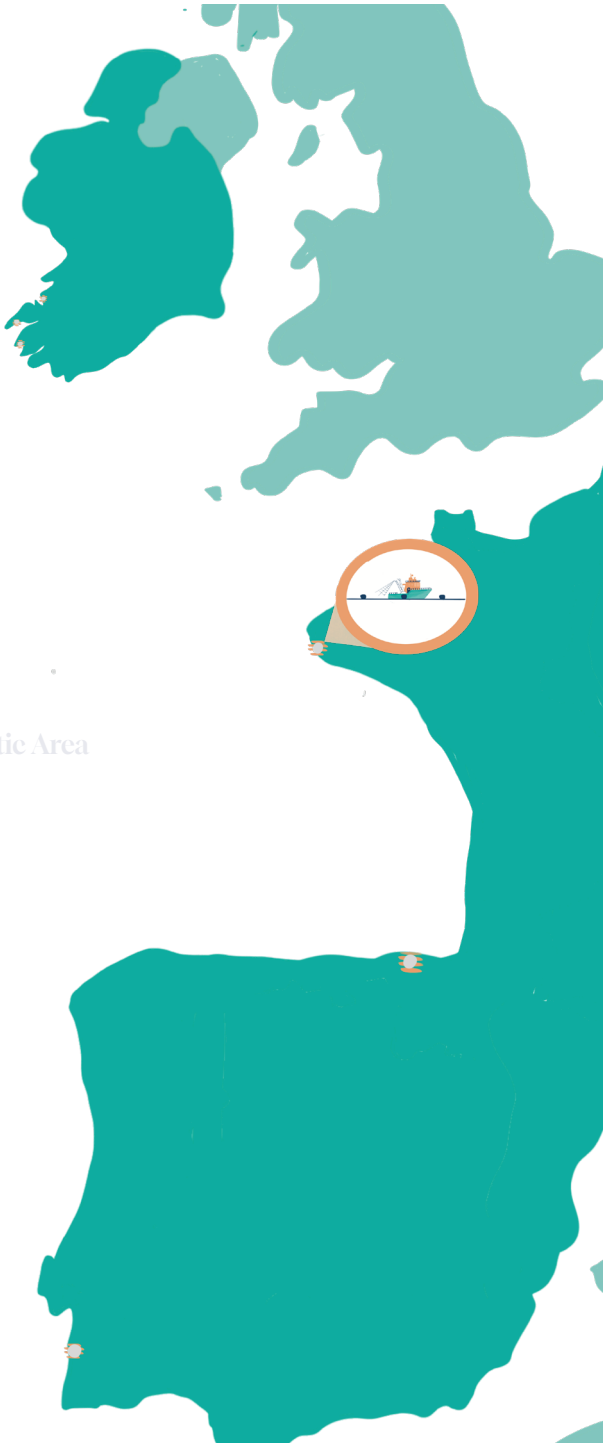
Pôle Mer Bretagne Atlantique,
Partner (P2)

Pôle Mer Bretagne Atlantique is a competitiveness cluster dedicated to maritime innovation, covering Brittany and Pays de la Loire regions. Its network is made up of 440 members, over 70% of whom are SMEs, but also include major groups, research structures and professional organizations. Thecluster's mission is to promote and support its members, by certifying their innovative maritime projects, giving them visibility and helping them find funding opportunities. Pôle Mer Bretagne Atlantique is currently involved in 8 European projects.

Areas of expertise:

- Defense, maritime safety and security.
- Shipbuilding and leisure boatbuilding.
- Marine energy and mineral resources.
- Marine biological resources.
- Environmental and coastline planning development.
- Ports, infrastructure and logistics.



Technopole Quimper-Cornouaille,
Partner (P3)

Technopole Quimper-Cornouaille is a business innovation centre providing bespoke services to meet early stage, and scale-up companies in all sectors.

Areas of expertise: The non-profit organisation has developed an expertise in food, agriculture, blue economy and digital areas, supporting the development of innovative businesses and innovation projects by offering project leaders and businesses tailored support services and access to innovation funding.

Technopole works closely with competitiveness clusters such as Pôle Mer Bretagne Atlantique (Maritime cluster) and Valorial (Agri-food cluster) as well.

Associated partners:

Regional Council of Brittany *(public body)*

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Sines Tecnopolo,
Partner (P4)

Sines Tecnopolo is a non-profit association whose associates are the main stackeholders of the quadruple helix of the Alentejo Litoral region and therefore, very well connected with local and regional policy makers and a very active member of the local ecosystem to support entrepreneurship and companies in blue economy.

Regarding the project, Sines Tecnopolo has experience in the organisation of events with fishermen of the Alentejo coast, and together with the Association of Owners of the Artisanal Fishing and the Siege of Southwest Alentejo and Vicentine Coast has developed training programs and promotional events of sea products at the Sea Fair in Sines.

Besides this, we have promoted support projects for fishing companies in the area of training new fishermen. We have a protocol with the FOR-Mar training centre for fisheries and the sea for the courses of fisherman, fisherman-sailor and seaman. Moreover, Sines Tecnopolo has developed projects in the area of blue economy, namely the Alentejo Azul - entrepreneurs training program for the blue economy, dynamisation of nautical stations in Alentejo.

Sines Tecnopolo is partner of an Interreg POCTEP project named "Impulse of the Atlantic Coastal Alliance for the Blue Growth" that aims to promote research, technological development and innovation, and is inserted in the Investment Priority 1.A: Improvement of the research and innovation infrastructures (R&I) and the capacity to develop excellence in R&I, and promotion of competence centres, especially those of European interest. The aim of this project is to deepen existing opportunities through the promotion of Blue Growth policies that exploit synergies derived from the constructive relationships between the different sectors operating in this area. The project will enable new business investment opportunities and improve competitiveness, the acquisition of knowledge in the area of marine information or the identification of Blue Growth potential in each region within the framework of an Atlantic Maritime Alliance.

Associated partners:

Comunidade Intermunicipal do Alentejo Litoral *(public body)*
Associação de Armadores da Pesca Artesanal e do Cerco de Sudoeste Alentejano e Costa Vicentina *(not-for-profit private organisation)*

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Munster Technological University,
Partner (P5)

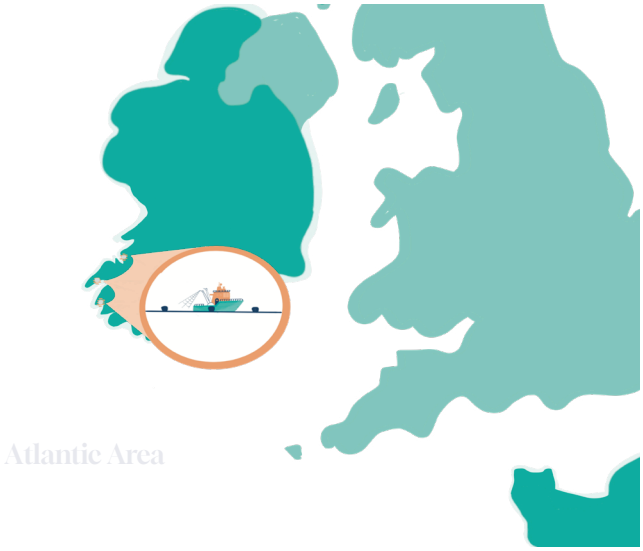
The partner is a key stakeholder in Ireland and operates in quadruple helix through a variety of channels. Expertise in Innovation, entrepreneurship, in particular female, start-ups, SME scaling and upskilling, open innovation platforms and marketplace development.

The Circular Bioeconomy (CIRCBIO) Research Group is a multi-disciplinary team operating out of Munster Technological University. The groups areas of expertise include bioresource modelling, smart specialization strategies, value chain development, bioprocessing and extraction technologies, new product development, business model development, and sustainability analysis.

Recognised as a leader in bioeconomy research nationally and internationally and partnering in a significant number of research & funded projects. The group has received €41m in Funding, worked on over 20 projects, leads 6 Education Programs and has developed 211 project and industry partnerships. The group is a multi-disciplinary research group comprised of lab-based and desk-based researchers ranging from post-graduate to Principal Investigator. The CIRCBIO Group was established in 2019 as a research group within Shannon ABC, at Munster Technological University, recognising the high level of expertise and participation in Bioeconomy and Circular Economy research, engagement and education at National and EU level. The CIRCBIO Group are also members of the SFI (Science Foundation Ireland) BiOrbic Bioeconomy Research Centre.

The CIRBIO group participates in a range of high impact initiatives including research, policy development and educational activities. The group collaborates with several MTU groups including IMAR Centre (Intelligent Mechatronics, Radio Frequency Identification & Internet of Things), and the CEED centre (Centre for Entrepreneurship and Enterprise Development). The group also leads Ireland's Circular Bioeconomy Cluster for the South-West Region (CBCSW).

The cluster was initiated in 2021, as a new first-of-a-kind regional circular bioeconomy cluster in South-West Ireland supporting enterprise profit, collaboration, and training. The three focus areas of the cluster are: 1. Agriculture - Advancing projects and new product development to reduce GHG emissions and waste 2. Marine - Developing bio-based products and materials from marine materials and seafood by-products 3. Waste to Value - Creating value added biobased products and material opportunities from by-products and waste.



The group has over 50 industry members, operating in the green and blue bioeconomy sectors.

CircBio has the capacity to address policy at a national and European level through its collaboration with over 200 collaboration partners across multiple sectors including all Irish Universities (Trinity College Dublin, University College Dublin, Technological University Dublin, University College Cork, University College Galway, University of Limerick, Technological University of the Shannon, Limerick & NUI Maynooth), the Environmental Protection Agency, Dublin, Teagasc the state agency providing research, advisory and education in agriculture, horticulture, food and rural development in Ireland, Irish Bioeconomy Foundation, Science Foundation Ireland, Department of Agriculture Food & Marine, MAREI the Energy, Climate & Marine Research, Bord Iascaigh Mhara (BIM) Ireland's seafood development agency and the Marine Institute. The CircBio group has a proven record of accomplishment of identifying innovation and knowledge gaps in industry, leveraging partnerships to address and reform national policy.

Publications from the CIRCBIO group include: Biological Properties and Health-Promoting Functions of Laminarin: A Comprehensive Review of Preclinical and Clinical Studies. Karuppusamy, S., Rajauria, G., Fitzpatrick, S., Lyons, H., McMahon, H., Curtin, J., Tiwari, B.K. and O'Donnell, C. 2022. Marine. Drugs 20(12): 772

Chitin and chitosan derived from crustacean waste valorisation streams can support food systems and the UN Sustainable Development Goals. Amiri, H., Aghbashlo, M., Sharma, M., Gaffey, J., Manning, L., Moosavi Basri, S.M., Kennedy, J.F., Gupta, V.K. and Tabatabaei, M., 2022. Nature Food, 3(10), pp.822-828.

Associated partners:

BIM Ireland's Seafood Development Agency *(public body)*

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METHO-DOLOGY

03

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DIAGNOSIS METHODOLOGY

First, the methodology employed for conducting the diagnosis will be presented. This will be followed by the characterisation of fisheries ecosystems, which includes socio-economic indicators, the types of activities present in each ecosystem, and the supply chain. Finally, both conclusions regarding the local ports and general conclusions concerning the Atlantic area will be drawn.

1 ECOSYSTEM DEFINITION

Each entity is asked to define its ecosystem by identifying the ports in these municipalities that make up the ecosystem, as well as the companies that are part of the fisheries supply chain, and to compare the ecosystem information related to the nuts level information.

2 QUANTITATIVE ANALYSIS

The socio-economic indicators of each ecosystem are analyzed quantitatively in order to characterise ecosystems.

3 ACTIVITY TYPES IDENTIFICATION

The identification of different activity types in the ecosystem.

4 SUPPLY CHAIN DEFINITION

The ecosystem's fisheries supply chain is graphed to illustrate which links are present in the ecosystem's supply chain, including their weight in terms of enterprises and jobs, and the specific activities that are represented by these links.

5 QUALITATIVE ANALYSIS

A qualitative analyis is conducted with agents involved in each ecosystem, and which were chosen by each ecosystem, with the aim of identifying the capacities, challenges and opportunities for the diversification of the local fisheries ecosystem.

✻ In compliance with ethical research standards, all data collected in this study is anonymized to protect the privacy and confidentiality of the participants.

✻ Leartibai Fundazioa has been the promoter of this phase of the project.

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GATHERED INFORMATION

04

Following the common methodology presented, each territory developed the diagnosis study on the selected local fisheries ecosystems. Associated partners also contributed to the local diagnosis phase.

The characterisation of each ecosystem will be presented one by one.

04.1. LEA-ARTIBAI

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04.1.1. ECOSYSTEM DEFINITION

Lea-Artibai is a region located in the northern region of Bizkaia, in the Basque Country, with a strong fishing tradition and one of the largest deep-sea fishing ports. The region also has a very complete fishing value chain that ranges from catching, through first and second processing to marketing, both wholesale and retail.

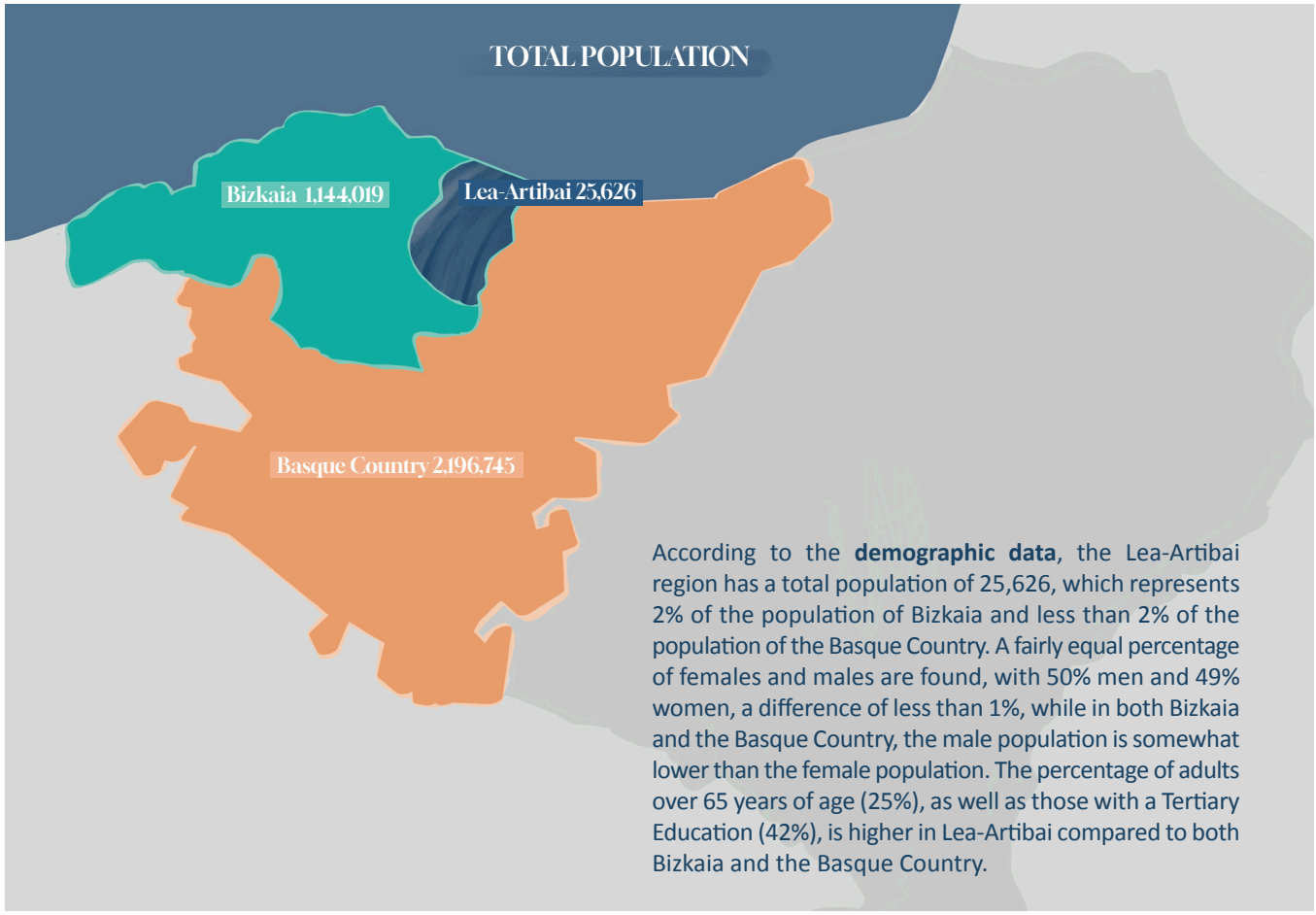
Ondarroa and Lekeitio are two of the largest towns in the Lea-Artibai area in terms of population. Traditionally, both have been fishing villages; however, over time, Ondarroa has developed into a more industrialized fishing port becoming of the most important ports for fish landings in the Basque Country, while Lekeitio has shifted towards recreational activities, maintaining only some artisanal fishing.

This project is a comprehensive project on the capacities offered by the sea in the region, which aims to reactivate the ports of Ondarroa and Lekeitio, taking advantage of the potential offered by the sea to promote the creation of new economic activities, and supporting the diversification of the activities present in the port and the fishing value chain itself.

04.1.2. QUANTITATIVE ANALYSIS

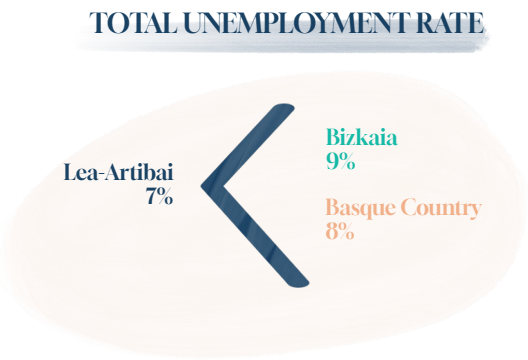
All the data is taken from the references at the end of the document.

