FANBEST PROJECT

WP4. Action 4.1.
Identification of the financial needs to propel innovation in Blue Economy in Atlantic Regions

Title: Conclusion report on stakeholder landscape supporting Blue Economy in the Atlantic Region

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List of Acronyms

BE – Blue Economy

BESD – Blue Economy Stakeholder Directory

EC – European Commission

EMFF – European Marine Fishery Fund

ERDF – European Regional Development Fund

ES – Spain

EU – European Union

FR – France

IE – Ireland

MMO – Maritime Management Organization

MU – Multi-Use

PT – Portugal

UK – United Kingdom

UKRI – United Kingdom Research and Innovation

UN – United Nations

UNCLOS – United Nations Convention on the Law of the Sea

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Summary

The presented report is part of WP4 of the FANBEST (Funding Atlantic Network for Blue Economy Technology Transfer; www.fanbest.eu) Project and is addressing Action 4.1. related to analysis of the stakeholder and agent landscape in the Blue Economy (BE) in the Atlantic Area. The report is meant as a conclusion report presenting an Atlantic wide methodology for the collection and analysis of spatial and non-spatial information of stakeholders supporting BE and the evaluation of results on the distribution and type of stakeholders present in the five countries of the Atlantic area (United Kingdom, Ireland, France, Spain and Portugal). The method was based on a stuctured BE Stakeholder Directory and compirses over 600 stakeholder of local, regional, national and international (EU wide and global) level, playing a potential role (financier, service providers, research/innovators, regulators/policy makers and other) in the Atlantic BE landscape. Results from the analysis were presented in terms of geospatial distribution of stakeholdes and in terms of quantitative respresentation of the stakeholder type (e.g. public institutions, private companies, investment banks, clusters, crowed funding organizations, etc...). The report draws attention on a set of conclusions and recommandations on the current oppportunities and challenges of mapping BE stakeholders across the Atlantic Area, the financial instruments available at sectoral and at territorial level.

Partners:

1. Introduction

1.1. What is the Blue Economy?

Literature provides several definitions of Blue Economy (BE). The aim of this chapter is to review most contemporary definitions of BE and derive a definition that at its best suits the FANBEST process.

The WWF defines BE as a concept and as policy-goal investment that should ensure that the economic development of the ocean contributes to a true prosperity, today and long into the future (WWF, 2019).

According to the European Union (EU) the BE can be defined as all the economic activities related to oceans, sea and coasts (EU MAF, 2019). The sectors of BE can be categorised into established/traditional sectors (Aquaculture, Fishery related activity, ports, ship building, Oil & Gas extraction, coastal tourism, maritime transport, etc…), emerging new sectors (e.g. blue biotechnology, desalination, renewable energy, coastal & environmental protection) and a set info instruments that enable the implementation of BE and should drive its sustainable and smart implementation (e.g. marine spatial planning, data and monitoring, maritime security, ecosystem-based management principles etc…).

The definition provided by the World Bank (WB, 2017) defines BE as the sustainable use of ocean resources for economic growth, improved livelihood, creation of jobs and preserving the health of ocean ecosystems.

The United Nations define Blue Economy as the economic activities that comprise of economic sectors and policies that determine whether the use of the ocean is sustainable. The challenges related to BE refers to an increased understanding on how to manage oceans sustainably, the awareness that sustainability can only be used through collaboration across borders, marine sectors and stakeholders (UN, 2019).

Within the Facility for Regional Policy Dialogue on Integrated Maritime Policy (support by DG NEAR and DG MARE), BE "encompasses all economic activities (existing or potential) that depend on the existence of the ocean". (Herpers et al., 2019).

Based on the above review of current definition for BE, the FANBEST Projects defines BE as

"the economic activities that derive direct and/or indirect economic and social benefit from the existence and utilization of the ocean".

1.2. The Atlantic Area

The study area (Figure 1) for the analysis for the analysis BE stakeholder landscapes includes the EU Atlantic Area and includes five countries: United Kingdom (UK), France (FR), Ireland (IE), Portugal (PT) and Spain (ES). The EU Atlantic is a rich in biodiversity and unique habitats of high ecological biodiversity (Johnsen et al., 2002), such as cold-water coral reefs and deep-sea sponge aggregations (Ramiro-Sánchez et al., 2019; Frank et al., 2011). The Gulf Stream is the dominating ocean circulation phenomenon conveying nutrients and warm, oxygen-rich water to EU coasts (OSPAR, 2010). The study area is characterized by a variety of marine economic activities, in particular shipping (MMO, 2014), fishery and tourism (Calado et al., 2019; MSP-Platform, 2020). Emerging sectors in the area refer to ocean renewable energy development and aquaculture (Dalton et al., 2019; Pinarbasi et al., 2019). In Table 1 an overview of the geographical and socio-economic boundary conditions of the countries composing the analysis is provided.

Table 1. Atlantic Area countries, including their EEZ, employment in the maritime economy (thousands of people) and contribution of the BE to the GDP (%). Source: Calado et al., 2019. Note: 1 – includes also North Sea basin and excludes French overseas territories in the Atlantic.

Countries	Exclusive Economic Zone (km^2)	Employment in maritime sectors (thousands)	GDP 2015 contribution (%)
United Kingdom	756,639	634.4	2.19
Ireland	409,929	38.4	1.82
France	349,000[1]	322.8	1.25
Spain	577,068	193.3	0.94
Portugal	1,656,181	171.2	0.94

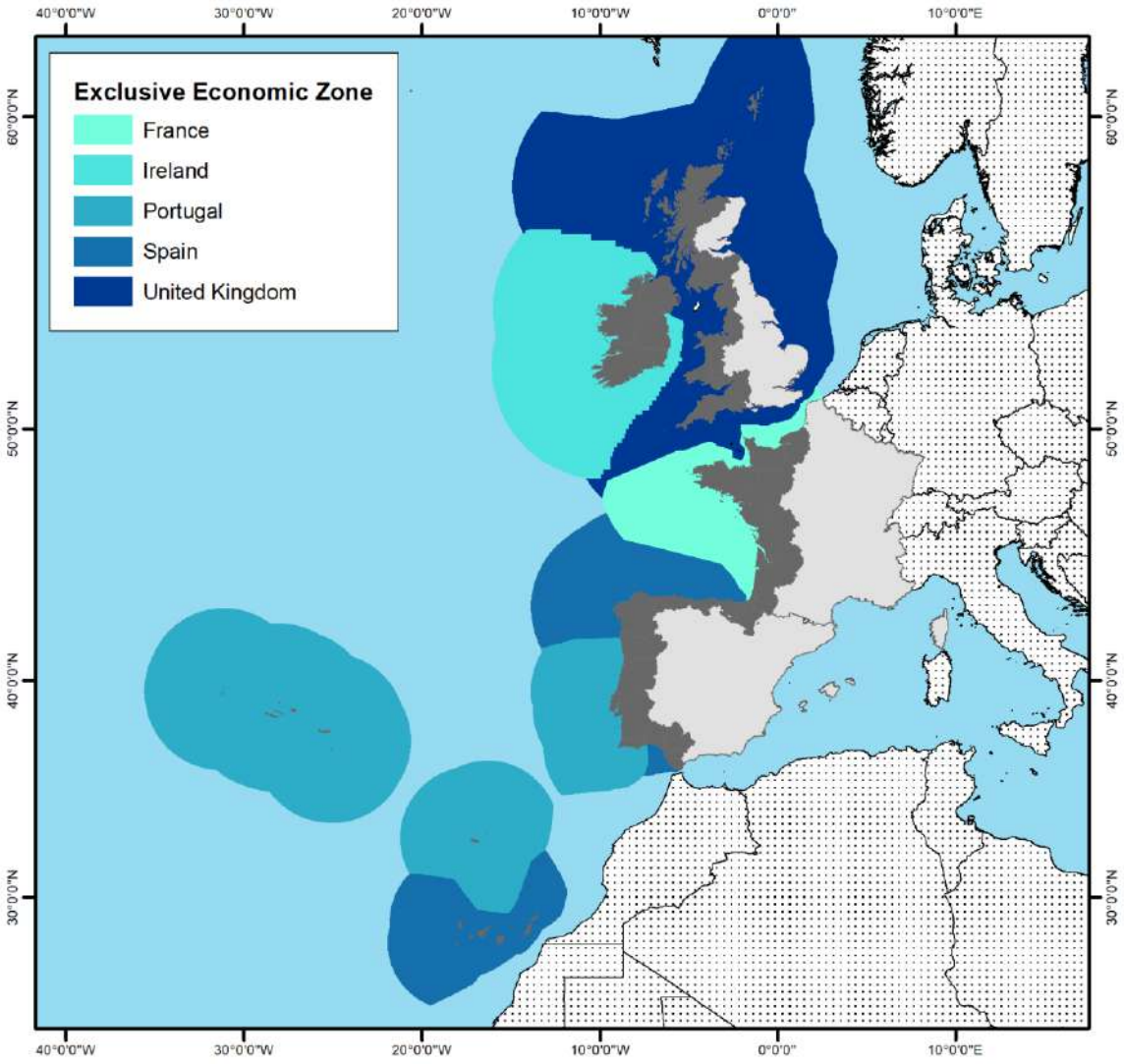

Figure 1. Atlantic Sea and EEZ of Atlantic countries involved in FANBEST. Source: UNEXE.