SOCIO-ECONOMIC INDICATORS



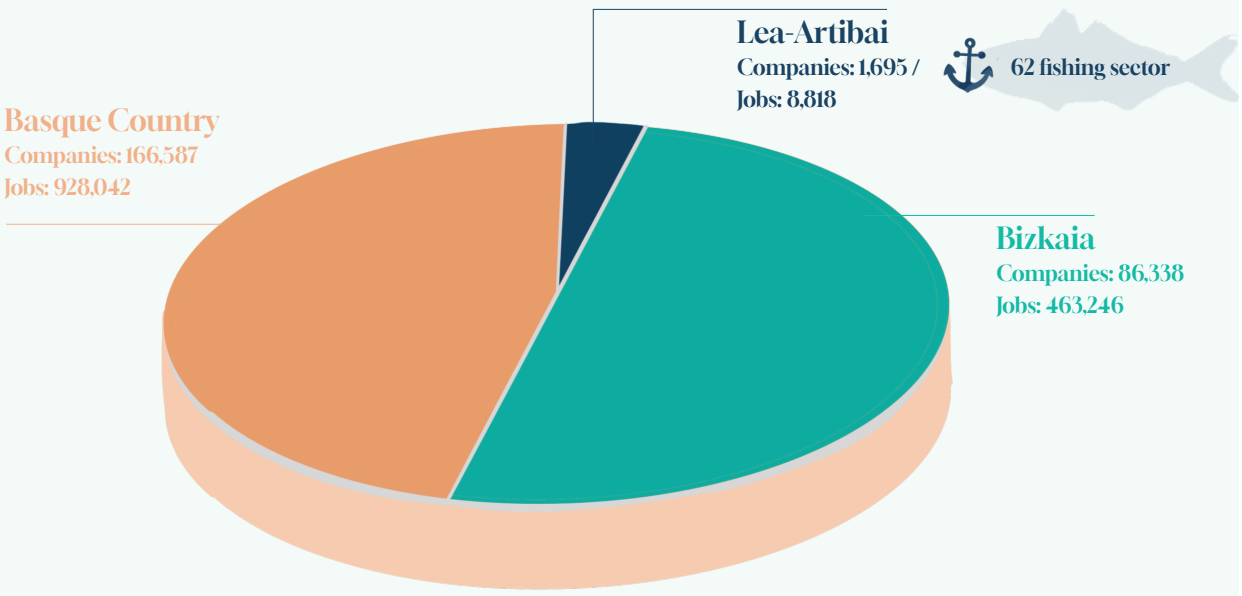
According to the **demographic data**, the Lea-Artibai region has a total population of 25,626, which represents 2% of the population of Bizkaia and less than 2% of the population of the Basque Country. A fairly equal percentage of females and males are found, with 50% men and 49% women, a difference of less than 1%, while in both Bizkaia and the Basque Country, the male population is somewhat lower than the female population. The percentage of adults over 65 years of age (25%), as well as those with a Tertiary Education (42%), is higher in Lea-Artibai compared to both Bizkaia and the Basque Country.

If we take a closer look at the **labour market,** compared to the Basque Country and Bizkaia, Lea-Artibai has a lower unemployment rate. Bizkaia and the Basque Country both have slightly higher female unemployment rates than male ones, however, the female's unemployment is around 44% and men's 54%.



In terms of **economic data**, there are 1,695 companies in Lea-Artibai, 153 of which are in the first sector, 307 in the second sector, and 1,235 in the third sector, generating a total of 8,181 jobs. In addition, the income per capita (20,379€) and GDP per capita (29,677€) of the region are lower than those of the Basque Country and Bizkaia.

NUMBER OF COMPANIES & JOBS



Weight of the Fishing Sector over GVA (Gross Value Added)	3,835.44
Volume of Fishing in Tons (t)	22,268.21
Volume of Fishing in € Value	42,761.82

As it is shown in the graphic, Ondarroa is one of the most important ports of fish landings. Lastly, there are more than 50 fish species that can be found in Lea-Artibai, including hakes, blue whiting, anchovies and mackerel, which are representatives for the Ondarroa Port. Likewise, the main fishing gear used by registered vessel owners in the ports of the ecosystem is trawlers technique, while artisanal fishing is the main fishing gear in Bizkaia and Euskadi.

04.1.3. ACTIVITY TYPE IDENTIFICATION

According to the activities in the port, 15 of the 69 companies comprise four types of activities: suppliers of marine and industrial supplies, inspection and control personnel, management of the first sale of fresh fish in the fish market and tourism activities related to the sea, which generate 86 jobs. Most of these 15 enterprises, 9 in particular, belong to the Suppliers of Marine and Industrial Supplies (Including Ice or Fish Crate) category and generate a total of 55 jobs.

On the other hand, 47 companies performed seven different types of activities related to the Central Fisheries Supply Chain, creating 738 jobs. These activity types are: Extractive Fishing: Fishing Catching Vessel Owners (11 enterprises), aquaculture companies (1 enterprise), Fresh Fish Wholesalers (14 enterprises), Wholesalers of Frozen Fish (1 enterprise), Fish Transporters (2 enterprises), Fish Processors (7 enterprises) and Fish Retail Trade (which includes both the main fishmongers in the port and the large scale distribution) (11 enterprises).

Moreover, there are 2 Sectoral Associations that carry out two activity types, Shipowners Associations and Associations of Wholesalers, and generate 5 jobs; 2 Knowledge Centers Linked to the Sector, which are Technological Centres for Food and Vocational Training Centres resulting in 35 jobs; and 3 Local public bodies such as town councils in fishing municipalities, among others, which generate other 3 jobs.

In summary, 68% of the companies and 85% of the employees are involved in activities associated with the core fisheries supply chain.

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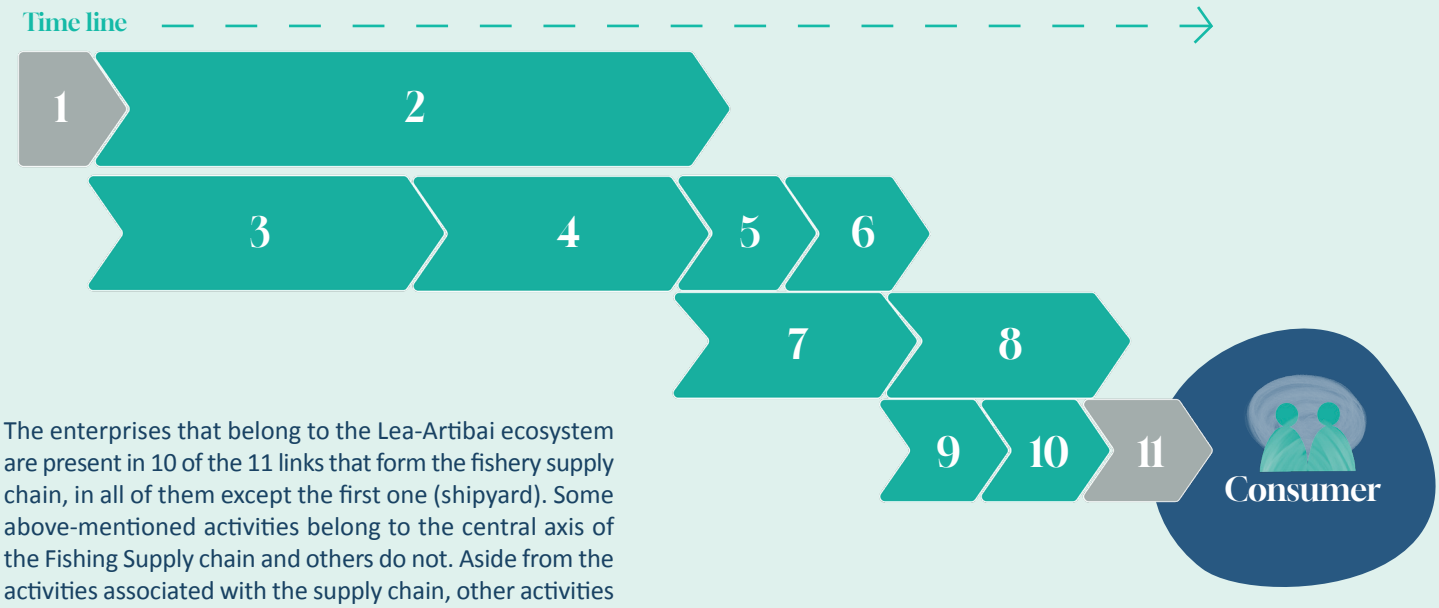
04.1.4. LEA-ARTIBAI SUPPLY CHAIN



The enterprises that belong to the Lea-Artibai ecosystem are present in 10 of the 11 links that form the fishery supply chain, in all of them except the first one (shipyard). Some above-mentioned activities belong to the central axis of the Fishing Supply chain and others do not. Aside from the activities associated with the supply chain, other activities are also carried out in the ecosystem, for example: Tourism Activities Linked to the Sea, Associations of Wholesalers, Vocational Training Centres and Local Public Bodies.

1 - Shipyard

2 - Port Activity: Port Inspection and Control Personnel

2 enterprises + 12 jobs:

> Security and general maintenance of the port and its surroundings.

3 - Suppliers of marine and industrial supplies

9 enterprises + 55 jobs

> Ship repair.
> Port services.
> Marketing of naval spare parts, tools and accessories.
> Manufacture of biodegradable and sustainable ropes and twines for fishing and aquaculture.
> Cleaning, distribution, repair and logistics of fish packaging.
> Maintenance and repair service for wooden and metal vessels.

4- Extractive fishing

11 enterprises + 207 jobs

> Deep-sea and inshore fishing activities.
> Unloading of fish in other national and international ports..

5-Aquaculture

1 enterprise + 2 jobs

> The farming, fattening and marketing of molluscs in the open sea.
> This company is in the research phase, not in industrial production.

6-First processing of fishery products (such as freezing services) & 7-Wholesale fresh and frozen fish trade

19 enterprises + 177 jobs

> Wholesale marketing of fish, both from the local fleet and imports from other
> shipowners.
> First processing and cleaning of fish.
> Freezing and cold storage.
> National and international distribution of fish.
> Purchase of fish abroad.
> Sale of fresh and frozen end products.
> Transport and logistics.

8-Seafood processing

7 enterprises + 342 jobs

> Second fish processing.
> Canned fish processing.
> Preparation of canned fish.
> Distribution and B2B sales and international markets.
> Production of high quality and gourmet products, mainly handmade..

9-R&D

1 entreprise + 25 jobs

> Research centre specialising in the agri-food sector: products, processing, preservation, quality, safety, etc.
> R&D&I in the food sector. Not specialised in fishing.
> Training classes become a fisherman.

10-Distribution

1 enterprise + 5 jobs

11-Retail trade

11 enterprises +22 jobs

> Local and traditionally family-run retail fishmongers.
> Mainly aimed at the final consumer or B2C.

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04.1.5. QUALITATIVE ANALYSIS

CAPACITIES

HIGHLIGHTED CAPACITIES

Infraestructures: modern fish auction, free spaces in industrial port, offshore marine polygon to start up new business.

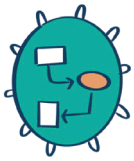
Market: high internationalisation, strong sales network, strong market position with label branding.

Know-how: expertise in ship repair and maintenance, fish processing artisanal know-how, R&D centre focused in food

CAPACITIES TO EMPOWER

Collaboration: The reinforcement of the collaboration of private companies could bring more capacity to invest.

Digitalisation: The digitalisation could automatise and get efficiency to the sector.



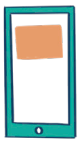
Management: The implementation of management tools could achieve higher profits.

Dissemination: The dissemination of fish healthy aspects could help to get higher fish consumptions rates.

CHALLENGES

Collaboration: It is needed a common project to empower the collaboration of public and private sector.

Generational replacement: The succession will be ensured by making the sector more attractive for next generations.



Digitalisation: The digitalisation could create more profitable business models.

Fish value: Increase of the value.

Distribution: Road transportation connectivity needs to be improved.

New protein sources: Revalorising discards and creating new protein sources through research and development.

Ondarroa Brand: To disseminate Ondarroa brand.

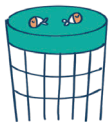
OPPORTUNITIES

Collaboration: The collaboration of all entities provide new opportunities.

Blue growth: Blue growth framework will give the opportunity to start a more sustainable economical development.

Entrepreneurship: The entrepreneurship promotion will empower the local ecosystem.

Higher consumption: New marketing strategies and better adapt to market demands.



Aquaculture: Aquaculture facilities to start up new blue growth ecosystem.

New Products: The development of new fish-based foods.

Retail trade: Digitalisation of businees models.

Distribution: Could be more sustainable with electric trucks and setting up dry ports.

In Lea-Artibai 25 interviews have been conducted with enterprises, sectoral associations, knowledge centres linked to the sector and public bodies that are involved in each ecosystem. These enterprises were chosen because they have meaningful weight in the respective links that are present in the supply chain of Lea Artibai.

CAPACITIES

From all the interviews conducted, the main capabilities that stand out and those that need empowering were identified.

With regards to **port activity**, the Ondarroa port boast very **modern infrastructure**, resulting in a highly technologically advanced fish market. In addition, the construction of the new fish market could affect other infrastructures and get other spaces that can accommodate new activities.

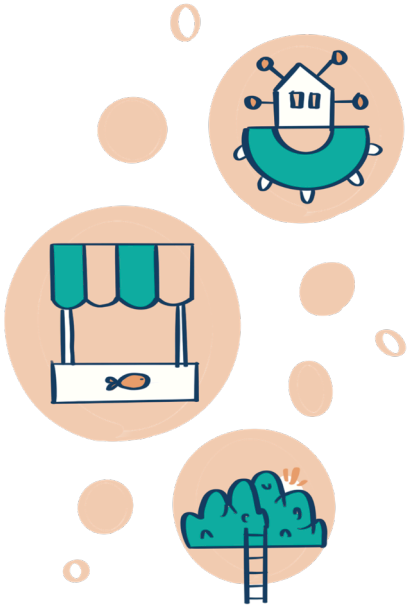
Even though **the expertise and experience in ship repair and maintenance serve** as an added advantage for the **suppliers of marine and industrial supplies** there is still significant need for diversification due to the links limited investment capacity, minimal digitalisation, basic management tools and narrow profit margins..

Concerning **extractive fishing**, boats of local shipowners are equipped with state-of-the-art technology. A high level of competition exists among different shipowners within the same port, which makes collaboration challenging. There is a **strong commitment to digitalisation** related to direct sales.

As part of the **aquaculture** link, the main capability has been the definition of a business starting from a research idea, providing the necessary financial and knowledge resources. There is also a **marine polygon** that could be used as a **location for new aquaculture activities**.

Regarding the links of **first processing of fishery products and wholesale fresh and frozen fish trade**, a **high degree of internationalisation** exists for exports and imports as well as a great negotiation capacity that buys in volume in local and international ports. High level in the areas of financial management and logistics. The ports have also invested heavily in innovative infrastructures. It might be said that they are technologically advanced companies in terms of process, but they are at a medium level of digitalisation.

Generally, processes for **seafood processing** are manual



and artisanal, although some **canning processes** are more sophisticated. It is a **high-quality**, top-of-the-line product with an established international sales network. Most of them have an average level of company management. Their primary focus is on own-brand products that have a strong market position targeting the premium market. Enterprises have taken steps towards digitalisation by offering online sales.

Research and Development involves the development of new healthy and **value-added products** based on local materials of plant or animal origin. The knowledge they generate is transferred to companies. Moreover, they have direct relationships with a wide range of companies operating in the food sector, including fish canneries. A state-of-the-art laboratory and equipment are also available to them for the development of their products.

Distribution by road transportation is handled most of the time by other companies, and even though this part of the chain has become crucial in recent years, it is underserved by the ecosystem. This creates less profit for the wholesalers who have to arrange and contract all services with other external companies.

In regards to the last link of the supply chain, the retail trade, there are fishmongers who sell fresh produce locally at a high quality/price ratio. There is the option of home delivery as well as the ability to order online or through social media. Several fishmongers have closed recently, mainly due to a decline in fish consumption, but supply appears to now be catching up with demand.

CHALLENGES

The challenges that different actors in the sector highlight will be presented in the following text.

Regarding port activity, enhancing the **port's activity** will require political involvement at all levels. Finding funding for the regeneration of infrastructure is a major challenge.

Regarding **suppliers of marine and industrial supplies**, enterprises have very low profit margins, which makes it difficult for them to invest. In addition, there are a number of challenges that need to be addressed, such as the monitoring of environmental legislation and the generational change or replacement. A **business model change could be accelerated by digitalisation**.

In the case of **extractive fishing**, it is challenging to have a major impact on European legislation and policies. Furthermore, consumer preferences are changing and the value of fish is decreasing. As a result, **it is necessary to adapt to new market demands**, even though there are some initiatives blue economy, waste management, etc they have to be reinforced.. Additionally, **implementing digital technology** to enhance traceability is also a challenge. There is a need to identify the factors that make a project attractive to investors, entrepreneurs, etc.

As for **aquaculture**, the project is still pending to get production volumes for industrialization and the production obtained does not meet the break-even point. Moreover, the business model needs to be revised: alliances should be formed with experts in the field and investors who will be able to relaunch the company.

First processing of fishery products and wholesale fresh and frozen fish trade links require adapting to environmental regulations and finding solutions for waste management. The processors and the wholesalers work in high financial pressure as they work with high volumes to achieve margins. In order to increase landings of fish, the port of Ondarroa should be made more attractive.

Reaching out to other international premium markets generates greater profit margins for **seafood processing**. (very tight profit margins). As well as generational replacement, seasonality of the work is also a concern. While some sales have been digitalised, much progress is still required in this area. In fact, making the business profitable is the main challenge.

One of the main areas of **Research and Development** is the development of new products based on waste or by-products, such as the application of new protein sources in food products and the identification of new sustainable protein sources. In order to develop these research projects, funding is required.

Regarding the **distribution** service, there are several factors that make it challenging, such as the high price of petrol for trucks at the moment, the road infrastructure up to the port of Ondarroa is not suitable for large lorries, and the fact that packaging management increases costs and impedes logistics.