1.3. International and EU-wide initiatives relevant for Blue Economy in the Atlantic Area

Overview of most relevant national, EU and international initiatives with relevance for the entire Atlantic Region of for countries of the Atlantic Region (Note that the list is not meant to be exhaustive).

- **United Nations Environmental Program Sustainable Blue Economy Finance Initiative (UNEP FI) –** Is a global initiative FI is now hosting the new platform which will bring together financial institutions who will work with scientists, corporates and civil society to raise awareness, share practices and develop tools to support the adoption of the Sustainable Blue Economy Finance Principles. The initiative aims at catalysing investment potential of the growing number of adhering institutions and stakeholders have already endorsed the Sustainable Blue Economy Principles (UNE FI, 2020).
- **Organization for Cooperation and Economic Development (OECD) –** The OECD provides a set of reports exploring the prospects and visions of growth of ocean economy and its role in addressing future challenges, such as energy security, environmental sustainability, climate change and food security. The reports explore future developments for 2030 and actions that can boost long term sustainable development and management of ocean resources (OECD, 2016).
- **World Economic Forum (WEF)** – The WEF supports the Ocean Action Agenda project that includes a set of initiatives from private-public sectors to foster the long-term sustainability of the ocean's use. It offers a multi-stakeholder platform that brings together government, civil society and research to explore opportunities for the development of cross-cutting ocean technologies (WEF, 2019). The initiative has three aims: 1) *Ocean Action Track* to boost innovative ideas in the Ocean and deliver support to the implementation of SDG14; 2) *Friends of Ocean Action Group* and 3) additional financial support to the *Ocean Action Track* (WEF, 2019).
- **WWF Sustainable Blue Economy Principles** – The purpose of the report is to provide definition of sustainable blue economy, a set of guidance principles and identifies actions required for foster sustainable Blue Economy across stakeholders and sectors (WWF, 2019). Principles were harmonized with UN's Sustainable Development Goals (SDGs).
- **Atlantic Interactions** - Is an intergovernmental initiative to unleash the potential of the Atlantic Ocean for society. It supports knowledge-driven solutions for national and global challenges that require interdisciplinary research and innovation through international cooperation. This intergovernmental initiative is being implemented through the Atlantic International Research Centre (AIR Centre, 2020).
- **European Business and Innovation Centre network (EBN)** – Within the EBN, a special interest group dedicated to the Blue Economy aims at bringing together incubators, accelerators and coaches of innovative start-up/SMEs related to the Blue Economy to strenghten and customize EU cooperation to the benefit of entrepreneurs (EBN, 2020).
- **Global Blue Economy Innovation Network** - The launch of a similar intiative than the special interest group of EBN through the World Ocean Council called the Sustainable Ocean Summit (2019) for bringing together the Ocean Innovation and Investment community to foster Blue Economy and tackle its main challenges.
- **European Maritime Board (EMB)** – The EMB is a pan-European Forum for research and technology of the sea. The strategic forum has the aim to initiate state-of-the-art analysis and provide policy recommendations to EU institutions and national governments (EMB, 2019). Within Blue Economy domain, the topics handled by the EMB include among others geohazards to BE, ecosystem services, training and education in the BE or oil and gas decommissioning.
- **EU Green Deal (EU-GD)** – The EU-GD is a novel growth strategy with the final aim to "*transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy*

where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use". Within the EU-GD, the role of the ocean in adapting to climate change is largely recognized and the role that sustainable BE can play in the use aquatic and marine resources, in particular fish proteins that can alleviate agricultural food production, and discloser of offshore renewable energy across European seas (EC, 2020).

- **EU Blue Investment Platform** - The BlueInvest platform supports investment readiness and access to finance for early-stage businesses, SMEs and scale-ups in the blue economy (BlueInvest, 2019). The Platform provides multiple support mechanisms such as Grants, networking and capacity building through the BlueInvest Community.
- **Marine Knowledge 2020 Initiative** – The initiative will provide and integrated knowledge infrastructure on national data infrastructure based on national datasets. Final aim is increase benefits if efficiency and innovation in the different BE sectors (EC, 2012). Several case studies were developed including BE sectors, illustrating the benefits of information platforms (EC, 2019).
- **Maritime Data Hub (MDH)** – The Hub is an interactive tool that provides information on projects and companies funded by EU and member state programmes. Particular focus of the hub is to projects that contribute to the implementation of the Atlantic Strategy (MDH, 2020). The Hub includes a large scoping of stakeholders involved in the projects. The Hub also includes information for the Black Sea and the Western Mediterranean.
- **Atlantic Strategy & Plan** – Aims at a more effective cooperation among the Atlantic Ocean Area by addressing five thematic challenges and opportunities in the Atlantic region: (1) Implementation of the ecosystem approach; (2) Reduction of Europe's carbon footprint; (3) Sustainable exploration of the natural resources on the sea floor; (4) Response to threats and emergencies and (5) Promotion of socially inclusive growth. A key aim of the Atlantic Strategy is to boost sustainable blue economy by 2020 through the Atlantic Action Plan implemented by its five member states (Ireland, France, Portugal, Spain and the United Kingdom). The Action Plan is supported by an Atlantic Assistance Mechanism (AAP) supporting stakeholder networking, participation and funding opportunities within the scope of the Strategy. Furthermore, the international dimension of the AAP has been strengthened following the signing of the Galway (2013) and Belém (2017) Statements, leading to the creation of the EU-US-Canada Atlantic Ocean Research Alliance and the launching of the EU-Brazil-South Africa Atlantic Ocean Research & Innovation Cooperation, respectively.
- **European MSP Platform** – Is an information gateway to support all EU Member States in their efforts to adapt and implement the EU Directive on Maritime Spatial Planning (2014/89/EU). The support mechanism is funded by the EU Directorate General for Maritime Affairs and Fisheries (DG MARE), the European MSP Platform acts as the central exchange forum for the rich knowledge generated in past, current and upcoming MSP processes and projects (MSP Platform, 2020).
- **OSPAR Convention** – The Convention for the Protection of the Marine Environment of the North-East Atlantic (concluded in Paris on the 22/09/1992) is a legislative instrument to coordinate international cooperation on environmental protection and setting internally agreed goals by participating governments in the North-East Atlantic (OSPAR, 2019).
- **The European Marine Biological Research Infrastructure Cluster (EMBRIC)** – EU-wide cluster is designed to accelerate research and innovation from marine biological resources. It promotes new applications in the field of drug discovery, novel foods and food ingredients, aquaculture selective breeding, bioremediation, cosmetics and bioenergy. Atlantic countries that are part of this cluster are UK, France and Portugal (EMBRIC, 2019).
- **European Network of Maritime Clusters (ENMC)** – Is a EU wide initiative that brings together maritime clusters across EU countries, including countries of the Atlantic area (e.g. Maritime UK,

Clúster Marítimo Español). The priorities of the ENMC is to represent EU maritime interests, direct investments and funding programs towards key maritime challenges and most innovative solutions for the marine environment (Marinelink, 2016).

- **COPERNICUS -** The is a fundamental data provides of the marine environment (global and European regional seas) through the Copernicus Marine Environment Monitoring Service (CMEMS). Services support (observation and forecasts) are provided in the domains of marine safety, marine resources, coastal and marine environment and weather (seasonal forecasting and climate; COPERNICUS Marine, 2019).
- **Atlantic Ocean Research Alliance (AORA)** – AORA is an international Atlantic Ocean Cooperation aimed at sharing. The cooperation actions support directly several sectors of the Blue Economy such as Aquaculture through the "Ocean of Food program", aiming at taping the potentialities for fish food production in the Atlantic Sea. Research projects include for instance VIVALDI (Preventing and Mitigating Farmed Bivalve Diseases; http://www.vivaldi-project.eu/) or PRIMEFISH developing an innovative market orientated prediction instrument to enhance economic sustainability and competitiveness of European Seafood on Local and Global markets (http://www.primefish.eu/).

2. The FANBEST Project

2.1. Purpose

FANBEST project (Funding Atlantic Network for Blue Economy Technology Transfer; EAPA_1022/2018) is funded by the Atlantic Area INTERREG Programme through the European Regional Development Fund (ERDF). The aim of FANBEST is to foster the technology transfer to SMEs in blue biotechnology and exploitation of marine resources by creating a network of public and private entities focused on the fund raising that make possible the start and scale-up phase. Funds such venture, business angels, participatory loan or crowdfunding will be offered by tools and services, so that the technologies and innovations "made in Atlantic regions" can reach the market turned into successful business projects.