To promote and encourage fish consumption in the retail trade phase, social networks and digital channels should be used. Additionally, digital marketing can be used to assess whether something can be done with the waste generated, since the volume generated is probably not sufficient. It is also important to reinforce the Ondarroa brand (fresh fish of excellent quality, fresh from the day, etc.).

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OPPORTUNITIES

Lastly, the following lines describe the opportunities that the Lea-Artibai ecosystem offers in each link of the supply chain.

In relation to the **port activity, the collaboration of all entities** will provide opportunities for the development that will help to regenerate the port economically. The framework of **blue growth** will be the context of this opportunity. That also **requires monitoring, advice, and the development** of regulations related to sustainable development.

In the **suppliers of marine and industrial supplies phase,** their ropes could be used for other activities, such as marine renewable energy. In addition to opportunities related to biodegradable materials at sea, the increasing number of ships approaching the port for unloading may provide opportunities as well.

Regarding **extractive fishing**, encouraging collaboration within the same sector and promoting entrepreneurship are essential **steps toward sustainable growth**. Emphasising the importance of innovation will drive the sector to adopt **new marketing strategies and better adapt to market demands**. Enhancing the image and value of fish will also help to promote the fishing sector.

The **processing of fishery products and wholesale fresh and frozen fish trade** represent opportunities that can be generated as a result of blue growth. These opportunities include **new forms of consumption** and changing consumer demand; the digitalisation of the sector, both in order to digitise fish from catch to customer as well as to track the traceability of packaging; diversification opportunities in the food sector; and opportunities for fish revaluation.

There may also be opportunities in the food sector regarding the **seafood processing** link. Researching and adopting advanced technologies will enhance competitiveness and facilitate **market expansion**.

In the **Research and Development** phase, there may be opportunities to develop new fish-based foods in collaboration with industry. Revaluing fish waste can also be a means of generating **new sources of protein**.

With regard to **distribution**, it should be examined what alternatives exist to the use of petrol for trucks, for example, electric truck fleets; other possibilities to access Ondarroa other than by road, such as setting up dry ports and intermediate unloading facilities, should also be considered.

As a final consideration, the **retail trade** could offer fish to other end users that require preparation and/or pre-cleaning such as nursing homes or canteens. In addition, the **digitalisation of the business would allow us to reach our customers in new ways**.

The data reveals that the **Lea-Artibai ecosystem possesses technological and innovative equipment and infrastructures that can be used to address the challenges identified**, including economic challenges and the need to digitise various processes.

04.1.6. GENERAL CONCLUSION

Ondarroa and Lekeitio have been the two analyzed ports for the Lea-Artibai ecosystem. On the one hand, while Ondarroa has developed its core business in industrialized big volumes fishing, on the other hand Lekeitio has shifted towards artisanal fishing and recreational activities.

Ondarroa is one of the most important ports in the Basque Country in terms of fish landings. Of the 1,695 companies in the region, 62 belong to the fishing sector, generating approximately 8,818 jobs, which reflects the importance of this industry for the local economy. Last year, the volume of fishing in the port reached 22,268.21 tonnes, with an economic value of 42,761.82 euros, which underlines its relevance in the fishing activity of the area.

Despite its importance, the port faces significant challenges, such as the decline in number of vessels, in fish stocks, the lack of modernisation in the business models and the lack of generational replacement in the sector's enterprises. All these characteristics put the ports long-term sustainability at risk. In times of globalization, it's important to note the commitment of enterprises in the region which have decided to remain linked to the territory and have been able to face periods of crisis such as the one generated by COVID-19.

Regarding the first activities of the value chain, such as extractive fishing and the wholesalers, these enterprises maintain the same business model in the last 50 years and nowadays is so tight the margin to profit. The captures of fresh fish are declining because of sustainable regulations from Europe, so to buy fresh fish and sell it in big volumes is hardly profitable. Some of the biggest companies could afford new investments and diversify their business into frozen fish for example. But in general, the retirement age is approaching and there is no capacity to invest in digitalization, for example.

In parallel, it is important also to enhance the image of the sector, highlighting its key role in the local economy and in the preservation of maritime culture and traditions. Promoting the Ondarroa brand is a key strategy to differentiate this port from other fishing markets and reinforce its identity as a benchmark for quality and freshness. The Ondarroa brand is associated with fresh fish of the day, guaranteeing excellent quality products that come directly from the sea. This identity, based on freshness and authenticity, can be a differential value that attracts both local consumers and wider markets, increasing demand and improving the competitiveness of its services and products.

Blue economy strategy brings, the opportunity to set up sustainable activities according to the needs of the ecosystem. The aim of the blue growth is linked to the economic development of the port of Lekeitio as well, where the local fish consumption, the fish sector heritage and the emerging sectors will be an opportunity to follow up.

In this way, it is also crucial to set up new businesses based in blue economy principles by local entrepreneurs. Ondarroa is the epicentre of the Lea-Artibai fishing supply chain, and it is in a critical historical point. Following the opportunity of Blue Economy principles, collaborating within private companies and public entities could get new opportunities in other sectors. Aquaculture, biotechnology and other emerging sectors can provide the opportunity to relaunch the economy based in Ondarroa Port. In fact, following the reorganisation of the ports industrial area,new activities could be hosted next to the sea. Other than that, it is also remarkable the strong knowledge-network of the Lea-Artibai ecosystem. This knowledge-network will provide on the one hand, new worker profiles with modern know-how and on the other hand, technology centres could offer new innovative products and innovative solutions to the sector.

To this end, it is considered necessary to create a governance model in line with the new activities and initiatives that are identified. At the heart of this diversification of maritime activities could be the aquaculture sector, which can offer multiple possibilities for generating activity. Equally important is the new fish market in the port of Ondarroa, which is technologically very advanced and offers great possibilities for improving the sector's competitiveness and efficiency.

04.2. BRETAGNE

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04.2.1. ECOSYSTEM DEFINITION

Brittany is one of thirteen administrative regions in France. Their objective is to contribute to the economic, social and cultural regional development. They carry out four main actions: economic development, initial and continuing training for young people and adults, territorial and environmental planning, and transportation. Brittany is the French region with the longest coastline and a heritage that has always revolved around fishing. With approximately €235 million worth of fish products sold in 2020, Brittany accounts for almost half of all French fishing. The Breton fisheries value chain (upstream and downstream) represents 13,250 jobs with 4 377 fishermen (Région Bretagne, 2023). 26% of French fisheries processing companies and products are produced in the region, and 34% of French wholesalers are in Brittany.

Cornouaille is a former political and cultural division of Brittany located in the south-west of the department of Finistère. 218 municipalities are spread over the 5,979 km² territory and the 451 km-long coastlines. The fishing industry plays an important role in the local economy and identity; half of Brittany's fishermen are from Finistère, and half of its fishing vessels are in Cornouaille (DDTM 2023), disseminated between the 7 fishing ports of Douarnenez, Audierne, St Guénolé-Penmarc'h, Guilvinec-Léchiagat, Lesconil, Loctudy-Ile-Tudy and Concarneau. These ports disseminated along the Atlantic coast account for almost 25% of French unloaded fresh fish (France AgriMer 2023), with a prevalence of inshore and artisanal fishing (78% of fishing vessels).

The choice of Saint Guénolé Penmarc'h as a pilot site relied on several factors: a fragilized auction hall which presents an opportunity for future development, a diversity of activities on the port, key stakeholders mobilized and new projects and challenges.

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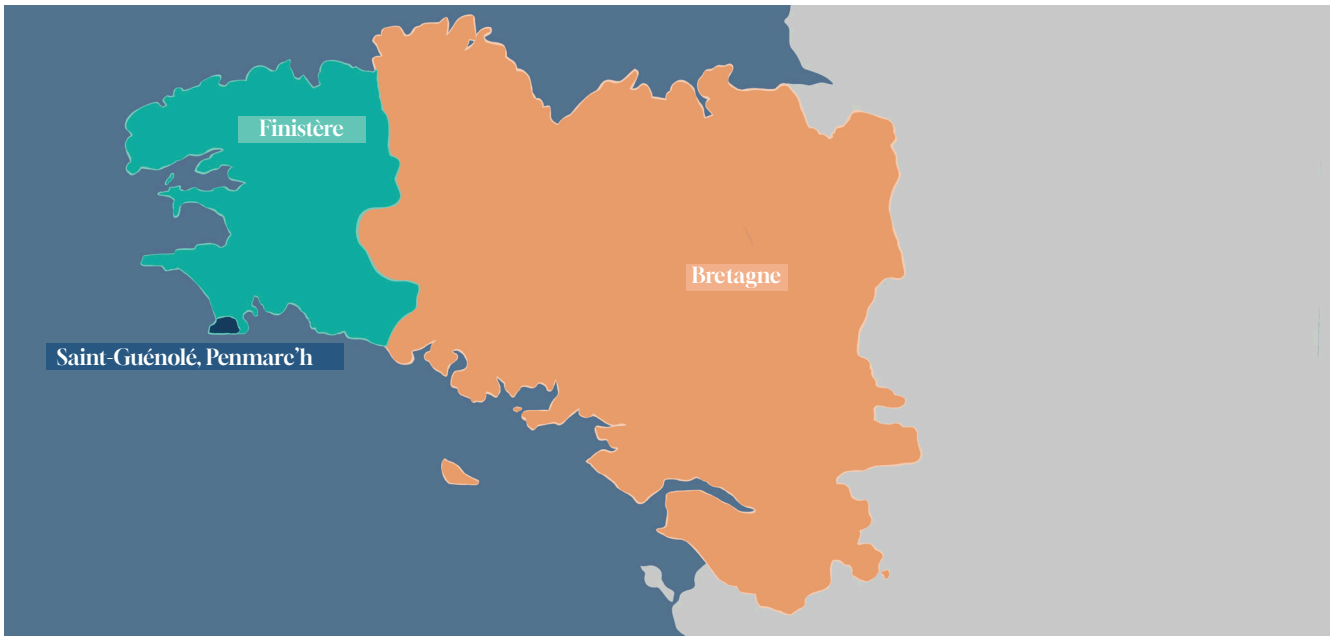
04.2.2. QUANTITATIVE ANALYSIS

All the data is taken from the references at the end of the document.

SOCIO-ECONOMIC INDICATORS



The port of Saint-Guénolé, located on the southern coast of Cornouaille in the municipality of Penmarc'h, is a historical purse seine fishing port. There are 5,139 inhabitants in Penmarc'h (46% males and 54% females), and half of them are over the age of 60 (INSEE 2020). The unemployment rate is higher than the average in both Bretagne and France (15% against 10% at regional and national levels), with 1,176 inhabitants declaring to have a job. Penmarc'h city centre is relatively far from its two ports: Saint Guénolé is located 4km away on the west coast, and Kérity 4 km away on the south coast. As a result, the consolidated municipal data does not accurately reflect the territorial diversity, where each area functions almost as an insulated district.

94

SEA-FISHING COMPANIES

ANNUAIRE DES ENTREPRISES, DATAGOUV

The economic sectorial data highlights the importance of the primary sector for the whole territory of Saint-Guénolé Penmarc'h. There are 94 sea-fishing companies, which include fishing vessels and fishermen as micro-entrepreneurs. The employment data also indicate this prevalence: 35% of the working population are blue collar workers (which includes fishers and processors), more than twice the percentage at the regional level (13%) (INSEE 2020).

Historically a port of deep-sea and purse seine fishing, Saint-Guénolé has almost completely stopped its deep-sea activity. Currently, the port carries on inshore fishing (sales in the afternoon) with the production of monkfish, pollock, rays, turbot and langoustines. Purse seine fishing is a very important activity, increasing in both quality and volume (morning sales) with large volumes of sardines, anchovies and horse mackerel. A total of 11,022 tons of fresh fish were unloaded in Saint-Guénolé in 2023 (fisheries auction hall combined with direct sales), representing a sales value of 16 million euros (ADRHM, France AgriMer 2023). Saint Guénolé's fisheries sales have decreased by 41% over the past ten years (4,513 fewer tons sold in the auction hall since 2013). Despite this decline in volumes, Saint Guénolé still accounts for almost 10 percent of Brittany's total volume in 2023, compared to 12% in 2013, line with the national and regional trends (France AgriMer 2023).

Volume of Fishing in Tons (t)	11.022.00
Volume of Fishing in € Value	16 million

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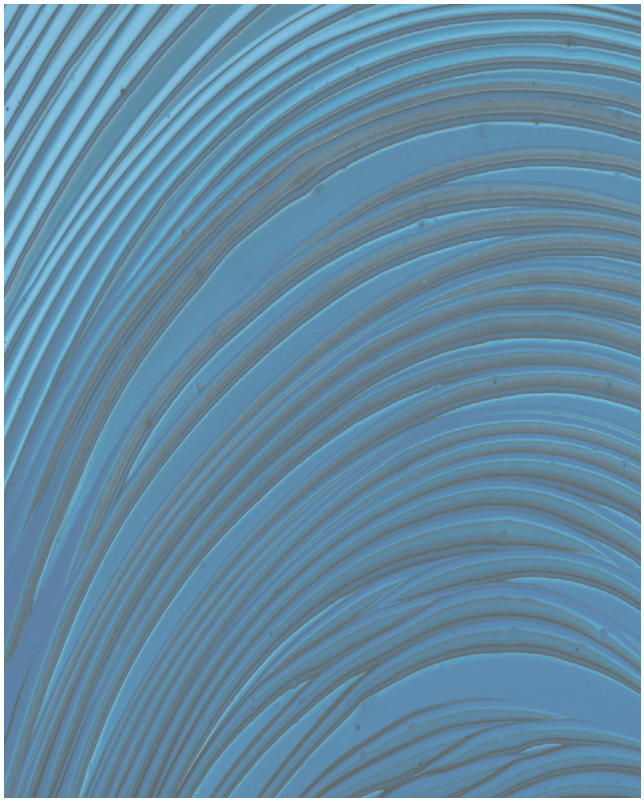
04.2.3. ACTIVITY TYPE IDENTIFICATION

Approximately 30 companies (manufacturing, services, retailing, etc.) are located on Saint Guénolé Port. Half of them are dedicated to non-maritime economic activities, such as banks, bars, bakeries, hairdressers, electrical maintenance and installation etc. The port also contains several companies that belong to the blue economy, including a biotechnology company and, a tourist cruise company.

Among the activities carried out on the port that are directly linked to the fisheries central value chain are the extractive fishing (vessel owners and fishers), wholesalers, processors, retailers, and fisheries auction halls and port management authorities. 46 fishing vessels are registered in Saint Guénolé, with 10 purse seine fishing, 15 trawlers (inshore and deepsea), and half of the fleet dedicated to exclusive or mixed passive arts: gillnetters, longliners, potters etc (CMPMEM, 2023).

The level of fishing activity also varies over time: fishing vessels can unload their stocks in different ports over the same week, and vessels registered in other ports can come sell in Saint-Guénolé, with an impact on the volumes of stocks and activity registered.



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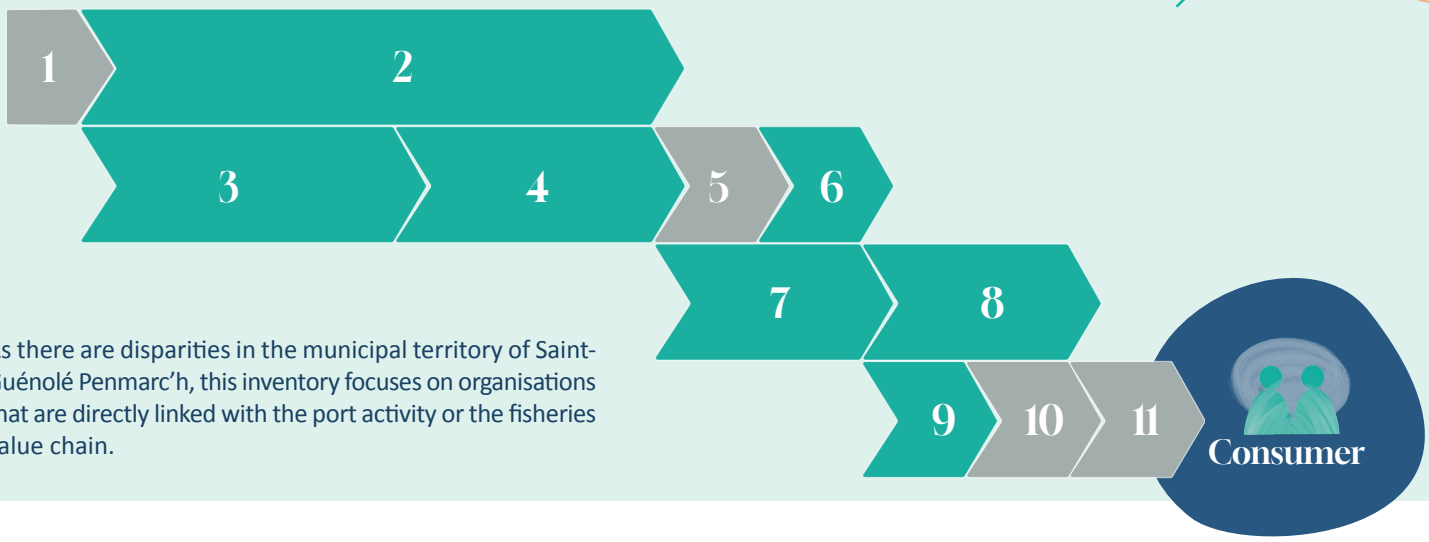
04.2.4. SAINT GUÉNOLÉ SUPPLY CHAIN

Time line



As there are disparities in the municipal territory of Saint-Guénolé Penmarc'h, this inventory focuses on organisations that are directly linked with the port activity or the fisheries value chain.

1 - Shipyard

3 companies

> Ship sales.
> Maintenance and repair service for wooden and metal vessels.