2.2. Objectives

FANBEST will improve the strategies for technology transfer to SMEs in the field of sustainable exploitation of marine resources through the following operational objectives:

Improving the information source on financing needs and potential of technology transfer, with special attention to projects led by women.

Taking advantage of the knowledge and opportunities represented by business angels and other not banking financing agents like crowdfunding platforms for SMEs of the maritime economy that do not have the necessary size to access to R+D projects investment.

Improvement of skills and abilities of the support services for entrepreneurs and spin-offs so that they can facilitate the fund raising for innovative projects and positioning the universities as agents that become agents connected with the necessary funds and financing support for innovation.

Exploration and exploitation of universities in all their potential. This network will facilitate and coach that the research outputs reach the market in the form of new commercial products or innovative services, provided by SMEs located in Atlantic
regions.

Increasing the funds and financial instruments available for innovation and scaling up in SMEs linked with marine resources sustainable exploitation.

2.3. FANBEST Online Services

One of the key outputs of FANBEST is the progressive development and implementation of five online services, that aim to support BE technology transfer in the Atlantic Region (Figure 2). The online services will be accessible through the following weblink: https://fanbest.eu/online-services/.

1. **Training Platform**. Online training programme for technicians and advisors at technology valorisation and transfer units aim to improve knowledge on financing support of scaling up of spin offs and start-ups in blue economy and to get them informed about new tools for fund raising outside banks system. It includes the development of on-line simulations tools to evaluate a financial viability of the projects and other new tools.
2. **Stock market**. The stock market is a digital catalogue with updates of technology and innovations with big potential for industrial use of marine and maritime resources.
3. **Virtual Business Missions**. The project will organize some webinars to enhance the knowledge across key stakeholders on the opportunities offered by the blue sector and facilitate "virtual" platform for innovative projects promoters and investors or mentors, as well as for companies to exchange best practices and develop commercial links.
4. **Investment Coaching**. The FANBEST network will coach and monitor the implementation of the selected projects to SMEs of Blue biotechnology/marine resources that make possible the start and scale-up phase of the beneficiaries. The partners will play the role of coach and monitoring of the whole process as well as to check the success of the Financial Instruments Set and the funded innovation projects during the whole first year.
5. **Agents map**. A map/directory of stakeholders and existing agents with information about actors that can play a role for bringing investments for innovation at the Atlantic regions. All partners will collaborate to bring information. As part of this map the existing financial instruments including those financed by EU, platforms and services available for beneficiaries in the Atlantic regions will be analysed.

Figure 2. Overview of FANBEST online services. Link: https//fanbest.eu/online-services.

2.4. Aim and Objectives of the report

The present report falls within Action 4.1. of the FANBEST project with the **aim to map stakeholders and existing actors that can play a role in supporting the innovation in the BE sectors in the Atlantic region**. The analysis is based on the development and compilation of a *Blue Economy Stakeholder Directory* (BESD) ensuring a systematic identification, collection and analysis of information sources on BE stakeholders in the Atlantic Region. It is not the aim of the report to provide a complete selection of stakeholders, but **the mapping was purposely focused on stakeholders dealing with innovation and those having strong references in the BE. Private companies have not been included in the stakeholders unless their core business consist of providing support to other BE enterprises.** The report furthers its focus on stakeholders providing financial support to BE on an EU to national level. The report concludes with an overview of conclusions and recommendations related to the findings of the BE stakeholder analysis for the Atlantic Area.

In detail, the objectives of this report are as follows:

1. Development of a **methodological approach to identify and map stakeholders relevant for the BE**
2. Identification the **role of stakeholders in providing support to Blue Economy**
3. Identification the **financial instruments supporting BE** in general and its sectors across different geographic scales (international, EU, national and regional/local level)
4. A set of conclusions and recommendations on the **support provided to BE sectors in the Atlantic area including an overview of the financial support mechanisms** available.

The collected data will be part of the **FANBEST online services** (https://fanbest.eu/online-services/) as described in section 2.3. of this report and will support users in the identification of BE agents/stakeholders in the Atlantic Region through agent maps service.

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3. Methodological approach for Blue Economy stakeholder landscape mapping

3.1. Conceptual design of the BE stakeholder directory

In Figure 3 an overview of the methodological is provided. The methodological approach for the identification and collection of BE relevant stakeholders is based on a mixed method approach (Depellegrin et al., 2019; Steinmetz-Wood et al., 2019). These types of methods support a better understanding of the human-environment relationships by combining qualitative and quantitative data collection instruments (Steinmetz-Wood et al., 2019). Within the conceptual design of the analysis this report adapts a definition of stakeholder according to the European Aid Cooperation Office (EC, 2004) as follows:

"Individuals or institutions that may – directly or indirectly, positively or negatively – affect or be affected by a project or programme".

The approach is composed by three steps that include 1) the data and information collection on BE stakeholders on national, EU and international level, 2) the design and compilation of attributes in the BE Stakeholder Directory (BESD; Table 3) and 3) the analysis of outputs and elaboration of results of the BESD application.

3.2. Structured data collection

The data collection process was subdivided across FANBEST Project Partners (PP) covering individual country responsibility. In Figure 3 an overview of the country responsibilities in the study area is provided as well. Information sources used for addressing the BE stakeholder landscape in the Atlantic Region was based on multiple data collection methods such as project expert group meetings and tele-meetings, expert interviews with relevant stakeholders on national and EU-wide level. This included as well a workshop (FANBEST Workshop on Blue Economy, Greater Manchester Chamber of Commerce, 06/11/2019), structured web research (websites and national and EU project databases, e.g. CORDIS) and literature review on EU and national scale BE development and trends.

Table 2. Country responsibilities in data collection among the FANBEST consortium.

Country	**FANBEST partner**
United Kingdom	University of Exeter; Greater Manchester Chamber of Commerce
Ireland	University of Exeter; Ryan Academy; Trailee Institute of Technology
France	Atlanpole; Vertigo Lab
Spain	University of Santiago de Compostela
Portugal	Orange Bird; Regional Fund for Science and Technology
EU wide and international stakeholders	All project partners

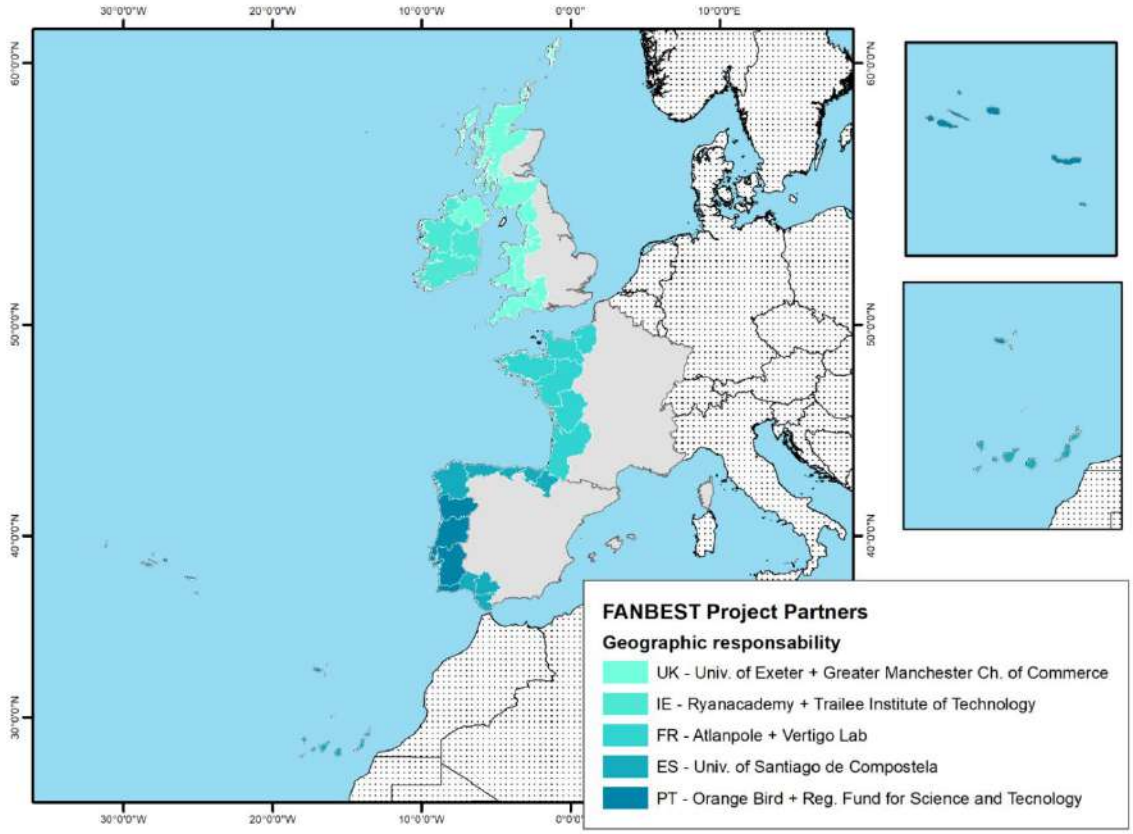


Figure 3. FANBEST Project Partners and geographic responsibility in data collection. Source: UNEXE.

3.3. Attributes definition of the BE stakeholder directory (BESD)

Table 3 provides an overview of the attributes composing the structured directory and the Figure 3 provides the workflow of the directory. The attributes included in refer to: 1) general description of the stakeholder (name & contacts where applicable), its category (e.g. private investor, maritime cluster, spin-off, learned bodies, accelerator, etc…) identified using expert knowledge literature research, 2) influence of the stakeholder (international to regional/local), 3) the role of stakeholder in the BE domain, 4) the geographic orientation of the support (international, 5) Atlantic Area to regional/local) and 6) the main BE sector the stakeholder is belonging to or active in according to EC, 2019.

Table 3. Overview and description of the attributes defined for the stakeholder directory development.

Attribute	**Description**
General attributes	Provides publicly available generic information of the BE stakeholder (stakeholder name, address, social media links)
Stakeholder category	The stakeholder groups that can support BE investment (e.g. private investors, accelerators, research institutions, maritime clusters etc…). Whereas with support to BE we intend the following 5 categories (financier, research/innovation, services providers, regulation-policy making and other). See further details see attribute – *role of the stakeholder in supporting BE*.
Scale of influence of the actor	The geographic scale on which the stakeholder can express his/her influence, including local, regional, national, EU and international level.

Role of the stakeholder in supporting BE	The role of the stakeholder in bringing/supporting investments in BE in the Atlantic Region. This includes the following roles: • *Financier* - Stakeholder that can provide direct or indirect investment resources. This refers to International or EU level organization providing financial support to BE (sectorial and/ multi-sector) • *Research/Innovation* – Stakeholders related research and innovation activities related to BE or to BE sub-sectors. This usually refers to Universities, public or private research centers, Spin-Offs or private companies. • *Service Providers* – Stakeholders that can provide indirect support in terms networking, lobbying to BE investment. This includes Maritime Clusters, knowledge dissemination platforms related to BE of accelerators. • *Regulator/Policy maker* – This refers international, EU, Atlantic, national and regional to local authorities that are responsible for the implementation and enforcement maritime policies. This includes for instance the OSPAR Convention responsible for the Atlantic Sea Strategy or Maritime Spatial Planning Authorities on national/regional level. • *Other* – Stakeholder groups that are not captured by the four categories described above.
Geographic orientation of the support	Refers to the geographic region the stakeholder supports the BE. This includes local, regional, national, Atlantic Region, EU and international level.
Type of financial support	The financial mechanisms provided by financiers in support the BE (e.g. funds, grants, loans, venture capital)
Blue Economy sectors and sub-sectors	This attribute specifies the BE sector the stakeholder is or can potentially support based on EC Blue Growth strategy (EC, 2019): • Aquaculture • Coastal Tourism • Marine Biotech • Ocean Energy (including offshore wind energy) • Seabed mining BE sub-sectors were also defined according to EC, 2012 to ensure more detailed characterization of the stakeholder (e.g. offshore oil and gas, deep sea shipping, fisheries, desalination etc…). See Figure 3 for a more detailed overview of the sectors.

3.4. Outputs

Outputs of the BE stakeholder directory includes (Figure 3):

- A BE stakeholder Directory for the Atlantic area based on an Excel database.
- Geospatial representations of the BE stakeholders distribution across the Atlantic area and for the five countries included in the analysis. The stakeholder directory was geocoded using the libraries ggplot2 and ggmap based R programming language (R-CRAN, 2019). A map representing the clustered distribution of BE stakeholder landscapes available as annex 1 was prepared using ArcGIS (ESRI, 2020).

- Statistical analysis of the BE stakeholder landscape in the Atlantic area and by country. This includes an analysis of the stakeholders providing financial support and mechanisms by BE sector on international, EU and national level.

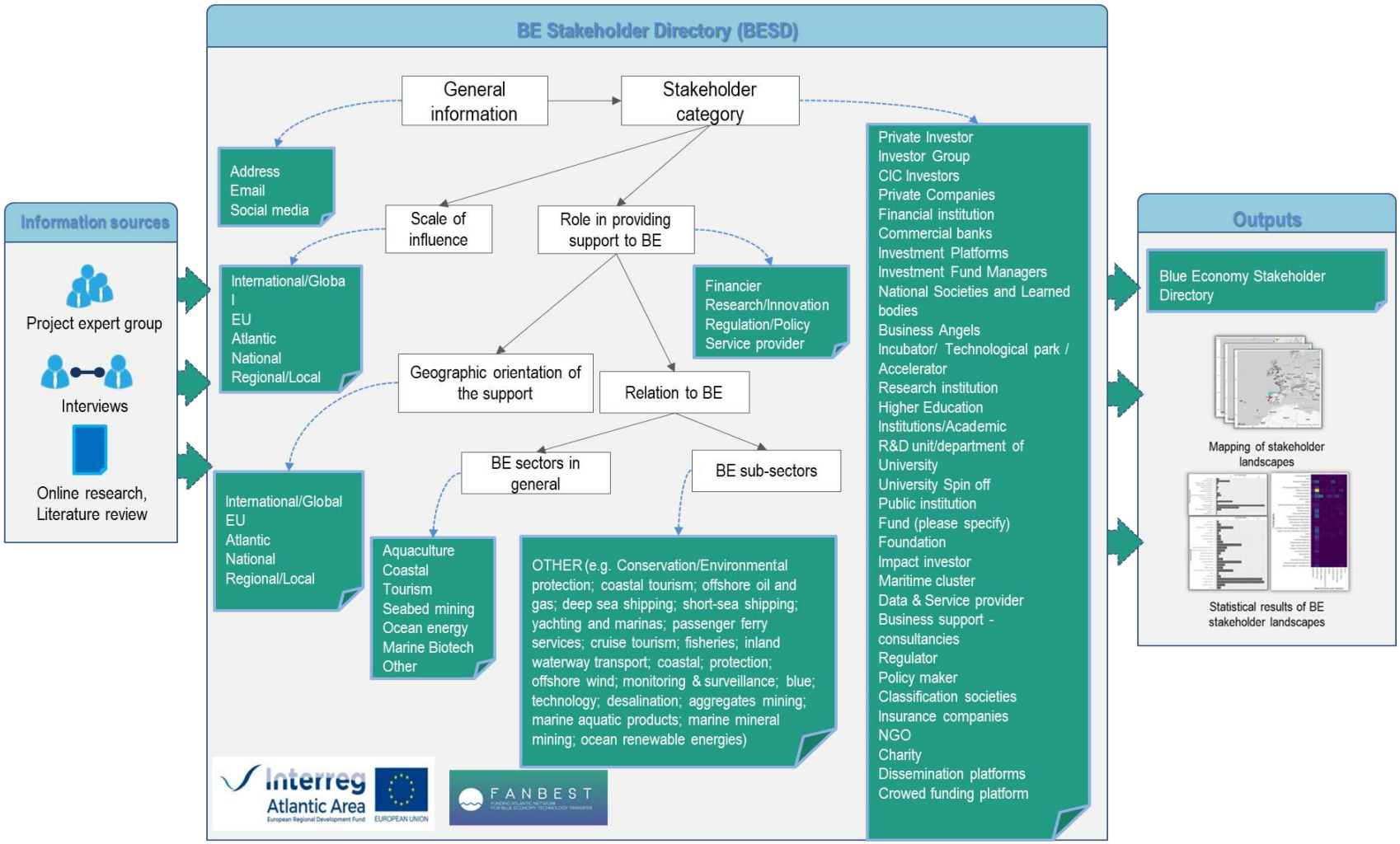


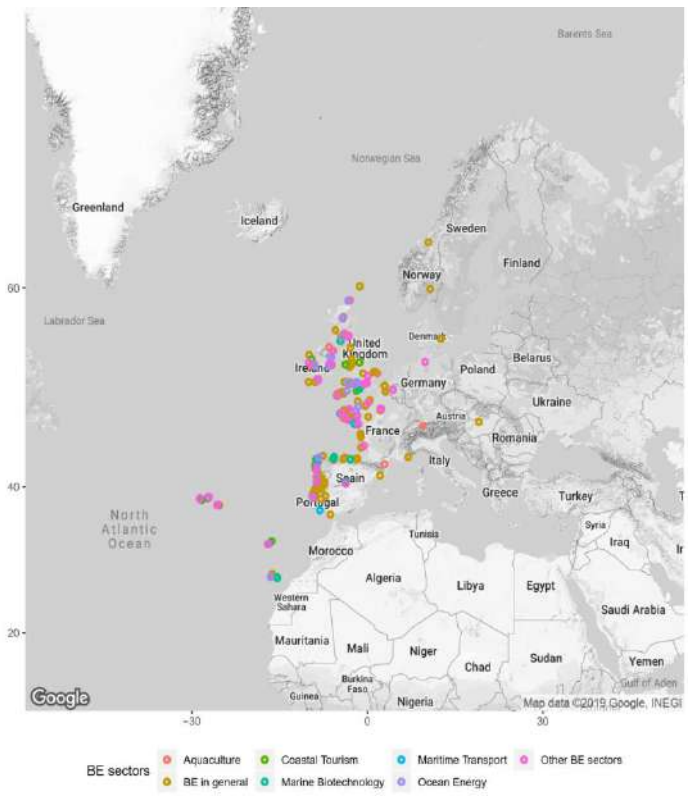
Figure 4. Blue Economy Stakeholder Directory workflow. Green panels illustrate the drop down box information created for multiple choice selection. Source: UNEXE.