2 - Port Management Stakeholders & Port Associations

3 institutional bodies
+ 2 associations

> Security and general maintenance of the port and fisheries auction hall.
> Sales declaration and management, food safety regulation in the fisheries auction hall.
> Management of exploitation permits in publicly owned port infrastructure.
> Fisheries management and representation at departmental level.
> City council.
> Community of municipalities.
> Social inclusion association: first processing training unit, wholesales and products from co-products.
> Port users' association (volunteers): mobilisation of the port ecosystem.
> A non-profit organisation dedicated to sea rescue (SNSM).

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3 - Suppliers of marine and industrial supplies

1 company

> Ship sales.
> Port services and fuel sales.
> Commercialisation and installation of fishing and naval spare parts, tools and accessories.
> Maintenance and repair service for wooden and metal vessels.

4 - Extractive fishing

46 fishing vessels (CDPMEM 29, 2023)

> Deep-sea and inshore fishing activities.

5-Aquaculture

6- First processing of fishery products (such as freezing services) & 7-Wholesale fresh and frozen fish trade

3 companies + 1 association

> Wholesale marketing of fish, both from the local fleet and imports from other shipowners.
> First processing and cleaning of fish.
> Freezing and cold storage.
> National and international distribution of fish.
> Purchase of fish abroad.
> Sale of fresh and frozen end products.
> Transport and logistics.
> Social inclusion association: first processing training unit, wholesales and products from co-products.

8-Seafood processing

1 company

> Second fish processing.
> Canned fish processing.
> Preparation of canned fish.
> Distribution and B2B sales and international markets.
> Production of high quality and gourmet products, mainly handmade..

9-R&D

1 company

> Seawater sprays, manufacture and sale.

10-Distribution

11-Retail trade

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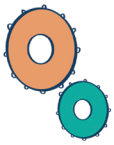
04.2.5. QUALITATIVE ANALYSIS

CAPACITIES

Natural Resources: Very high quality and plenty natural resources available.

Infrastructure: Available infrastructure directly on the port.



Strong skillsets: Strong maritime know-how (fisheries, processing, wholesaling and shipyards).

Access to the Bay of Biscay: Direct maritime access to diverse resources.

CHALLENGES

Political Decisions Process: Scale play and the cost of uncertainty, local impact of remote political decisions.

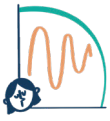
Financial Pressure: Economic balance is threatened by rising operation costs.

Environmental and circular economy challenges: Fisheries resources are directly affected by climate change.

Port infrastructure: The Port infrastructure needs a strategic reflexion, various renovations and decontaminations.

Technological Gap: Investments in research and development in this sector is critical.

Workforce Renewal: Difficulty in attracting and retaining talent, with the danger to lose existing skillsets.



New Consumer Trends: New products and consumer trends are arising, adaptation is needed.

Identity Crisis and Perceptions: External communication is challenge to clarify the way the fisheries value chain and sector work.

OPPORTUNITIES

Infrastructure: The reorganisation of the port infrastructure could bring about new or the reuse of spaces that could host new activities.

Innovation: Possibility to diversify activities through innovation.

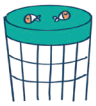
Small Scale Circuits: Working in proximity and without claming to respond to all challenges raised.

Science: Study of the marine ecosystem and the potential impacts of new activities and climate change.

New Models: Invent and develop new fishing and business models to sell seafood, adapted to the types of fishing and use of ecosystems.

Circularity: Achieve additional profitability by recycling/reducing materials and equipments or developing by products.

Renewable Energy: Potential to use wave energy as renewable energy.

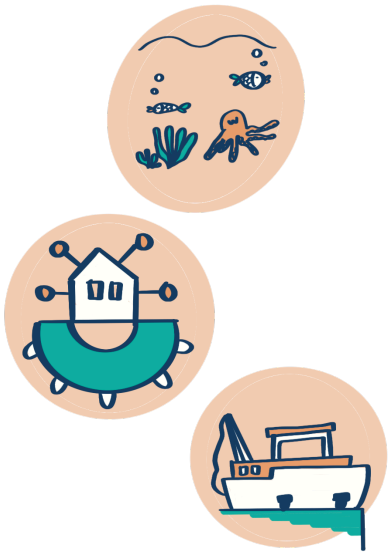


Aquaculture: Possibility for the port to become a pilot site, if there is demonstrable potential.

Know-How Promotion: Valorize and reinforce the attractiveness of the sector.

14 interviews with organisations, associations, companies, etc., have led to the recollection of perceived capabilities, opportunities and challenges for Saint-Guénolé Penmarc'h. This should not be taken as a structured socio-economic analysis but rather as a starting point for further work on the port of Saint Guénolé.

CAPACITIES



Natural resources play a crucial role in the area's appeal, highlighted by 14 km of coastline and high-quality natural resources, especially seawater (strong stir-up) & fishing resources.

The port itself boasts significant **infrastructure**, including linear quays, an auction hall, premises and ample dock space, with a well-sheltered quay. This area is an asset for developing new projects. Fisheries are a cornerstone of the local economy, based on a small-scale fishing community rich in skills and intangible heritage. The know-how has been established for many years: fishermen with 40 years of experience, shipyards, family cannery, versatile technicians who have learned on the job, career fishmongers and new activities have arrived (biotechnologies, Ike Jime fishmongering). This expertise is complemented by a local attachment to the area and the port. Fishing and activities around the port are both an economic resource and an identity marker; the port is a productive activity that should be preserved.

The port offers direct maritime **access to the Bay of Biscay**, supporting a diverse value chain that includes processing activities, trawlers and inshore fishing, and auction hall operations equipped with digital sales and traceability tools. The port of Saint-Guénolé Penmarc'h wants to commit to remaining a fishing port (especially sardine).

CHALLENGES

Cornouaille fisheries are undergoing multiple crises, with a **strong impact of political decisions** taken at European and national levels that foster complexity and economic uncertainty (Brexit fleet exits, Closure of the Bay of Biscay in 2024 and 2025, etc.). Changes happen fast, all at once and local stakeholders feel excluded from vertical decisions that have a direct, immediate and critical impact on their activity, while abiding by increasingly complex regulations. The uncertainty complexifies decision-making for the economic activity and smaller players have increasing difficulties to stay competitive.

Multiple instances and intermediaries coexist, while economic actors and fishermen can still lack direct participation. There are also difficulties related to the Port management authority, CCI Finistère, criticized for a lack of dialogue that has had a impact on the economic activity and the development of new projects. Its mandate ends in december 2025.

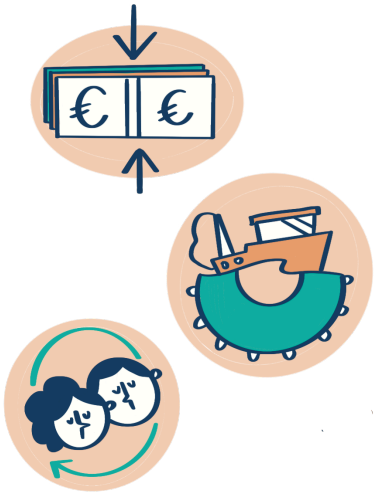
Economic balance is getting more difficult each year for fishermen as **operation costs are rising** while the fishing fleet is getting older, in a context of global inflation. Optimizing costs and renovating infrastructure is also a challenge for the port management authority: fisheries infrastructures are expensive to maintain while the unloaded volumes and associated taxes and revenues decrease.

Regarding the **environmental** and circular economy challenges, fisheries resources are impacted by climate change (among others: smaller sardines, oceanic acidification, plankton evolution, etc.). Unloaded volumes are decreasing in French ports, but causal links are unclear: is it the impact of climate change or the fleet exits, especially deep-sea trawlers?

Circular economy solutions are still lacking at port level for materials (plastic, boats, fishing nets, etc.).

Other than that, sea access to the port of Saint Guénolé is complex, and some premises are in the submersion zone, where there is significant flooding risk. Various buildings need to be renovated or decontaminated, but the property management and ownership is complex and determines what kind of activity could take place within existing premises. The port is almost an insulated territory, which entails higher logistics costs. **Port infrastructure requires a strategic reevaluation and reflexion**.

Research and Development for fisheries could have been more invested in the past, while the need to modernize and decarbonize fishing vessels and ports is critical, creating **a technological gap** which means that developing operational solutions will be slow. New boats are too expensive for



newcomers, as are pilot technologies for selective fishing or decarbonation, and access to financing is scarce.

Many skilled workers are close to retirement age. Throughout the value chain, **recruitment and renewal of the workforce** is a challenge where skillsets can be lost. Demanding working conditions on ageing boats are not as attractive for younger fishermen, even when the activity is economically viable. They prefer inshore fishing that is more compatible with family life, but inshore species quotas are already consumed by the existing fleet.

New trends for fishery products are appearing. Nowadays, consumers want processed, ready to cook products rather than whole fish. They buy more in supermarkets and less on the port. They consume more imported species, with a focus on lower prices and a growing lack of knowledge of the local resources such as seasonality, geographical origin and ways to prepare and cook fisheries products.

Finally, the sector is undergoing through an identity and perception crisis. Environmental NGOs have had a strong impact on the perception of fishermen in the past few years, with a communication strategy now presenting fishermen as destroyers rather than food-providing heroes as was the case in the past. The fisheries value chain activities are not well-known by the public, and the distinction between "artisanal" and "industrial" fishing is not clear to many. Trawlers are particularly criticized by environmental NGOs for instance, while key to maintain lower fisheries product prices and often operated by crews of less than 5 seafarers. This contributes to negative perceptions and disinterest for the activities and jobs linked to the fisheries value chain.

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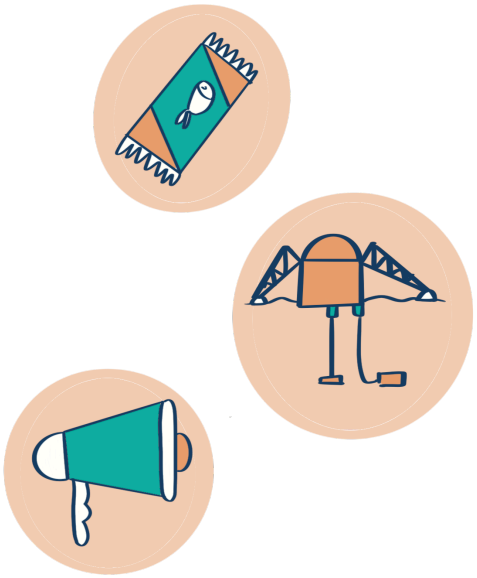
OPPORTUNITIES



A significant opportunity lies in the **reorganisation of port infrastructure**. Several locations and rental opportunities could be created / reused by new projects. Since 2024, Penmarc'h, Le Guilvinec, Treffiagat, Plobannalec-Lesconil, Loctudy are labelled "Small town of tomorrow", a territorial approach to revitalise these port areas affected by the post-Brexit fleet exit plan. The national programme "Small town of tomorrow" is a scheme to trigger a revival, focusing on the port premises. In addition, the port governance authority will change in January 2026.

Thinking about possible **innovations** in the port of Saint Guénolé Penmarc'h is not easy. Each actor has its own definition, more or less precise. The avenues mentioned by the interviewees, which are based on the region's assets, are played out at several scales (port, Cornouaille, sectoral or regional) to **diversify activities**.

The **small scale** is seen as an asset by local economic actors. It allows them to deal with unforeseen events in a more flexible and reactive way (management of teams, costs), and to adapt. To explore possible innovations in line with the perceptions collected, an opportunity: working on a small scale, in proximity, without claiming to respond to all the challenges raised.

At this pivotal moment, stakeholders need answers that will enable them to navigate, even in rough weather. The **scientific community**, made up of experts sometimes based in the territory, could be a key resource. It would provide essential information to those who live from the sea to manage daily life and imagine desirable futures. Fishermen want to participate to the study of the marine ecosystem and the potential impacts of new activities or climate change. They would be lookouts and guarantors/guardians, participating in the maintenance of the biodiversity that they know, practice every day and which represents their source of income.

Several promising opportunities exist within the extractive fishing sector at the port, particularly through **new business models** in direct sales, which are aligned with strong consumer expectations: consumers are keen to understand the job, the types of fish, how to consume it. It would also be beneficial to develop a short supply chain and distribution model to enhance efficiency. There is an opportunity to invent and develop new fishing models and new business models to sell seafood that are adapted to the types of fishing and use of the ecosystems.

In the part 50 years in France, several **circularity projects** were developed that aimed at developing by-products, particularly marine by-products, with more precise, more restrictive but also more incentivising regulations, a stronger environmental commitment on the part of the players, with industrials taking up this issue by internalising it or outsourcing it to other companies, with additional profitability, and more lucrative markets. Marine by-products and under-utilised resources can be an opportunity, the question remains as to what the available volume is.

Moreover, potential recycling/reuse of boats materials and equipments (nets…) has also to be considered.

Regarding the location of the port with swell and waves, the potential for marine **renewable energy** as wave energy generation could present an interesting opportunity.

The potential for the development of **aquaculture** in Saint Guénolé has not been assessed but it has been mentioned in the interviews. Reseeding local species (lobster for instance) for rewilding, becoming a pilot site for aquaculture: small scale, new species, seaweed, multitrophic, developing land-based aquaculture (seaweed/shrimp farming) using existing premises, or experimenting with Nori seaweed, are among the ideas requiring fuller consideration and maybe a scientific opportunity study.

Youth & generational renewal is key for local development, all the more so since there is a maritime vocational school in Guilvinec, close to Saint-Guénolé. It is important to valorize fisheries to reinforce the attractiveness of the sector/raise the profiles of these jobs through the **know-how promotion**. Helping young fishermen get started (e.g. cooperative's help) can be also explored.

Even if there is a greater focus on coastal attractions, landscapes and culture traditions among tourists than on fishing know-how, Penmarc'h has **touristic assets that can be emphasized**: the proximity of beaches and international surf spots, cultural events, new business tourism. But the link between the productive and leisure activities should be planned.

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04.2.6. GENERAL CONCLUSIONS

The interviews carried out for FISHINN have given a new opportunity to start thinking about the potential for innovation on the port and in the value chain. The perceptions will then be confronted with a further analysis to work on potential outcomes.

Challenges in the port and fisheries activity are complex and multifactorial. Citizens lack a clear understanding of the value chain, technical definitions, and existing systems and organisations. The complexity does not allow us to draw causal links, give a simple understanding or offer clear solutions.

At port level, **maintaining the productive fisheries activity is key** to maintain the ecosystem. On the other hand, buyers underline that territorial price disparities, decrease in fisheries unloaded volumes and geographic distance can hinder sales. Some players want to develop local markets for consumers, with high added-value niches, while others favour massification and centralized sales channels to reduce the cost of logistics and transportation. Strategies may differ according to the position in the value chain, and the scale of the activity. Challenges and opportunities may lay at various levels: locally, regionally, nationally, European level, etc. The fisheries value chain operates at a scale that goes beyond the port, while being key for the activity onsite.

All interviews raised questions regarding the **potential diversification onsite and how to reconcile different uses**. The quality of natural resources can be impacted by productive or extractive activities. Tourism increases the pressure on natural resources. Any project will have to assess the possible coexistence, and potential priorization, of different activities.

The current period carries a **strong uncertainty** for all the port stakeholders and for any project: **2025 is a turning point** where the CCI (Port Management Authority) mandate ends, and the new managing structure is not yet defined. Regulations are also still changing, with a new fishing ban announced in the Bay of Biscay for 2025. Locally, various projects have started to assess potential new directions for development, innovation and urban planning, such as Petites Villes de Demain, a national scheme to facilitate transitions for small towns.

Other than that, Saint-Guénolé Penmarc'h, as well as other ports of Cornouaille, benefit from new mobilized organizations that foster collective dynamics to participate in the discussion around potential changes. The opportunity to **become a pilot ecosystem** to test, try and develop new solutions even on a small scale, is underlined by all local stakeholders, whether directly linked to the fisheries value chain or simple port users. No clear, unique solutions are identified, but the framework of the project allows to bring new thematics to be analysed, with a strong will to maintain the port rationale: a productive area where the maritime fishing activity and know-how are preserved through new generations.

04.3. ALENTEJO

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04.3.1. ECOSYSTEM DEFINITION

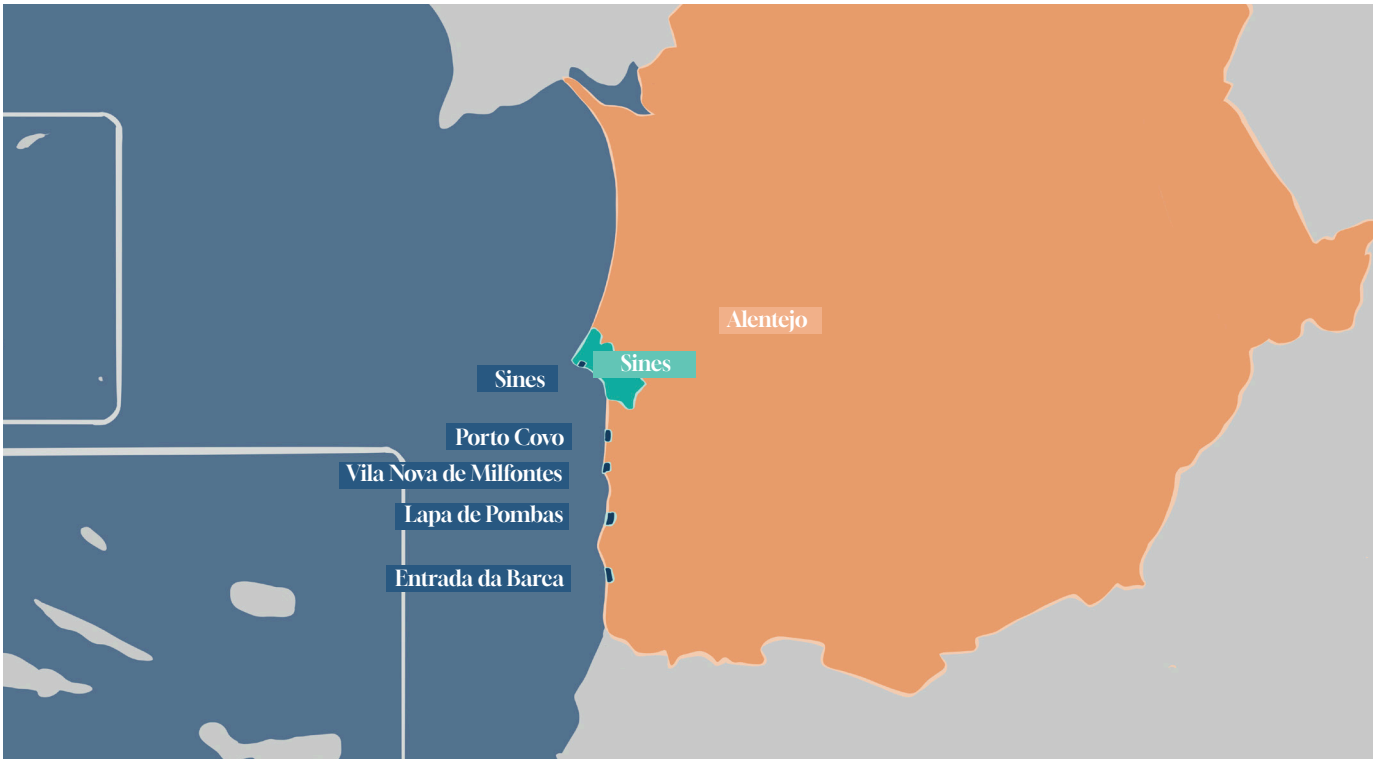
Alentejo is a geographical, historical and cultural region of central-southern and southern Portugal. Alentejo includes 47 municipalities, and it has a population of 790,849 inhabitants (7% of the country).
In Alentejo there are six traditional fishing ports: Sines, Porto Covo, Vila Nova de Milfontes, Lapa de Pombas (Almograve), Entrada da Barca (Zambujeira do Mar) and Azenha do Mar, but only four of these ports have auction or selling points. The searched territorial impact is to increase the number of people working in traditional fisheries and to ensure the generational handover, to improve the co-management in the stocks of the species caught, to improve fishers and ship owners' capacity to innovate and collaborate.