4. Stakeholder supporting Blue Economy in the Atlantic Region

Section 4 provides an overview of the analysis performed in relation to the stakeholder supporting BE in Atlantic Region. The section is divided into and international/EU wide representation of stakeholders and an overview on national level stakeholders. The described results do not aim to be exhaustive and the BE Stakeholder Database for this will be continuously updated during project lifetime.

4.1. International, EU – wide and national Blue Economy stakeholder landscape in the Atlantic area.

The analysis of BE stakeholder landscapes for the Atlantic Region returned n = 616 stakeholders (Figure 5). This includes n = 42 (7%) international and EU level stakeholders. Results from the country-based analysis determined n = 573 (93%), with the following distribution: Portugal (n = 166; 27%); United Kingdom (n = 132; 21 %); France (n = 111; 18 %); Spain (n = 106; 17 %) and Ireland (n = 58; 9 %). More detailed results from the country-based analysis are included in the next section with a detailed analysis of the BE stakeholder categories identified and their role in BE economy support. Then a description of the stakeholder providing financial support is provided along with the type of financial support provided across the most important BE sectors defined by the EU Blue Growth Strategy (EC, 2019): ocean energy, aquaculture, coastal tourism, seabed mining and marine biotechnology.



BE Stakeholder in the Atlantic Area
=
616

International Stakeholders
=
42 (7 %)
National level:
UK = 132 (21 %)
Ireland = 58 (9 %)
France = 111 (18 %)
Spain = 106 (17 %)
Portugal = 166 (27%)

Figure 5. Left. Geospatial distribution of BE stakeholder in the Atlantic Region; right. Geographic distribution of support in the Atlantic Region. Source: UNEXE.

The analysis of BE stakeholders resulted in 40 different BE stakeholder types (Figure 6), ranging from financiers to policy-makers and regulators, a range of services providers, research and innovation stakeholders and others. The most numerous stakeholders refer to Public Institutions (n = 121), private companies (n = 72), followed by research institutions (n = 55), business angels (n = 42) and investor groups (n = 40). Another relevant stakeholder group are related to scientific research, namely higher education institutions and academia (n = 29). The most frequent financial support stakeholders include investment fund managers (n = 25), investment platforms (n = 27), foundations (n = 22) or business support or consultancies (n = 23). Also, to mention is the presence of sectoral or multi-sectoral clusters and national societies/learned bodies (n = 16).

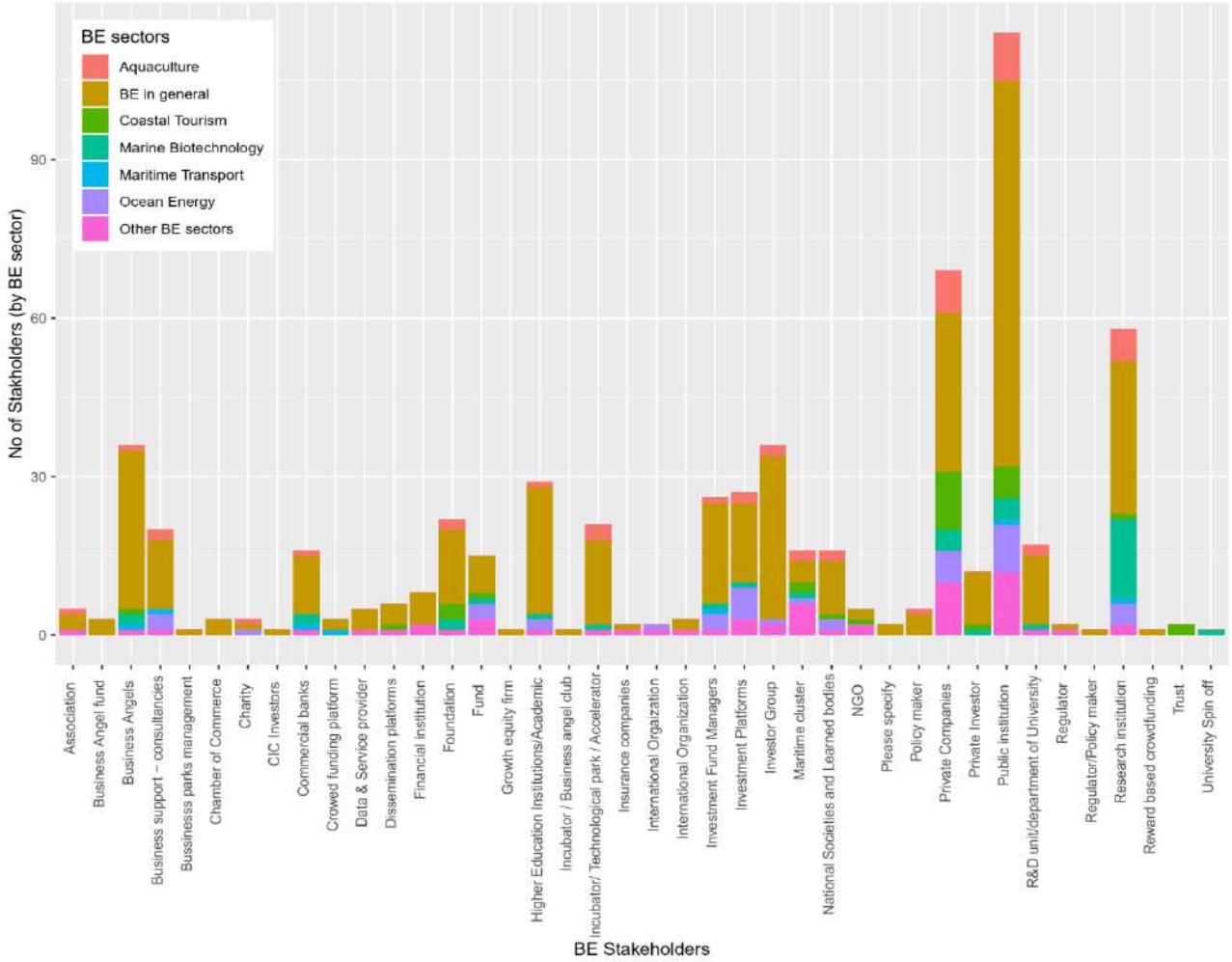


Figure 6. Blue Economy stakeholder landscape for the Atlantic Region. Note: Other sectors may refer to other sub-sectors of the BE such maritime transport, port activities, environmental conservation or fishery. Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

4.2. National level stakeholders

4.2.1. United Kingdom

Figure 6 presents the analysis of UK's Blue Economy stakeholder landscapes. In total n = 133 stakeholders were identified for England (n = 79), Wales (n = 10), Scotland (n = 38) and Northern Ireland (n = 6). The Figure 7 (left) presents the geospatial distribution of stakeholders in the BE sectors and Figure 7b presents the stakeholder categories involved according to their BE sectors representation. The geospatial distribution of results shows that in UK's Atlantic area, regions such as the Cornwall (South-Western), Greater Manchester Region and Liverpool (Merseyside county), Bristol (Wales), Scotland (Highland and South-West), Belfast (Northern Ireland) are regions representing the highest density of BE stakeholders. Other important areas refer to London (important for national and international level stakeholders). The prevailing BE stakeholders identified refer to public institutions, private companies, followed by investment platforms, fund or business support – consulting stakeholders. Relevant public institutions identified on national level include UK National Research Council (UKNRC), that provides financial support in different area of science include strategic BE sectors (ocean energy, aquaculture and biotechnology). Other important BE support on national level is provided by Scotland (e.g. Scottish Enterprise; https://www.scottish-enterprise.com/).

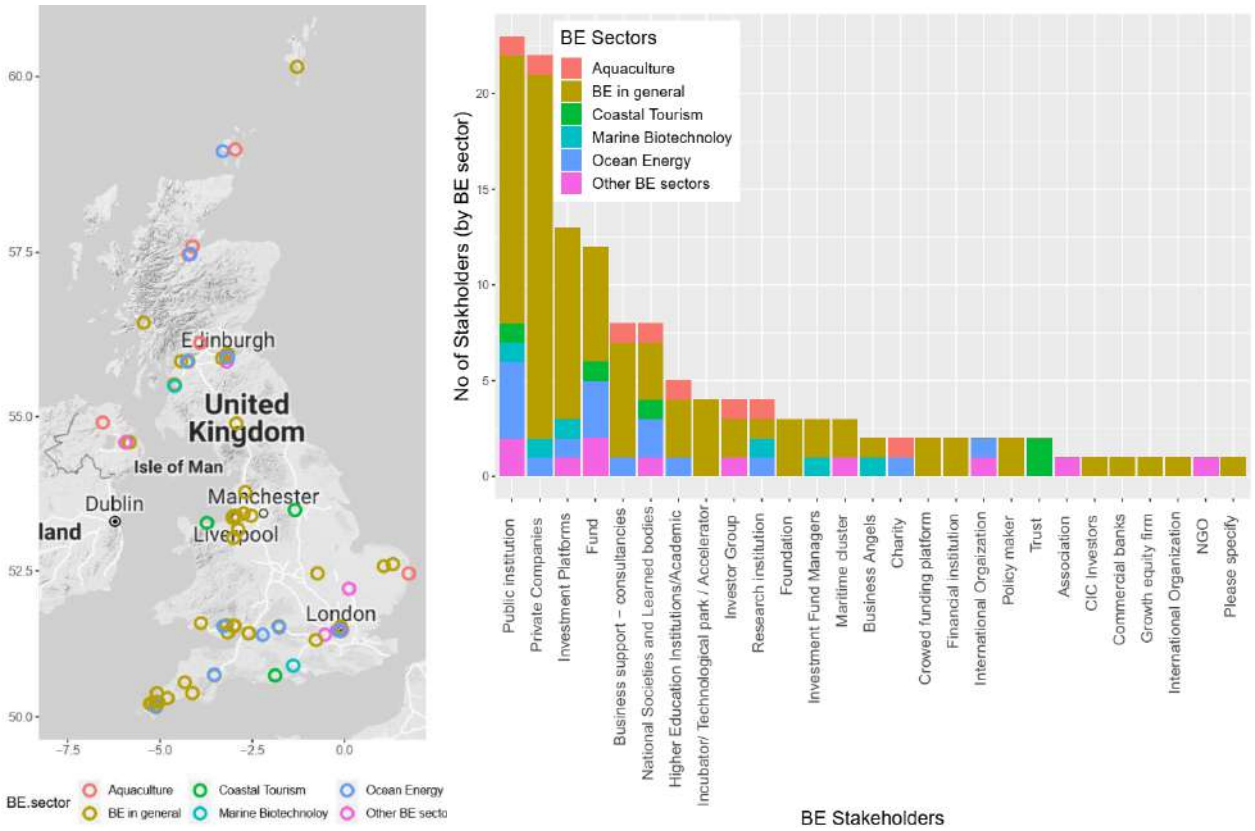


Figure 7. Blue Economy stakeholder landscape for UK. Left. Geographic distribution of BE stakeholders; right. Quantitative distribution of BE stakeholder by sector. Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

4.2.2. Ireland

Figure 8 presents the BE stakeholder landscape for Ireland. In total n = 56 stakeholders were identified. The most important centers for BE are the urban areas of Dublin (Leinster Province), Cork (Munster Province) and Galway (Connacht Province; Figure 7 left). The most predominant BE stakeholder groups refer to public institutions (e.g. Irish Research Council; Irish Seafood Investment Agency), higher education institutions/academia (e.g. MaREI – Marine and Renewable Energy Center; Marine Institute Ireland; the Science Foundation of Ireland) followed by Business support – consultancies (e.g. Enterprise Ireland), investment platforms (e.g. Energy Ireland) and marine clusters (e.g. Irish Maritime Energy and Resource Cluster).

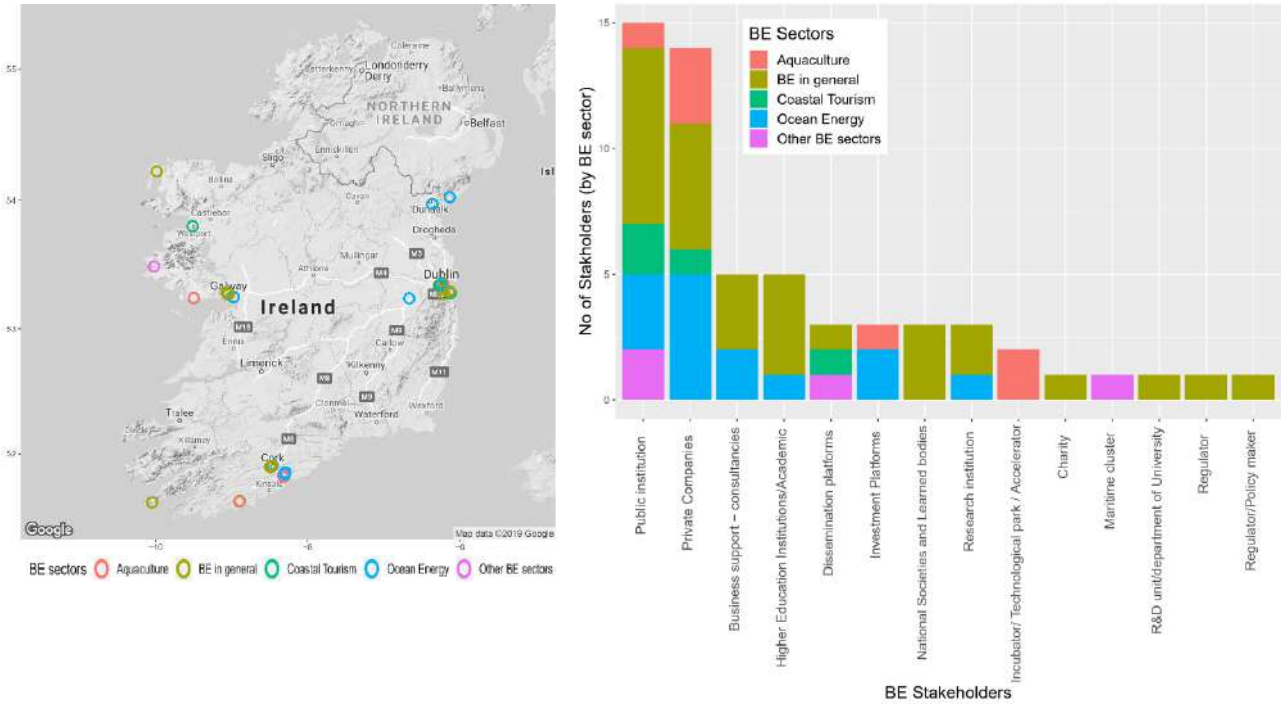


Figure 8. Blue Economy stakeholder landscape for Ireland. Left. Geographic distribution of BE stakeholders; right. Quantitative distribution of BE stakeholder by sector. Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

4.2.3. France

Figure 9 presents the BE stakeholder landscape for France (Atlantic area). In total n = 111 stakeholders were identified. The Figure 9 (left) representing the spatial distribution of BE stakeholders shows a high concentration of stakeholders in the Bretagne region and the Pays de la Loire (Greater Nantes area) located in north-western France. The most relevant BE stakeholders identified on national level include investment fund managers (n = 22), followed by research institutions/academia (n = 13), public institutions (n = 15) followed by research institutions and maritime clusters. The mapping was purposely focused on stakeholders dealing with innovation and those having strong references in the BE. Private companies have not been included in the stakeholders unless their core business consist of providing support to other BE enterprises. Other relevant stakeholders relevant on national and international level are located in Paris, such as the dedicated Blue economy related network of business angels called 'Mer angels'.