Sines Tecnopolo will contribute to the development of the activities foreseen in the project, in which it can add value with its experience and knowledge. Sines Tecnopolo is a non-profit association whose associates are the main stakeholders of the quadruple helix of the Alentejo Litoral region and therefore very well connected with local and regional policy makers and a very active member of the local ecosystem to support entrepreneurship and companies in blue economy.

04.3.2. QUANTITATIVE ANALYSIS

All the data is taken from the references at the end of the document.

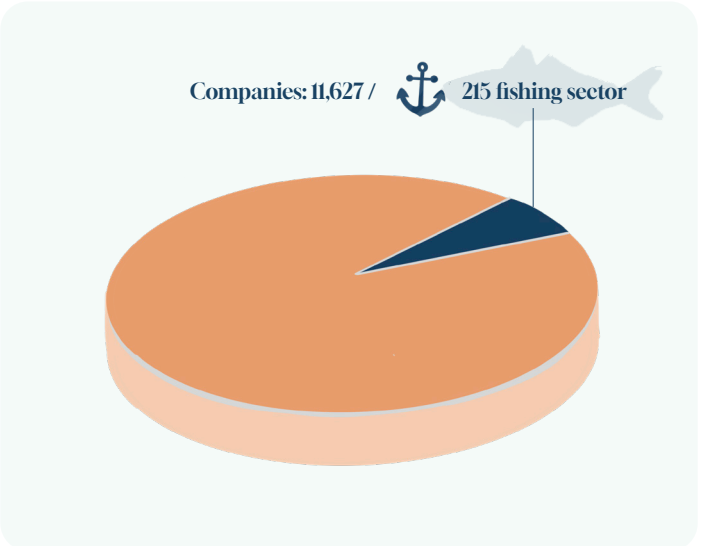
SOCIO-ECONOMIC INDICATORS



The Alentejo Litoral region has a total population of 99,111, with a fairly gender distribution of 48% male and 52% female. Approximately 26% of its residents are over 65 years of age, and only 12% hold tertiary education.

Currently, the region's unemployment rate is 5%, with a slight gender disparity: 6% for men and 5% for women. Overall, 31,685 jobs are available in the region, which can be found in a variety of sectors, while the income per capita in the region is 30,083 €. The region is home to 11,627 companies, of which 215 are specifically involved in the fishing industry.

Fishing remains a key economic activity, contributing significantly to employment and income. The volume of fish caught in the region amounts to 878 tons annually, with a total economic value of €5,897,783.51.



The ecosystem's primary catches include sardines, mackerel, blue whiting, and octopus, which are targeted using various fishing methods. Among the main fishing gears registered in the region are trap fishing with 66 vessels, net fishing with 69 vessels, and purse seining with 69 vessels.

Volume of Fishing in Tons (t)	878
Volume of Fishing in € Value	5,897,783.51

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04.3.3. ACTIVITY TYPE IDENTIFICATION

The Sines and Vila Nova de Milfontes ports support a wide range of activities across multiple sectors, with 14 distinct activity types contributing to its dynamic operations. Several enterprises are directly involved in the fisheries supply chain, enhancing the port's core functions. These include fishery product transformation services, such as fish freezing (2 enterprises), as well as personnel dedicated to port inspection and control (1 enterprise) and management of the first sale of fresh fish at the market (1 enterprise). Some activities in the ports operate outside of the direct supply chain yet still play essential roles. These include suppliers of marine and industrial goods, such as ice or fish crates (5 enterprises), and a thriving tourism sector related to maritime activities, with 32 enterprises catering to sea-linked tourism. Additionally, there are also other non-maritime activities within the ports, representing 5 companies.

Focusing on enterprises linked closely to the fisheries supply chain, the ports have a substantial extractive fishing sector, with 45 registered fish-catching vessel owners. Additionally, fresh fish wholesalers (5 enterprises) and fish retail trade operators, including prominent fishmongers and larger distribution networks (50 enterprises), form a robust market presence in the region. Although not a central component of the fishing supply chain, there is also one aquaculture company.

The ports also benefit from sectoral support through shipowner associations (1 association) and knowledge centers that focus on the marine environment and coastal development (1 centre). Furthermore, the ports collaborate with several public bodies. These include local public bodies such as town councils in fishing municipalities (5 bodies) and other regional public instruments dedicated to food, fishing, and coastal development (4 bodies).

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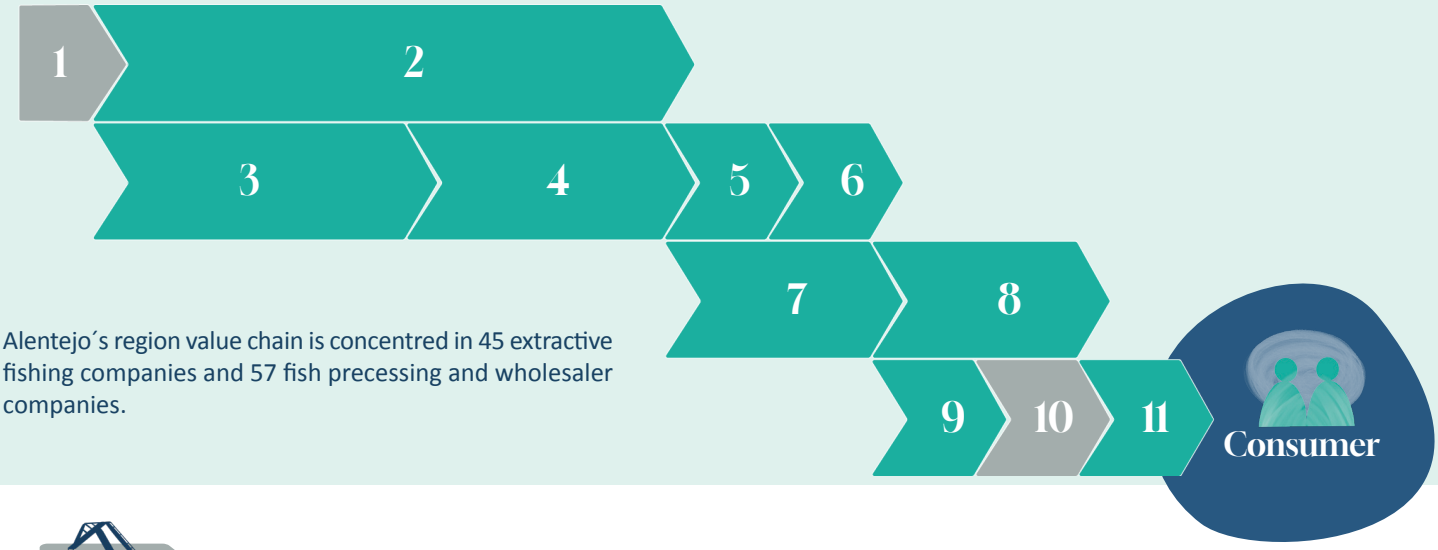
04.3.4. ALENTEJO SUPPLY CHAIN

Time line



Alentejo´s region value chain is concentred in 45 extractive fishing companies and 57 fish precessing and wholesaler companies.

1- Shipyard

2- Port Activity: Port Inspection and Control Personnel

7 enterprises + 36 jobs

> Port Services.
> Fishing Net Repair.
> Fueling.
> Ice Sales Stations.

3- Suppliers of marine and industrial supplies

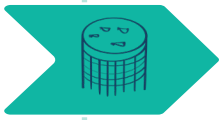
5 enterprises + 10 jobs

> Port Services.
> Fishing Net Repair.
> Fueling.
> Ice Sales Stations.

4- Extractive fishing

45 enterprises + 500 jobs

> Deep-Sea and Inshore fishing activities.
> Seine Fishing.



5-Aquaculture

1 enterprise + 15 jobs

> Sea Bass Aquaculture

6-First processing of fishery products (such as freezing services),

7-Wholesale fresh and frozen fish trade

8-Seafood processing

57 enterprises + 235 jobs

> Wholesale marketing of fish, both from the local fleet and imports from other shipowners. These companies also do some kind of fish processing.
> They sell it fresh or frozen.
> Distribution is through their own shops, international sales and sales to large distribution chains in Portugal and Spain.

9-R&D

1 enterprises + 20 jobs

> To promote and carry out scientific, educational and cultural activities.
> To improve knowledge of the marine environment and the sustainable use of its resources.

10-Distribution

11-Retail trade

Not quantified

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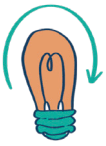
04.3.5. QUALITATIVE ANALYSIS

CAPACITIES

Integrated Value Chain: Integration of activities to create synergies.



Innovation and Efficiency: Advanced technologies and automation, productivity, quality and marketing.

Research and development: Initiatives focused on marine biodiversity and development of new fish products.

Sustainability: Environmental prospective implementing sustainable practices and use of resources.

Specialized Knowledge: in extractive fishing.

Operational Resilience: Adaptability and perseverance.

Market: Strong market presence with local and international partnerships.

Distribution: Extensive distribution network in wholesaler and processing activities.

CHALLENGES

Regulations: Regulations regarding the creation of new fishing operators, transitioning to clean energy, protecting marine biodiversity from overfishing and pollution, and reducing the carbon footprint in production and processing.

Financial Stability: Create a steady demand by making fish attractive to customers.

Social Challenges: The succession will be ensured by making the sector more attractive to new generations.

Financial Pressure: High operational costs/variable fish prices/financial stability and economic pressures.

Technological and Digital Challenges: The modernisation in supply chain management, production processes and in remote marine environments.

Marketing Challenges: To build a strong brand presence in new markets.

Collaboration and Co-management: To implement an effective conservation and equitable access to marine resources.

OPPORTUNITIES

Innovation: The ports stand poised to leverage innovation and technologies to modernize their operations.

New Consumers: Developing diversified products, value added seafood products according to sustainable fishing practices. Diversifying sectors to the hospitality sector.

New Niche Markets: eco-friendly or specialty seafood, etc. digital or online markets..

Multifocus Partnerships: Forming partnerships with environmental organizations to embrace ecological practices and circular economy principles.

Research and development: Essential for supporting the co-management of marine resources.

Capitalisation: To monetise the knowledge that the sector has in extractive fishing.

In the 13 interviews conducted with employees from different enterprises, associations, and local authorities, a number of capabilities, challenges, and opportunities have been identified for the ports.

CAPACITIES

Regarding the port activity, the ports excel in **innovation and efficiency** by embracing advanced technologies and automation, increasing the productivity and quality of both production and marketing activities. These ports are also dedicated to the **integration of activities**, creating synergies between sectors as fishing and tourism. This integrated approach not only enhances consumer experiences but also fortifies the local economy.

By **implementing sustainable practices and offering environmental education**, the ports help preserve marine life and cultural heritage, fostering a deeper appreciation for the local environment. This commitment is complemented by the strengthening of the local economy, where the ports actively support regional commerce and artisanal fishing. These efforts generate job opportunities and stimulate local economic growth. In fact, the ports' **specialized knowledge** and **local expertise in extractive fishing** reflect years of accumulated experience, enabling efficient and sustainable fishing practices that respect the marine ecosystem. This knowledge base contributes to operational resilience, as the ports' fishing operations adapt to market pressures, including price fluctuations and seasonal changes.

Moreover, these ports can sustain activity even in challenging market conditions, demonstrating both **adaptability** and **perseverance**. Focused on **resource management**, the ports take proactive steps to mitigate rising energy costs and optimize resource use, thus promoting sustainable fishing practices. There's also potential for **technological adaptation**, as the fishing sector explores options to adopt digital solutions for improved efficiency and traceability, though regulatory barriers currently limit these advancements. Additionally, the ports demonstrate a **capability to respond to new opportunities to develop new revenue streams** while also **encouraging sustainable practices**, for example, the ports are ready to explore fishing tourism; however, the regulations for such activities need to be adjusted.

The ports' **wholesale and processing activities** feature an **extensive distribution network** with strategically located warehouses in Portugal and and storage facilities for catches in Morocco, providing efficient access to multiple markets. This fish distribution capacity is supported by

diverse sourcing from various countries, which enhances the variety and availability of products offered. **Strong partnerships with major retailers** in Portugal and Spain allow the ports to maintain high-quality standards and a **strong market presence**.

To stay competitive, these ports focus on **diversification** by continuously developing **new fish products** and **exploring applications** that respond to evolving market demands. It also exhibits **leadership in technology**, setting an example within the sector in the ecosystem and overcoming some of the management challenges faced by other firms.

The ports' **research and development** initiatives play a crucial role in advancing scientific research focused on marine environments, particularly along the Alentejo coast. The aim is to **deepen knowledge** about **marine biodiversity**, and **sustainable use of resources**, with a particular focus on assessing the environmental impacts of human activities on these ecosystems. Beyond research, the centre also serves as an essential **pedagogical and cultural resource**, dedicated to raising public awareness and educating the community on the importance of preserving marine ecosystems.

CHALLENGES

The ports face significant challenges related to different areas. **Complex regulations** change frequently, especially around sustainable fishing and marine conservation. This, combined with **fluctuating demand**, where product demand and tourist interest vary, affects the ports' **financial stability**. Given this situation, ensuring **fair working conditions** and **comprehensive staff training** are key priorities. In parallel, the port is tasked with reducing its environmental impact, especially regarding **pollution** and **protecting local marine biodiversity**.

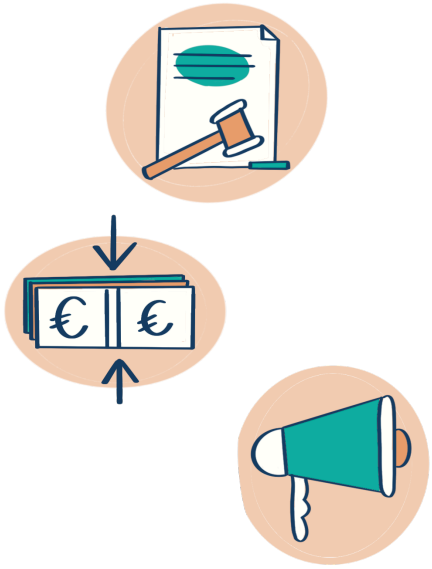
As a result of the ongoing investments in infrastructure and technology required to maintain competitiveness, the ports are also subject to **high operational costs**. Additionally, **collaboration among stakeholders**—including fishermen, tourism operators, and local communities—is essential for creating a cohesive environment. **Transitioning to sustainable energy sources** adds another layer of complexity, as the port undertakes an energy transition amid high initial costs and infrastructure limitations.

The **extractive fishing** link encounters **outdated regulations** that fail to support modern practices like fishing tourism, which **limits operational flexibility and creates barriers for new operators**. In this link, the **rising of energy** costs and the **variable fish prices** further strain the sector's financial stability, complicating financial planning and impacting profitability.

A **shortage of skilled labor** is another pressing issue, as a lack of qualified workers affects efficiency and limits the ability of fishing communities to adapt to evolving market demands. Additionally, the **limited technology adoption**—due to **inadequate digital infrastructure and resistance to change**—prevents it from implementing new systems that could enhance efficiency and improve traceability.

Furthermore, the sector contends **with pollution**, **overfishing**, and **climate change**, which pose threats to both marine ecosystems and the sustainability of the industry. Moreover, **inefficient waste management** complicates recycling efforts for fish waste, as current regulations and limited recycling facilities restrict sustainable waste valorisation. Intense and variable competition also impacts the sector, with strong competition and seasonal demand fluctuations affecting profitability and necessitating constant innovation to add value to products.

With an increasing demand for skilled labor and the need to ensure fair labor practices, **social challenges** are also associated with the wholesale and processing link. Supporting local communities and meeting the growing demand for sustainable and ethically sourced products is therefore essential. **Environmental challenges** also present additional pressures, requiring efforts to reduce the carbon



footprint of production activities, manage waste from food processing, and comply with strict environmental regulations, all while advancing sustainable practices across the value chain.