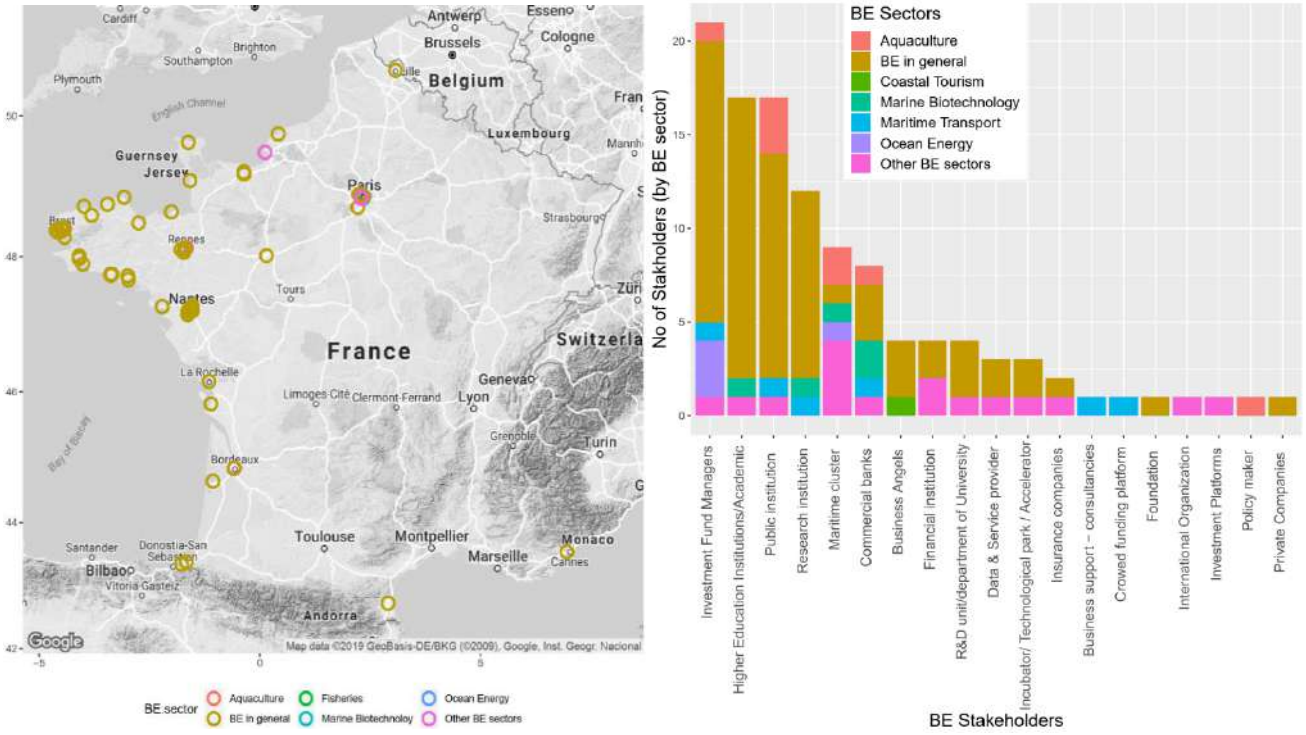


Figure 9. Blue Economy stakeholder landscape for France (Atlantic area). Left. Geographic distribution of BE stakeholders; right. Quantitative distribution of BE stakeholder by sector. Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

4.2.4. Spain

In Figure 10 the Blue Economy stakeholder landscape for Spain (Atlantic Area) is presented. In total n = 106 stakeholders were identified in Spain. The Figure 10 (left) representing the geospatial distributioon of the BE stakeholders shows that the Northern Spain regions of Galicia, Cantabria and the Basque Country have the highest distirbution of BE stakeholders. The most relevant BE stakeholders refer to research institutions (n = 37; e.g. University of Las Palmas de Gran Canaria – Institute of Animal Health and Food Safety or AQUABIOTIC research group at the University of Santiago de Compostela), public institutions (n = 13; e.g. ENISA, Basque Buisness Development Agency) and foundations (n = 15; e.g. Local action groups of the fishery sector). Among the higher education institutionas and academia, include for instance several university departments (e.g. BIOCOST, GRICA, METMED) at La Coruna University from the Centre for Scientific and Advanced Research (CICA).

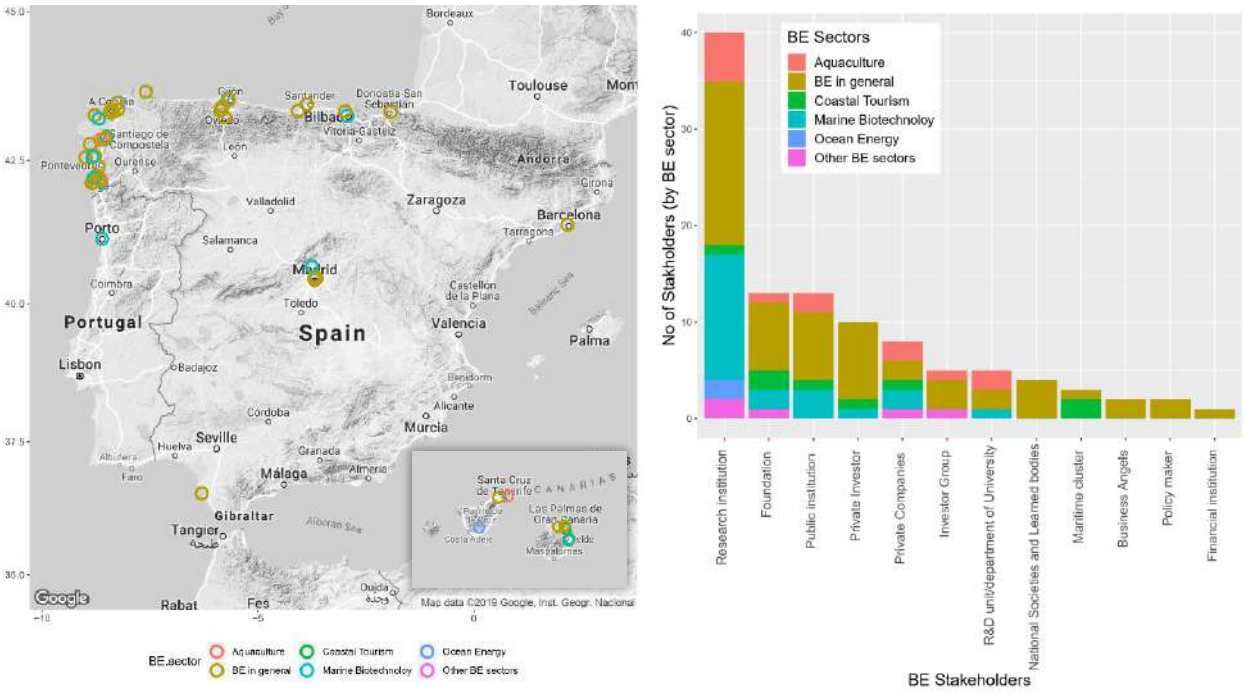


Figure 10. Blue Economy stakeholder landscape for Spain (Atlantic area). Left. Geographic distribution of BE stakeholders; right. Quantitative distribution of BE stakeholder by sector. Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

4.2.5. Portugal

Figure 11 presents the BE stakeholder landscape for Portugal (including Azores and Madeira Islands). In total n = 166 stakeholders were identified. The Figure 11 (left) representing the spatial distribution of BE stakeholders shows that shows that area of Porto (Norte region), Lisbon (Lisboa region) and Coimbra (Centro region) register the most relevant distribution of BE stakeholders. The stakeholders with highest representation are public institutions (n = 32), followed by business angels (n = 27), investor groups (n = 27) and private companies (n = 24). Stakeholders with minor presence include accelerators, commercial banks and associations. Some of the most important public institutions which support and fund blue economy are included, such as Direção-Geral de Política do Mar (DGPM), Agência para o Desenvolvimento e Coesão, IP (AD&C) and Fundação para a Ciência e Tecnologia (FCT). Among the higher education institutions and academia are included the Universidade de Lisboa, Universidade do Algarve, Universidade os Açores and Universidade da Madeira. Similar to other countries of the Atlantic area, stakeholders are related to BE sectors in general, rather than having evident sectoral specificity.

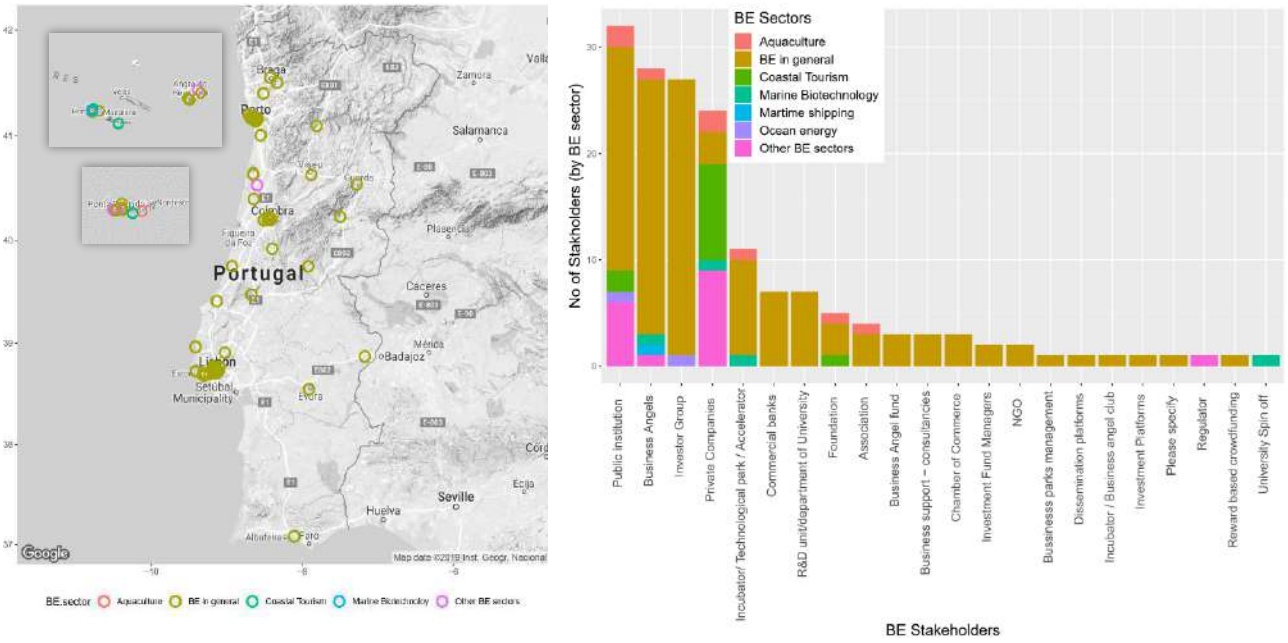


Figure 11. Blue economy stakeholder landscapes for Portugal. Left. Geographic distribution of BE stakeholders; right. Quantitative distribution of BE stakeholder by sector. Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