Regarding the **technological challenges, modernization in supply chain management** and **production processes** becomes critical to improving operational efficiency. The sector also contends with product challenges, which include maintaining consistent quality, adapting to evolving consumer preferences, and managing the complexities of a diversified product range for increasingly demanding markets. The expanding product range demands a flexible approach to satisfy market expectations and secure customer loyalty. Meanwhile, **Marketing challenges** involve adapting to market fluctuations, managing competitive pressures, and responding to shifting demand trends, as the sector seeks to expand into new markets and build a strong brand presence.

All these operational challenges are intensified by economic pressures. Balancing economic viability with investments in innovation and sustainability is a delicate task, especially when competing in both domestic and international markets.

In addition, the ports' research and development link faces **significant political and legislative challenges**, with **restrictive laws on fishing** and **sustainability complicating compliance with marine protection standards**. Co-management of marine resources is hindered by a lack of inclusive governance structures. Therefore, greater legislative support is required to address concerns like overfishing and habitat degradation.

To boost the entrepreneurship in the sector, the collaboration among stakeholders is needed—such as

maintaining traditional fishing practices and addressing socioeconomic disparities—. This sectoral collaboration is a challenge because it needs efforts to coordinate across sectors like fisheries, tourism, and shipping, as each one has its own priorities and varied regulations make it difficult to adopt an integrated resource management approach.

Furthermore, as **sustainable management of marine resources** is vital for ecosystem preservation yet is increasingly at risk from over-exploitation and habitat loss, demanding effective co-management and conservation strategies.

Limited infrastructure and outdated technology restrict the capacity to monitor and manage marine resources effectively, and logistical challenges arise in remote marine environments.

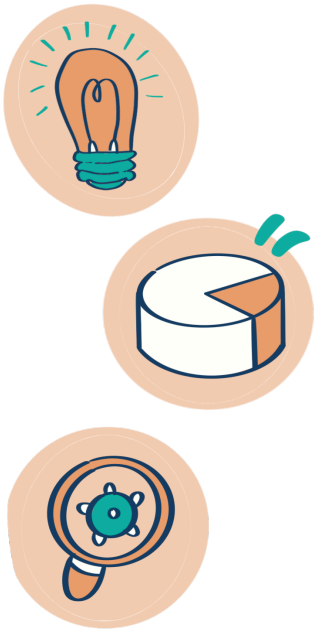
Finally, **technological and digital challenges** require ongoing adaptation, as the need for advanced monitoring systems and new technologies grows, demanding continuous investment to keep pace with rapid digital evolution.

OPPORTUNITIES

Regarding the opportunities **the port activity link offers, the ports stand poised to leverage innovation and technologies to modernize their operations**, with advanced monitoring tools and resource management systems that can enhance more efficient operations. **Developing diversified products could attract new consumers**, especially young people. **Embracing ecological practices** and **circular economy principles** will help the port align with strict environmental legislation. **Forming partnerships** with environmental organizations and research institutions can further promote conservation, allowing the port to develop sustainable fishing practices. Furthermore, **collaboration with other businesses** for resource sharing boosts efficiency, helping reduce costs and optimize resource use.

The ports could also be well-positioned to **expand their offerings in tourism and experiences**, for example by integrating marine tourism, such as eco-tourism experiences and innovative experiences .. In addition, working closely with the **hospitality** sector would enrich tourism offerings and local experiences. **Expanding market** and **collaboration** opportunities promises growth for the port. By expanding partnerships with businesses, institutions, and local communities, the port could create and strengthen networks of collaboration and innovation. Additionally, utilizing digital marketing and online platforms will help the port reach new markets and enhance customer engagement. Investing in innovative technologies also presents significant potential, as advanced technologies can improve operational efficiency, stock management, supply chain transparency, as well as enable more streamlined processes.

In the **wholesale and fish processing link**, the ports can **capitalize on collaboration** and **synergies with other sectors to promote technological innovation**. This cross-industry cooperation also offers valuable opportunities to improve supply chain efficiencies. **Diversifying into value-added seafood products, adopting sustainable fishing practices, and exploring niche markets**, such as eco-friendly or specialty seafood, offer promising



avenues for the fishing sector. Furthermore, expanding into sustainable aquaculture aligns the sector with the blue economy, promoting ecological sustainability. Waste reduction practices and eco-friendly operations not only improve profitability but also strengthen environmental responsibility. In the same line, adopting sustainable fishing practices and developing value-added products can **attract eco-conscious consumers**, and **utilizing digital tools, such** as social media, digitization, and direct sales, can **boost market presence and customer engagement**.

The ports' **research and development** initiatives are also essential for supporting the co-management of marine resources. These opportunities reflect a growing trend towards innovation, sustainability, and strategic collaborations, enabling the marine and fishing sector to adapt to contemporary market demands and contribute to a more sustainable future.

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04.3.6. GENERAL CONCLUSIONS

The Alentejo Coastline in Portugal, is a small yet busy fishing ecosystem, encompassing six traditional fishing ports: Sines, Porto Covo, Vila Nova de Milfontes, Lapa de Pombas (Almograve), Entrada da Barca (Zambujeira do Mar), and Azenha do Mar. However, it is important to mention that out of these mentioned 6 ports only 4 of these ports are equipped with auction or selling points.

Additionally, it is considered a small ecosystem because the Alentejo Region encompasses a total of 47 municipalities (including the six forementioned) and is home to nearly 800,000 inhabitants, representing just 7% of Portugal's population. Even so, fishing continues to be a vital economic activity, making a significant contribution to both employment and income. Namely in the Alentejo Litoral (coastline).

As noted at the start, the main objetive is to increase the number of people working in traditional fisheries and to ensure generational replacement, to improve the co-management in the stocks of the species caught, to improve fisheries and ship owners' capacity to innovate and collaborate.

Firstly, regarding the **improvement of the capacity of fisheries and shipowners to innovate**. This is a very complex issue because, as mentioned in previous sections, it is a more mature sector with an aging workforce that is resistant to change, even though ports are well-positioned to leverage innovation and technologies to modernize their operations. Digitization must take centre stage in the coming years to ensure the sector can attract new generations. It is important to highlight that these innovations must be aligned with complex regulations concerning sustainable fishing, overfishing, pollution control, the protection of local marine biodiversity, and the outdated regulations related to extractive fishing practices.

Secondly, regarding the **generational replacement**, the fishing sector in Alentejo is currently experiencing a significant shortage of skilled labor, it remains a subject of considerable debate and is often perceived unfavourably by those outside the industry.

To ensure generational renewal, it is essential to improve the public perception of the industry. Achieving this requires the establishment of fair working conditions and, most importantly, the provision of comprehensive training for staff.

The ports possess specialized knowledge and local expertise in extractive fishing, which are invaluable assets. Should these be lost, the delicate balance of the ecosystem would be at serious risk. Efforts must be directed toward preserving these skills to sustain the sector and its vital role within the region.

Another significant challenge faced by the fishing sector in Alentejo is the fluctuating demand, which creates substantial financial pressures for most small and medium-sized enterprises in the region. To address this issue, it is advisable for the sector to diversify its business activities. This could include offering a broader range of products and services beyond fish, such as developing diversified products to attract new consumer segments, exploring niche markets, or expanding into tourism and experiential offerings. These strategies could help stabilize revenues and ensure the sector's long-term sustainability.

Thirdly, regarding the **network of partnerships and the use of marine biodiversity resources**, it is essential to emphasize the importance of collaborative efforts among all sector participants. The current ecosystem benefits from an extensive distribution network and a strong market presence. However, it is evident that social dynamics and different interests among stakeholders are significant obstacles to set up new businesses in marine ecosystems. According to the blue economy principles, sustainability initiatives would be adapted to new market and consumption trends. Alliances between stakeholders and actors could foster the adoption of ecological practices and principles of the circular economy.

In conclusion, the fishing sector of Alentejo stands at a pivotal moment, facing key challenges such as generational replacement, the need for improved cooperation among stakeholders, and the integration of innovation. However, these challenges also present significant opportunities for growth. By embracing the principles of the Blue Economy, the sector has the potential to modernize, promote sustainability, and attract new generations to the industry. Collaborative efforts, alongside the adoption of innovative practices and technologies, will not only strengthen the sector's resilience but also enhance its contribution to both the local economy and environmental preservation. The future of Alentejo's fishing industry is promising, with a clear path toward sustainability and long-term prosperity.

04.4. KERRY

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04.4.1. ECOSYSTEM DEFINITION

The ecosystem is located in the South-West of Ireland, specifically in County Kerry, and it is home to three vital fishing ports: Dingle, Portmagee, and Fenit. In 2020, the three fishing ports collectively landed aproximately 8,156 tons of fish (live weight equivalent), contributing to 4% of Ireland's total wild fish landings, which amounted to 188,051 tons in that year. This reflects the crucial role these ports play in Ireland's broader fishing sector, as they handle a considerable share of the country's fish catch.

More precisely, Dingle serves as the primary landing port for larger vessels and stands as the largest port in County Kerry. It features an extensive commercial fishing pier as well as a substantial marina catering to recreational boating and tourism. Due to its strategic location and the variety of activities available around the peninsula, fishermen seeking supplementary income often turn to the tourism industry.

Secondly, with respect to Fenit, the port is closely linked to industry and features both a commercial pier and a marina for recreational use. Its deep-water capabilities enable large cargo vessels to dock with ease to facilitate Liebherr Cranes built in Kerry to be dispatched internationally. Industrial activity plays a significant role in the area, and Fenit serves as a commuter town for Tralee, the largest town in County Kerry. This can offer employment opportunities to local fishers that may get shift work with them to allow them to work around their fishing schedule with relative ease.

Lastly, Portmagee is a small rural pier accommodating approximately 15 commercial vessels, with agriculture serving as the primary economic activity. The area also experiences a robust angling and boat tour season. Located approximately one hour from the nearest large town, many fishers in Portmagee are also engaged in agriculture alongside their fishing activities. Additionally, most of these fishers belong to second- or third-generation fishing families.

Overall, the fishing industry in County Kerry is a dynamic sector, characterized by the daily presence of small-scale wholesalers and buyers and the region supports a significant number of individual fishermen.

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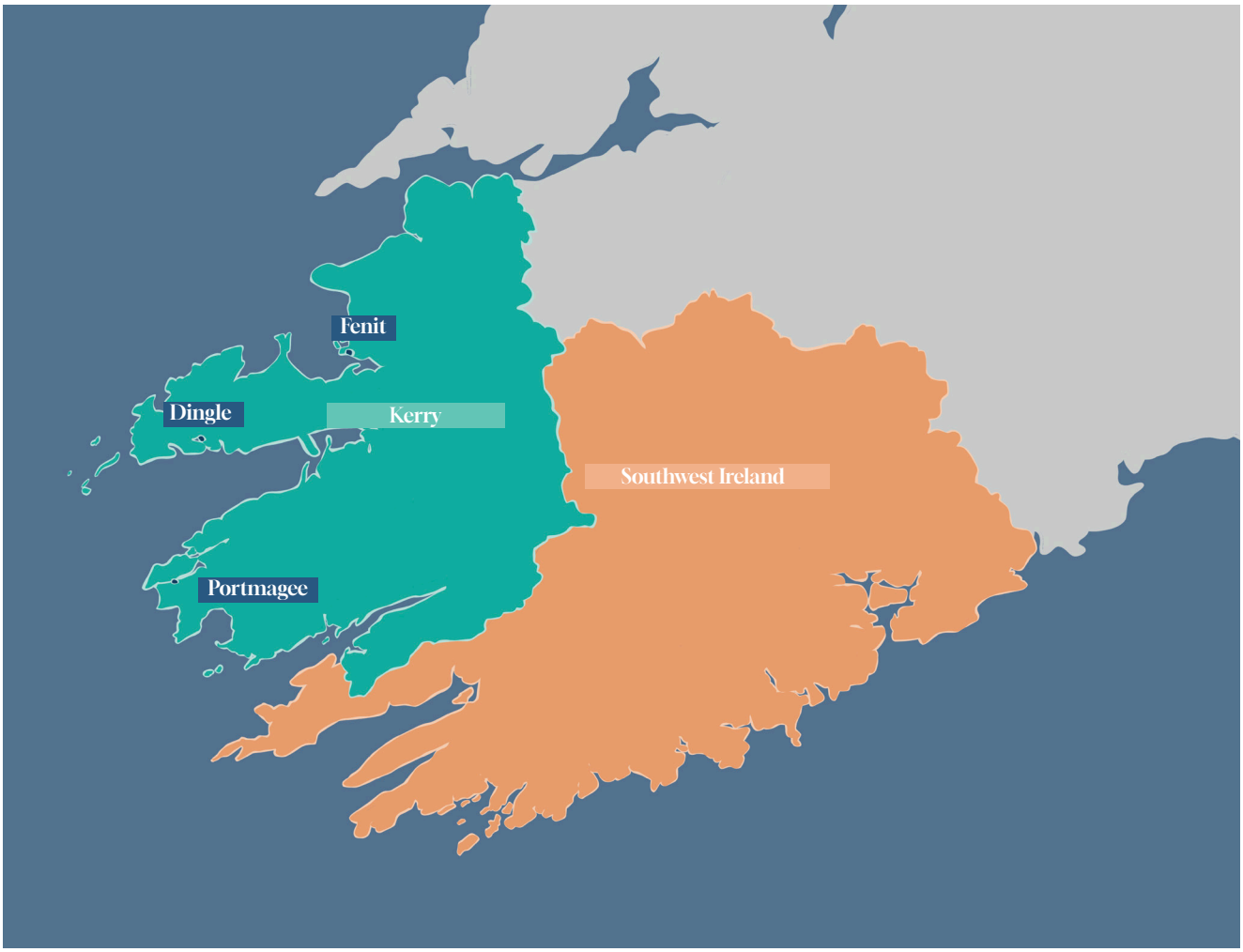
04.4.2. QUANTITATIVE ANALYSIS

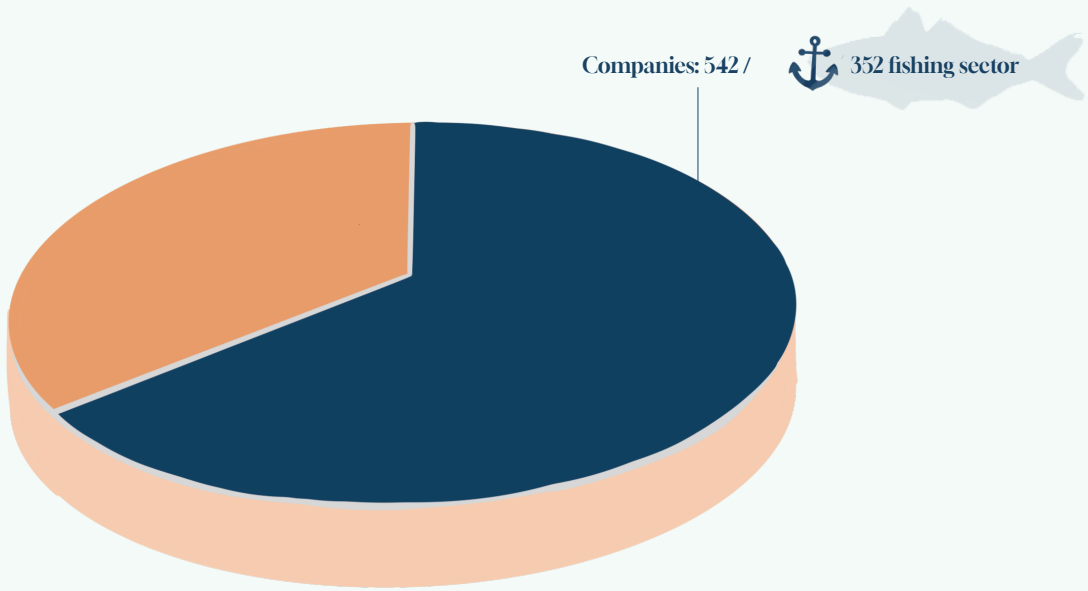
All the data is taken from the references at the end of the document.

SOCIO-ECONOMIC INDICATORS



The ecosystem consists of a total of 4,322 inhabitants, spread across three ports including Dingle (2,041 people), Portmagee (1,662 people), and Fenit (619 people), while the broader Kerry Cork region has a population of 1,703,393.

The gender distribution of the ecosystem is 49% male and 51% female. A notable portion of the population, approximately 21%, is over the age of 65. In terms of educational attainment, 23% of the population holds tertiary education qualifications, while the unemployment rate stands at 11%. However, local communities such as Fenit experience a slightly higher unemployment rate of 14%, with male unemployment at 15% and female unemployment at 12%.



The economic landscape of the ecosystem is influenced by its vibrant fishing sector, with 542 companies operating within the region, of which 352 are directly involved in fishing activities. These companies collectively provide 4,323 jobs, underscoring the significance of the industry in the local economy. The volume of fish caught in the ecosystem is 7,886 tons of seafood annually, translating into a total value of 27,639,238 €. The primary species caught in the ecosystem's ports include shrimp, lobster, crab, shellfish, also there are various types of white fish, such as pollock, hake, crayfish and prawns. Fishing techniques in the ecosystem are diverse, with pots and monofilament nets being the main fishing gears used by registered vessel owners in the ports and municipalities.

Volume of Fishing in Tons (t)	7,886
Volume of Fishing in € Value	27,639,235

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04.4.3. ACTIVITY TYPE IDENTIFICATION

There are 364 enterprises within the ecosystem, providing a total of 1,825 jobs. A significant portion of these enterprises, 152 to be specific, operate directly within the port, employing 973 people. The activities in the port are diverse, with a strong focus on services that support the fishing industry. These include shipyards for the construction and repair of fishing gear (5 enterprises), suppliers of marine and industrial supplies such as ice and fish crates (3 enterprises), and port inspection and control personnel (3 enterprises). The port also plays a crucial role in the management of the first sale of fresh fish at the fish market, which is carried out by 6 enterprises. Additionally, there are 50 enterprises in the region involved in tourism activities linked to the sea, providing 224 jobs, and 85 other non-maritime activities taking place in the port, which employ 520 people.

Beyond port-related activities, there are 200 enterprises in the ecosystem that focus on various aspects of the central fisheries supply chain, contributing 838 jobs. This includes extractive fishing activities such as fish-catching vessel owners (150 enterprises), aquaculture companies (20), and wholesalers of both fresh (7 enterprises) and frozen fish (1 enterprise). There are also fish transporters (4 enterprises) and fish retail businesses, including both port-based fishmongers and larger-scale fish distribution (18 enterprises).

In addition to the enterprises directly involved in fishing and seafood distribution, there are also several sectoral associations. These include a shipowner association (1 enterprise) and wholesalers associations (4 enterprises). In addition, the ecosystem hosts knowledge centers that focus on enhancing the sector's capabilities, with 4 enterprises providing specialized knowledge and 8 jobs. Among these, 2 technological centers for food-related research employ 5 people, while 2 centers focused on the marine environment and coastal development provide 3 jobs.

Public and local bodies also play an important role in supporting the fishing sector. There are 3 public enterprises employing 6 people within the ecosystem, including local public bodies such as town councils in fishing municipalities (2 enterprises, providing 3 jobs). Other regional public instruments linked to the food, fishing, or coastal development sector, such as governmental agencies, contribute 1 enterprise and 3 jobs.

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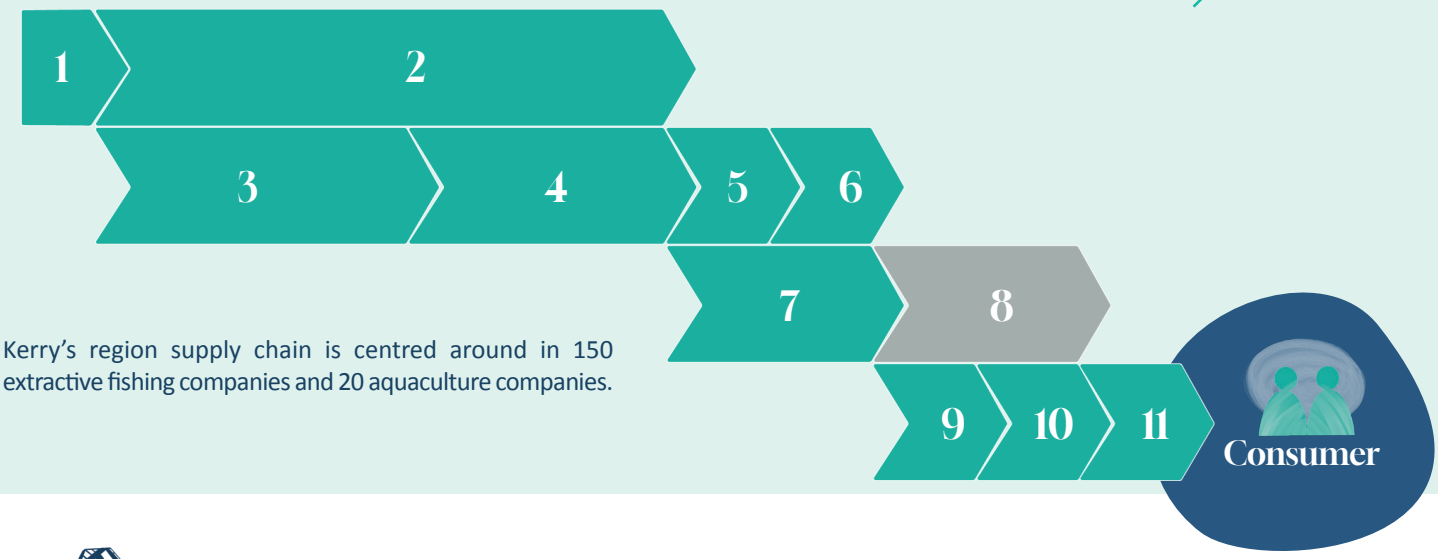
04.4.4. KERRY SUPPLY CHAIN

Time line



Kerry's region supply chain is centred around in 150 extractive fishing companies and 20 aquaculture companies.

1 - Shipyard

5 Enterprises + 84 jobs

> Boat Building & Repairs
> Engine Supply
> Welding and Fabrication
> Electronic & Technology Suppliers
> Fuel Suppliers
> Delivery service from other companies that are not local i.e. nets, pots, rope etc.

2 - Port Activity: Port Inspection and Control Personnel

3 Enterprises + 8 jobs

3 - Suppliers of marine and industrial supplies

3 Enterprises + 25 jobs

> Communication & Navigation Solutions
> Riggings, Sails, Ropes, Nets
> Pumps, Water Tanks
> Engines, Trailers, Steering, Remote Controls
> Pot haulers, Net Haulers
> Specialised Fabrication Services
> Commercial Marine Electronic Navigation and Fish Finding Equipment

4- Extractive fishing

150 Enterprises + 302 jobs

> White Fish
> Lobster
> Brown Crab
> Velvet Crabs
> Shrimp
> Crayfish
> Prawn

5-Aquaculture

20 enterprises + 284 jobs

> Salmon
> Oysters
> Mussels
> Seaweed
> Peri Winkles

6- First processing of fishery products (such as freezing services) & 7-Wholesale fresh and frozen fish trade

14 enterprises + 308 jobs

> Fish Processing Technicians
> Fish Cutters and Fish Graders
> Quality Control
> Production Supervision
> Packaging, Labelling
> Fishmongers & Wholesalers
> Sales and Marketing
> Customer Service
> Logistics Coordinator
> Retail Management

8-Seafood processing

9-R&D

2 enterprises + 5 jobs

> Marine Regional Development Officer
> Shellfish Development Executive
> Seafood Product Innovation
> Research Staff

10-Distribution

4 enterprises + 21 jobs

11-Retail trade

18 enterprises + 54 jobs

> Super Value Chain
> Fishmongers
> Market Stalls
> Direct to Customer

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04.4.5. QUALITATIVE ANALYSIS

CAPACITIES

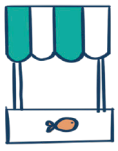
Business Model: Well established cooperatives and small and medium-sized family businesses.

Knowledge: Traditional knowledge in extractive fishing and processing operations. Combination of tradition and research.

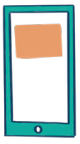
Infrastructure: State-of-the-art marina and services.

Value Chain: Extractive fishing, aquaculture and fish processing.

Quality: The region has a stellar reputation for producing high-quality marine products.



Market: The enterprises have local and international customers and providers.

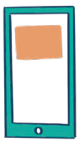


Digitalisation: Innovative technologies and the use of digital solutions.

CHALLENGES

Infrastructure: Infrastructure is key to economic development in the region.

Market: Fishing volumes are decreasing while the seafood market is increasing, new products and consumers must be attended.



Digitalization: The fisheries sector needs to adapt and modernise according to the new era of the industry.

Regulations: Compliance with regulations impose significant costs and administrative burdens, particularly for small-scale operators.

Market Access: Taking globalisation into account and having large-scale companies competing in the sector, small fishers need to access the market by new channels and products.

Shortage of Skilled Labour: The workforce is increasingly unable to meet the needs of the industry mainly because of the lack of clear career paths and the professionalisation of the industry deter younger generations from entering the field.

Consumer Perception: As fish prices are increasing, promotion of sustainable practices and other initiatives are needed.

Sustainability and R&D: The implementation of the use of sustainable resources and new developments will respond to the overfishing and the lack of raw material.

OPPORTUNITIES

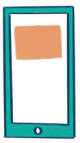
New Consumer Trends: Drive product diversification, eco-conscious markets, value-added processing, and direct-to-consumer models through digital platforms and social media.

Blue Tourism: Eco-tourism, recreational fishing and offering sustainable seafood experiences.

Infrastructure: Finding an infrastructure balance between the three ports by redefining some of it..

Generational Replacement: The fishing sector needs to promote clear licensing and income stability to attract young talent.

Initiatives: Increased levels of grants for vessel upgrades and related business opportunities such as the FLAG initiative.

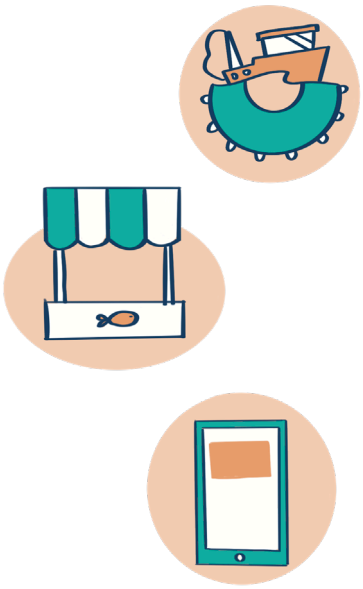


Digitalisation: Advancements in technology can offer innovative solutions, the adoption of digital platforms for marketing and sales can enhance market access.

Collaboration: Forge partnerships with research institutions, NGOs and governmental bodies.

In the 15 interviews conducted with employees from different enterprises, associations, and local authorities, a number of capabilities, challenges, and opportunities have been identified for the ports.

CAPACITIES



The southwest of Ireland, with its rugged coastline boasts a rich marine biodiversity and a vibrant fishing industry that has been an integral part of the local economy and culture. The capabilities of local fisheries in this region can be categorised into several key areas: **resource availability**, **community involvement**, **traditional knowledge**, and **sustainable practices**. The ports of Dingle, Portmagee and Fenit offer access to a diverse range of marine resources, including various fish species, shellfish, and seaweed. Key species harvested include mackerel, cod, haddock, and shellfish like crab and lobster. The region's unique marine ecosystems provide **fertile grounds for aquaculture**, with local producers cultivating high quality oysters and mussels. These **local fisheries** are **characterised by strong community ties**, with many families having participated in fishing for generations. **This communal approach fosters a sense of responsibility and stewardship for marine resources**. Fishermen and women in the region are actively engaged in local governance and decision-making processes, advocating for sustainable fishing practices and resource management. Community-based organisations, such as co-operatives, enhance collaboration among fishers, promoting shared knowledge and resources.

The fishing communities in this region possess a wealth of traditional knowledge regarding local marine ecosystems, fishing techniques, and seasonal patterns. This indigenous understanding of the sea not only aids in sustainable fishing practices but also enhances the resilience of the industry against environmental changes. By **combining traditional knowledge with modern scientific research**, local fisheries can optimise their operations while preserving cultural heritage. In recent years, there has been a significant shift toward sustainable fishing practices, driven by both regulatory frameworks and consumer demand for environmentally friendly products.

Dingle Port stands out as a premier destination, equipped with a **state-of-the-art marina tailored for Blue Tourism activities**. The facility features advanced pontoons, which have significantly increased berthing capacity, alongside enhanced amenities designed specifically for visiting yachts and boats. Additionally, Dingle Port offers a **comprehensive suite of ancillary services** that cater to fishing vessels and their crews. These services include refuelling, maintenance, and waste disposal, addressing the diverse needs of both local and international sailors. Recent upgrades, such as the installation of Wi-Fi, secure access points, and modern shower and laundry facilities, have notably enhanced the overall experience for visitors, making Dingle Port a welcoming hub for nautical enthusiasts.

In **Fenit**, the Harbour office boasts changing rooms and shower facilities that cater to the needs of users. The Oyster Co-Op operates their base from the port which has been well designed, providing **easy access and modern buildings** that serve as office space. The marina is noted for its **sheltered and secure environment**, making it a haven for users. Fenit is also home to a thriving sailing club and swimming clubs, attracting a large volume of visitors daily from across the region, further emphasising its **popularity as a maritime destination**.

Portmagee is strategically positioned near local shellfish buyers, including Portmagee Seafoods and Quinlan's, which are **involved in wholesale and processing operations**. From a 'blue tourism' perspective Portmagee provides Skellig Island boat tours, although highly sought after, are weather-dependent, allowing tourists to experience the breathtaking beauty of the islands. The island is best known for its Gaelic monastery, founded between the 6th and 8th centuries, and its variety of inhabiting species, which include gannets, puffins, a colony of razorbills and a population of approximately fifty grey seals

The marine and industrial supplies sector is dominated by three main companies, leaving little room for new entrants. These established firms effectively manage most regional requirements, ensuring stability in the market. The advent of **innovative technologies and digital solutions**, such as 3D mapping, is revolutionising fishing practices, leading to more efficient catch processes and optimizing time spent at sea. Furthermore, well-established cooperatives in the region play a **crucial role in maintaining quality** and **control over marine products**. The Sea Fisheries Protection Authority (SFPA) conducts regular water sampling to ensure higher-grade waters and maintain organic status classifications (A, B, C).

CHALLENGES

While the capabilities of local fisheries in the Kerry region are substantial, the industry faces several significant challenges that threaten its sustainability and economic viability. Fisheries management in Ireland is governed by both EU regulations and national policies, which can sometimes be complex and challenging for local fishers to navigate. **Compliance with these regulations can impose significant costs and administrative burdens**, particularly for small-scale operators. Moreover, rigid regulatory frameworks may not always align with the specific needs and realities of local fisheries, leading to conflicts and inefficiencies. **Local fisheries often struggle with market access**, particularly in the face of competition from larger, industrial fishing operations. The global seafood market is dominated by a few large players, making it **difficult for small-scale fishers to compete on price and scale**. Additionally, the **lack of digitization and marketing capabilities infrastructure** and support can hinder local producers from reaching broader markets, limiting their economic potential.

The maintenance yard and the boatbuilding industry has seen a significant decline since the 1980s. This downturn in local boatbuilding is reflective of broader challenges facing the fishing and marine sectors in the region. One of the most pressing issues is the **shortage of skilled labor**. There is a notable lack of manpower, and career progression opportunities in the sector are almost non-existent. This exodus of talent has led to a **workforce that is increasingly unable to meet the needs of the industry**. As a result, customers are being priced out of the market, with costs for boats and vessels increasing beyond the reach of the consumer in recent years.

In **Dingle Port**, space is at a premium, and the available marina areas have been maximized, making it **difficult for businesses to expand or adapt to new market conditions**. Similarly, **Fenit pier requires redevelopment** to better serve its users. The population in Fenit remains static, and there has been little to no growth within the fisheries sector, which further complicates the local marine based economic landscape. **Portmagee** is somewhat **isolated, with a low level of infrastructure and access**. Tourists typically visit the village to embark on boat tours to Skellig Island, however it is essential for the boats operating in this area to maintain and upgrade. The challenges do not end there; **material costs, labor expenses, and the overall cost of living have severely impacted fishers' willingness to invest in their businesses**. Many are now spending only, when necessary, rather than seeking opportunities for growth or development.

The **decline of certain fish** species and the sensitivity of market channels have further exacerbated the situation. For example, profits from brown crab fishing have dropped by up to 50% in recent years. New entrants to the industry find themselves completely priced out—unless they inherit a family business. Setting up a small enterprise requires around <€100,000, which is necessary just to support one person at an average annual salary. **The lack of clear career paths and the professionalisation of the industry deter younger talent from entering the field**.

Climate change is another significant factor impacting the fishing industry. Altered weather patterns are affecting seasonal fishing, growth rates, and collection rates, making it increasingly **difficult for fishers to predict sales and revenues**. Buyers often manipulate prices, leading to further challenges in securing fair compensation for their catch. Licensing issues also pose significant barriers; new licenses are not being granted, which inhibits the scaling of enterprises. Additionally, there have been a number of marine areas designated as Special Areas of Conservation (SAC) and Special Protection Areas (SPA) including the waters surrounding the Dingle peninsula.

Small-scale processing operators conduct most processing. However, the **high capital and investment costs** required to enter this market, combined with stringent health and safety regulations, mean that few new enterprises are likely to emerge soon.

While **road infrastructure has improved significantly, further enhancements are still necessary to facilitate access to small-scale ports and landing sites**. Additionally, transitioning to alternative fuels and electrifying fleets will require government incentives or grant funding schemes to encourage investment in greener technologies.

Furthermore, the **perceived high price** of fish and seafood products in Ireland has become a **barrier to consumer acceptance**. Many consumers prefer to purchase meat-based products or pre-prepared alternatives, which can be more convenient and often perceived as more affordable. Addressing this perception is crucial for revitalizing the market and encouraging consumers to embrace local seafood.

There is a **lack of financial business planning within the sector**, so it is difficult for investors to identify clear commercial opportunities for a return on their investment. The biggest challenge is getting skilled people that will work in rural Ireland to support the seafood sector. Fishing is very dependent on climate change, so international approach as opposed to national approach for fisheries is critical. The fishing industry is open to collaboration; however, the fishing sector is very fragmented so getting consensus amount fishermen is challenging

Also, from an R&D perspective there is a lack of raw material, due to quotas, approx. 80% of seafood is sourced outside of Ireland. Ultimately, the fishing and marine industries in Ireland are at a crossroads, facing numerous challenges that require innovative solutions and strategic investments.

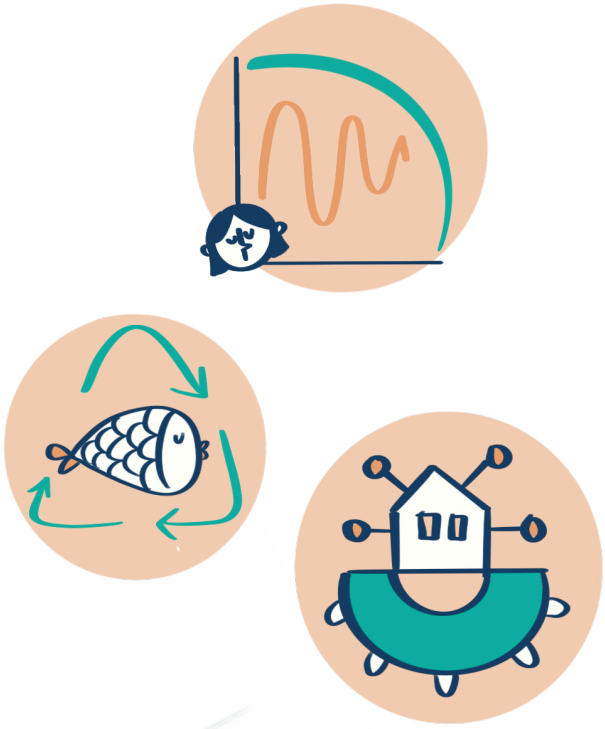
Lastly, climate change poses a significant threat to marine ecosystems and, consequently, local fisheries. Rising sea temperatures, changing ocean currents, and increased acidification disrupt fish habitats and spawning patterns. Fishers are already experiencing shifts in species distribution, making it more difficult to predict fishing yields and adjust practices accordingly. The unpredictability of climate impacts can lead to economic instability for fishing communities. **One of the most pressing challenges is overfishing**, which has led to the depletion of certain fish stocks. Historical practices, coupled with increased competition from industrial fishing fleets, have placed immense pressure on local resources.

OPPORTUNITIES

Despite many challenges, there are numerous opportunities to innovate and thrive. By leveraging unique capabilities and addressing the challenges, the fishing sector as a whole can enhance its sustainability and economic resilience. Local fisheries can benefit from **diversifying their product offerings beyond traditional fish and shellfish**. The **growing demand for seaweed** and other marine resources presents an opportunity for fishers to explore **new markets**. By engaging in **value-added processing**, such as smoking or packaging seafood, local producers can increase profit margins and appeal to health-conscious consumers.

The stunning natural beauty of the southwest coast, combined with its rich marine life, makes it **an ideal destination for eco-tourism and recreational fishing**. Local fisheries are capitalising on this trend by offering guided fishing tours, educational workshops, and **sustainable seafood experiences**. By promoting responsible fishing practices and marine conservation initiatives, local fisheries can attract eco-conscious tourists and generate additional revenue streams while raising awareness about the importance of sustainable marine practices.

The country is **currently facing a significant shortage of boat supplies**, which presents **potential business opportunities**, particularly with the Irish Navy and the growing wind farm sector. This situation necessitates alterations to the **existing fleet to better meet these emerging demands**. In Dingle, there is a pressing need to redevelop and rebrand the area at the far end of the marina. This revitalization requires the establishment of a landmark business or attraction that can draw visitors and promote local culture and tourism effectively. By creating a compelling destination, Dingle could enhance its appeal as a key player in the Blue Tourism market. Fenit presents unique opportunities primarily in the realm of **Blue Tourism**, as there are limited prospects within the fisheries sector itself and this focus on tourism could help diversify the local economy and create new employment opportunities for residents.



Portmagee faces challenges due to an ageing fleet, yet this also opens avenues to attract young talent to the fishing sector if **clear licensing and income stability could be promoted**. However, the prohibitive costs associated with entering the industry and the lack of accessible financing options may hinder this potential growth. However, there is an opportunity to receive a 40% grant towards new boats under the BIM Young Fishers Scheme, but due to the high cost of a new fishing boat this requires an additional and significant financial commitment.

The marine and industrial supplies sector is largely dominated by three main companies, which manage most of the regional requirements. This consolidation leaves little room for new entrants. Nevertheless, there is **potential for growth in specific areas, particularly in taking control of the decontamination and purification processes thereby enhancing access to targeted online sales channels to international purchasing companies**. These developments would enable smaller-scale companies to build relationships and offer higher-quality products.

Increased levels of grants for vessel upgrades and related business opportunities, such as the FLAG initiative, have positively impacted areas like Dingle, where innovative projects like the WAVE virtual reality ocean experience have taken root. Portmagee is also benefiting from initiatives focused on re-engineering and upgrading vessels, while Fenit has invested in supporting small sole trader businesses. The commitment to digitization is evident; however, there is a strong interest in adopting tried-and-tested technologies, such as through the FISHINN best practices highlighting advancements in technologies across the partner regions.

Programs available through BIM and culinary schools emphasize valorisation, encouraging the uptake of direct-to-consumer sales channels. Companies that have tapped into online business models have successfully created added profits along the value chain. There is a clear opportunity for research and development (R&D) and innovation in food technology, but this must be accompanied by consumer campaigns promoting new fish and seafood options. Many consumers are hesitant to prepare fish at home, often opting for simpler, easier-to-cook meals due to the demands of work and daily living.

Distribution companies across the region and throughout Ireland are grappling with rising transportation and energy costs. While there is a growing awareness of the need to **electrify fleets or transition to alternative fuel options**, the investment costs must be carefully weighed against the anticipated benefits.

The emergence of **direct-to-consumer business models**, combined with fish-focused restaurants alongside traditional retail, is yielding success for several companies that have diversified their revenue streams. By utilizing online sales platforms, engaging in social media, and embracing digitization, these businesses are effectively building their brands and fostering customer loyalty. As the industry continues to evolve, there remains a wealth of opportunities waiting to be explored, particularly for those willing to innovate and adapt to changing market conditions.

There is significant potential for local fisheries to forge **partnerships with research institutions, NGOs, and governmental bodies**. Collaborative efforts can facilitate knowledge exchange, improve resource management, and enhance sustainability practices. Engaging in joint research initiatives can help fishers adapt to changing environmental conditions, optimize fishing strategies, and explore new market opportunities. Additionally, partnerships with culinary experts and restaurants can promote local seafood, creating a niche market for high-quality, sustainably sourced products. Through the activities of the FISHINN Project the links between the university, BIM Innovation Centre and the FLAG are continuing to develop with a view to securing funding and finance for research, academic programmes, and enterprise development opportunities.

Advancements in technology can offer innovative solutions to the challenges faced by local fisheries. **The adoption of digital platforms for marketing and sales can enhance market access, allowing fishers to connect directly with consumers and reduce reliance on intermediaries**. Technologies such as GPS and sonar can improve fishing efficiency and reduce bycatch, while data analytics can provide insights into stock assessments and environmental changes. Investing in training for fishers to utilise these technologies can lead to increased productivity and sustainability, however the cost is often prohibitive. Rather than diversifying away from fishing it is vital to sustain the fishing sector but support it with additional blue economy revenue creating opportunities including R&D to develop marine based health products, ingredients, cosmetics, nutraceuticals and raw materials for additive manufacturing.

As consumers increasingly prioritize sustainability, there is a **growing market for responsibly sourced seafood**. Local fisheries can capitalize on this trend by promoting their commitment to sustainable practices and the quality of their products. Engaging in certification programs and transparent labelling can help build consumer trust and differentiate local products in the marketplace. Additionally, marketing campaigns that highlight the cultural and environmental importance of local fisheries can resonate with consumers, driving demand for local seafood.

Advocating for supportive policies and funding at the local, national, and EU levels is crucial for the sustainability of local fisheries. Engaging in dialogue with policymakers can help ensure that regulations are tailored to the needs of small-scale fishers while promoting sustainable practices. **Access to grants and funding for innovation, infrastructure improvements, and training programs can empower local fisheries to adapt and thrive in a changing economic landscape**.

04.4.6. GENERAL CONCLUSIONS

The South-West of Ireland, specifically County Kerry, hosts a vital fishing ecosystem centered around three key ports: Dingle, Fenit, and Portmagee. Together, these ports landed approximately 8,156 tonnes of fish in 2020, accounting for 4% of Ireland's total wild fish landings. This underscores their importance within Ireland's fishing sector, handling a significant portion of the national catch.

Dingle, the largest port in County Kerry, serves as the primary hub for larger vessels and boasts both a commercial fishing pier and a marina for tourism and recreation. Fenit, known for its deep-water port, supports industrial activity and facilitates the docking of large cargo vessels, while also offering flexible employment opportunities for local fishers. In contrast, Portmagee is a small rural pier with a fishing fleet of around 15 vessels, where agriculture and fishing are often combined.

In County Kerry, the fisheries supply chain is supported mainly by three key links: extractive fishing, aquaculture, and fish processing. Extractive fishing, comprising approximately 150 enterprises, represents the foundational stage, involving the capture of wild fish species critical to the region's economy. Aquaculture, with around 20 enterprises, focuses on the cultivation of aquatic species like salmon, oysters, mussels, seaweed and periwinkles. The fish processing sector, with 14 enterprises, adds significant value to the supply chain by preparing, packaging, and distributing seafood products to both domestic and international markets.

The emphasis needs to focus on a combination of advanced facilities, cooperative management and regulatory oversight to position the region as a leader in marine tourism and seafood production, offering a promising future for both residents and visitors alike.

Firstly, the fisheries in Kerry could also benefit significantly by diversifying its activities beyond traditional practices. By expanding their product offerings to include a broader range of seafood products and engaging in value-added processing methods, such as smoking, curing, or packaging, local producers can increase the value of their products and enhance their profitability.

Additionally, such initiatives can create opportunities for branding and premium pricing, helping Kerry's fisheries distinguish their offerings in a competitive market. By focusing on innovation and market adaptation, the sector could build resilience against challenges such as fluctuating fish stocks or market uncertainties, ensuring long-term sustainability and economic growth for the local community.

This diversification into new markets must be closely aligned with digitalisation, as it not only enables the provision of value-added products to customers but also has the potential to streamline management and administrative tasks for workers.

Furthermore, it is also important to mention that rather than diversifying away from fishing it is vital to sustain the fishing sector but support it with additional blue economy revenue creating opportunities including R&D to develop marine based health products, ingredients, cosmetics, nutraceuticals and raw materials for additive manufacturing, for example.

Secondly, the fisheries in County Kerry have significant opportunities to leverage Blue Tourism to diversify their income and enhance community engagement. With its rich maritime heritage and vibrant fishing culture, Kerry can attract tourists through activities such as seafood festivals, guided fishing tours, and visits to working harbors. Additionally, combining aquaculture and tourism through educational tours and tastings can create a deeper connection between visitors and sustainable seafood practices. By integrating Blue Tourism, Kerry's fisheries can boost local economies while promoting cultural and environmental awareness.
Thirdly, the seafood sector in rural Ireland faces an undeniable shortage of young talent and skilled manpower, primarily due to the limited progression opportunities within the industry. Attracting young professionals to the fishing sector could be achieved by implementing transparent licensing processes and promoting income stability as key incentives.

Finally, it is remarkable that Ireland enjoys a stellar reputation for producing high-quality marine products, which is essential for both local economies and international markets. As these sectors continue to evolve and adapt to new challenges and opportunities, the commitment to quality and sustainability remains paramount. To achieve that innovative solutions and strategic investments are required. By addressing the issues of skilled labor shortages, market accessibility, and consumer perceptions, there is potential for growth and revitalisation within these vital sectors. Creating a more supportive environment for new entrants, while simultaneously promoting sustainable practices, could pave the way for a more resilient future for Ireland's fishing communities.

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05. CONCLUSIONS OF THE ATLANTIC AREA

INTRODUCTION

During the initial phase of the FISHINN project (2023–2026), efforts focused on characterizing the ecosystems of four Atlantic Area European territories through qualitative and quantitative analyses. To be more precise, the selected ecosystems are Lea-Artibai (in Biscay, Basque Country), Finistère (in Brittany, Cornouaille), Sines (in Alentejo, Portugal), and Kerry (in Ireland).

This analysis aimed to understand the capacities, challenges, and opportunities of each selected ecosystem. It serves as a starting point for creating strategies to diversify and encourage new business models within the Blue Economy. The Blue Economy focuses on promoting long-term, sustainable growth in marine and maritime industries, balancing environmental conservation with economic and social progress.

In this sense, it is worth highlighting the case of Kerry, which also excels in its large presence in extractive fishing, with almost 150 companies (68% of the supply chain). Additionally, aquaculture plays an important role in this region, with 20 companies involved. Although this represents just 9% of the total supply chain, Kerry excels as the ecosystem with the highest number of aquaculture businesses.

Alentejo and Lea Artibai stand out in the areas of first processing and wholesale trade. Both ports develop their core business in industrialized large volumes of fishing, establishing them as the most industrialized ports among the four analysed. Specifically, Lea Artibai had 19 enterprises dedicated to this (31% of the supply chain), while Alentejo had 57 (49% of the supply chain).

In summary, the key findings that were identified were as follows:

Traditional vs Blue Growth Business Model

The initial assessment included a characterization of the value chain for each ecosystem. It is important to note that the four selected ecosystems share **similar characteristics** in general terms, such as population, rural environment, and other characteristics. For a similar diagnosis of each ecosystem,the same data were collected at each site. These included socio-economic indicators as well as the activity types present in each ecosystem. Additionally, interviews with various agents of each ecosystem were conducted in order to identify the challenges, opportunities, and capacities of each ecosystem.

In brief, the traditional fishing business model has mainly focused on **selling high volumes to achieve profit margins**, with an emphasis on export and large-scale production. However, this approach has become outdated and less competitive in the modern market. Besides, the implementation of fishing quotas and practices to minimize overfishing affected profitability based on large-scale business models.

The **lack of workforce** in the fishing sector is a serious issue, driven by an aging workforce and a lack of interest from younger generations. The sector needs policies that promote training, improve working conditions, and highlight the cultural and economic importance of fishing to **attract new talent** and ensure its sustainability.

In response to not only the need for skilled laborers but also **technological and digital advancements**, the Blue Growth model is centered on diversifying business strategies, integrating new technologies, and promoting research and innovation. This model aims to create more sustainable and adaptable practices, helping the fishing industry remain competitive while **ensuring the health of**

marine ecosystems.

In this respect, we must also consider that the competition in **global markets** is becoming increasingly intense, and the traditional "make and sell" approach must adapt to new market demands. Both supply and demand are evolving, with **new consumer profiles** emerging that reshape the landscape. Among these is the eco-consumer, who prioritizes sustainability and environmentally friendly practices. To stay relevant, businesses in traditional sectors should seek to embrace these changes and align their strategies with the expectations of this growing segment, while also ensuring to maintain the core business.

Coastal Infrastructure for Economic Development

Other than that, the **modernization and digitalization of port infrastructure** were essential to enhance the efficiency and competitiveness of maritime industries. By integrating advanced technologies such as automated systems, real-time data tracking, and smart logistics solutions, ports are able to streamline operations, reduce costs, and minimize environmental impact. Smart digital ports also enable better connectivity with global supply chains, ensuring faster and more reliable services. Investing in these improvements could be crucial not only for supporting the growth of trade and fishing industries but also for preparing ports to meet the challenges of a rapidly changing global economy.

Additionally, the establishment of **innovation hubs and port labs** within port facilities can serve as an **accelerator for entrepreneurship** and technological advancement. Innovation hubs are physical spaces where businesses, startups, and entrepreneurs collaborate, share knowledge, and generate synergies, fostering a culture of blue cooperation. These initiatives could not only promote economic development but also contribute to the transformation of ports into dynamic, multi-functional ecosystems, which are pivotal for the **revitalization of the fishing sector**.

It is important to note that the governance of port infrastructures often **involves multiple public entities**, such as port authorities, environmental agencies, and local governments, which influence legal and operational frameworks. Ensuring cohesive collaboration between these entities is key to the successful implementation of modernization initiatives. Programs like INTERREG Atlantic Europe play a crucial role in fostering such efforts by supporting **cross-border cooperation and funding innovation projects**. With a collective approach, the modernization and digital transformation of ports can act as a cornerstone for revitalizing the European fishing industry, ensuring its sustainability and resilience for generations to come.

Sustainable Marine Resources

The current economic crisis in the fisheries sector is not only driven by external factors, it is also by issues closely tied to the **availability of marine resources**. **Excessive extractive fishing** practices and the effects of **climate change** could have reducedimpacted the availability of marine resources.

To address this, it is very important to preserve and responsibly manage the resources that remain by adhering to regulations aimed at sustainability. However, compliance alone is not enough. The sector will also focus on diversification and competitiveness to thrive in a rapidly changing landscape. In this context, adopting the principles of the Blue Economy serves as a critical framework. This approach emphasizes the **sustainable use of ocean resources** while fostering economic growth, job creation, and innovation. By exploring new solutions and developing alternative business models, the European fisheries sector can build **resilience**, ensure **long-term sustainability**, and **competitiveness**.

Research and Development of Advanced Solutions

To achieve this diversification, each of the ecosystems must be prepared for change. It is crucial to implement and **encourage the research and development** of advanced solutions, not only in technology or digitalisation but across various other fields such as social, environmental and economic. These fields may include opportunities beyond the traditional fisheries ecosystems like international collaboration amongst others.

Each ecosystem has its own key entities and real opportunities that are multifaceted and multidisciplinary, which will enrich the development of cross-sectoral solutions. Nowadays, challenges remain, particularly in emerging sectors such as **biotechnology, marine energy, circularity or health**. One of the main obstacles to scaling these innovations is the **transferability and sustainable implementation** of the developed solutions. To overcome this, collaboration across sectors and disciplines will be necessary to drive the practical adoption of new technologies and new models.

Dissemination of the Blue Growth Values

The dissemination of Blue Growth values is essential for enhancing the image of the fisheries ecosystem and fostering its sustainable development. Blue Growth values emphasize collaboration, **environmental preservation, and sustainability**, fostering collective efforts to protect

marine ecosystems while promoting economic growth and innovation in harmony with nature.

By promoting these values, younger generations can be attracted and inspired through **educational initiatives**, cultural events, and interactive activities that highlight the sector's importance and opportunities. This strategy not only aids in recruiting and retaining talent but also ensures the preservation of cultural heritage and traditional practices.

Blue tourism, identified as a key pillar of sustainable tourism, intertwines gastronomy and emerging sectors of the blue economy to create unique, environmentally conscious experiences. Moreover, efforts to revitalize the fishing sector's heritage in specific ecosystems contribute to recognizing the sector's value and best practices.

Collaboration among stakeholders, strengthening communities coupled with the recovery and promotion of maritime professions, plays a pivotal role in safeguarding resources, preserving traditions, and fostering innovation within this framework.

Forward Steps in the Atlantic Area for Blue Growth

To enhance the competitiveness of the European fisheries value chain, the current business model must evolve towards Blue Growth, **embracing digital and technological solutions** tailored to the sector's needs. Emerging sectors linked to the Blue Economy should also consider shifting market demands and evolving consumer profiles. Building a new entrepreneurial ecosystem within this framework requires a strong focus on **fostering both intrapreneurship and entrepreneurship**. Achieving this vision demands **unwavering commitment to the core values of Blue Growth**: cooperation, community, and sustainability. Now is the time to act—let us join forces to innovate, adapt, and lead the European fisheries sector toward a resilient and prosperous future.

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