5. Financial mechanisms supporting the Blue Economy

Table 4 provides an overview of the stakeholders providing financial support to the BE. In total n = 216 different financier type were identified for the Atlantic Region distributed over 26 different stakeholder categories (ranging from Private Business Angels, Investment Platforms, Foundations and Funds). The type of financier most represented are business angels (n = 27; 13%), public institutions (n = 53; 25%) and investor groups (n = 31; 14%). The BE sectors most represented is BE in general. From a sectoral point of view followed by Aquaculture (n = 15; 7%), ocean energy (n = 13; 6%). Other BE sectors (especially fishery, maritime shipping, port activities) are represented by n = 17 (8%). Regarding the geographic orientation of the financial support providers, the information did not allow to identify the geographic domain of support. As information on the geographic portfolio was not always available and retrievable in the information collection process.

Table 4. BE financier matrix for the Atlantic Area. Note: Note: Ocean Energy includes as well offshore wind energy. Source: UNEXE.

	BE sectors							
Finanzier	**Aquaculture**	**BE in general**	**Coastal Tourism**	**Marine Biotechnology**	**Maritime Transport**	**Ocean Energy**	**Other BE sectors**	**TOTAL (%)**
Business Angels	0	23	1	2	1	0	0	27 (13%)
Business support - consultancies	1	0	0	0	0	0	1	2 (1%)
Charity	1	0	0	0	0	1	0	2 (1%)
CIC Investors	0	1	0	0	0	0	0	1 (<1%)
Commercial banks	1	5	0	2	1	0	1	10 (5%)
Crowed funding platform	0	0	0	0	1	0	0	1 (<1%)
Financial institution	0	5	0	0	0	0	2	7 (3%)
Foundation	1	7	1	0	0	0	0	9 (4%)
Fund	0	6	1	0	0	3	2	12 (12%)
Growth equity firm	0	1	0	0	0	0	0	1 (<1%)
Incubator/ Technological park / Acce	2	1	0	0	0	0	0	3 (1%)
Insurance companies	0	1	0	0	0	0	0	1 (<1%)
International Organization	0	0	0	0	0	0	1	1 (<1%)
Investment Fund Managers	1	8	0	1	1	0	1	12 (6%)
Investment Platforms	2	11	0	0	0	4	2	19 (9%)
Investor Group	2	27	0	0	0	1	1	31 (14%)
National Societies and Learned bodi	0	3	0	0	0	0	0	3 (1%)
NGO	0	0	0	0	0	0	1	1 (<1%)
Please specify	0	2	0	0	0	0	0	2 (1%)
Policy maker	0	2	0	0	0	0	0	2 (1%)
Private Companies	0	2	0	0	0	1	0	3 (1%)
Private Investor	0	10	1	1	0	0	0	12 (6%)
Public institution	3	41	0	1	0	3	5	53 (25%)
R&D unit/department of University	1	0	0	0	0	0	0	1 (<1%)
TOTAL	**15 (7%)**	**156 (72%)**	**4 (2%)**	**7 (3%)**	**4 (2%)**	**13 (6%)**	**17 (8%)**	**216**

5.1. European institutions and related financial support mechanisms

This section provides an overview of the of the most relevant EU wide institutions and financial instruments that provide or can provide support to BE.

- **European Investment Bank (EIB)** – Through the subsidiary of the EIB, the European Investment Fund (EIF) instruments for investment including Blue Economy can be provided. Examples include Blue Blue Sustainable Ocean Strategy (Blue SOS) supporting sustainable blue economy initiatives (EIB, 2020).
- **InnovFin Blue Economy** – These financing products provided by the EIF include loans, equity type funding provides a variety of instruments, including modalities in supporting the Blue Economy industries (InnovFin, 2019). The instruments are demand-driven, without any allocation among sectors or countries/regions.
- **BlueInvest Grant and Funds** – The BlueInvest Platform will support EMFF calls for proposals with particular focus on services and technology grants to market and investment ready SMEs for the BE. Within the BlueInvest Platform support is provided through BE investment coaching & advisory supporting innovative SMEs in BE and community building (for investors, partners and beneficiaries), dissemination and capacity building though the BlueInvest Academy (BlueInvest, 2019).
- **The European Regional Development Fund (ERDF)** – The ERDF aims to increase socio-economic cohesion across European regions. Investment are focused on Innovation and research, the digital agenda; SMEs or the low-carbon economy. Compared to the other financial support mechanisms, the ERDF presents specific regional characteristics aiming at improving the environmental and socio-economic conditions of urban and in particular peripheral areas of Europe (EU Regional Policy, 2019). The INTERREG Program is supported by the ERDF and provides a set of grants. Regionally tailored funding programs for the refer to Interreg Europe, Atlantic Area or Interreg2Seas. The Atlantic Area co-finances cooperation projects in the fields of Innovation & Competitiveness, Resource Efficiency, Territorial Risks Management, Biodiversity and Natural & Cultural Assets (Interreg-Atlantic Area, 2019). Examples of projects related to support of Martime activities and Blue Growth sectors include SIMAtlantic (Supporting Implementation of MSP in the Atlantic Region) or the call of proposal on Blue Technology – supporting technology transfer in marine economies.
- **The European Institute of Innovation & Technology (EIT)** – The EIT is an independent body of the European Union to support innovation across Europe. It brings together business, education and research organisations to form so-called Innovation Communities and each is dedicated to finding solutions to a specific global challenge. The EIT communities develop innovative products and services, start new companies, and train a new generation of entrepreneurs (https://eit.europa.eu/).
- **Blue Growth and Horizon 2020 –** A Europe 2020 financial instrument implementing the Innovation Union, aimed at securing Europe's global competitiveness. The Horizon 2020 Programme (2014-2020) for research and innovation is part of the drive to create new growth and jobs in Europe. The program has a market-driven approach addressing societal challenges by supporting research and innovative enterprise into their technological breakthroughs into viable products with real commercial potential. This market-driven approach will include creating partnerships with the private sector and Member States to bring together the resources needed (O'Really and Sullivan, 2013).
- **The European Maritime and Fishery Fund (EMFF)** – The EMFF is the funding mechanism for the EU maritime and fisheries policy. It belongs to the European Structural and Investment (ESI) Funds with aim to promote growth and job development. It supports several BE relevant domains, such as sustainable aquaculture development, diversification of economic activities and livelihood for coastal

communities, sustainable fishing and new jobs and improved life quality. Within the EMFF the so-called Community-led Local Development (CLLD) is an area-based funding instrument to private sector (e.g. fishery, aquaculture, coastal tourism), local authorities and civil society addressing the multiple challenges faced by local fishing communities. The communities brought together through a so-called **Fisheries Local Action Groups (FLAGs)**. Across the countries of the Atlantic Area over 65 FLAGS were identified (FLAGS, 2019). FARNET is the European Fisheries Areas Network is responsible for the implementation of the CLLD under the EMFF (FARNET, 2019).

- **Blue Bio COFUND –** The COFUND is the result of JPI Oceans and the former ERA-NETS COFASP and consists of 16 countries including Ireland, Spain and Portugal for the Atlantic Area. The aim of the BlueBio COFUND is in the field of marine biotechnology, disclose potentials for of microbiomes in support of aquaculture, fishery and fish food processing (Bluebioeconomy, 2019).
- **OCEAN ERA NET COFUND (OCEANERA-NET COFUND)** – This Ocean Energy COFUND has the aim to coordinate support for research and development in ocean energy with the final purpose of bringing innovative carbon solutions closer to commercialization, drive down the levelized cost of energy (LCoE), create growth and jobs and reduce the environmental impact of the energy system. Participating regions of the Atlantic area include Basque Country, Brittany, Ireland, Pays del la Loire, Portugal, Scotland and Spain (Oceancofund, 2020).
- **MarTERA** – Is an ERA-NET Cofund scheme of Horizon 2020 with the aim to strengthen the European Research Area (ERA) in maritime technologies and Bleu Growth. The MarTERA consortium is based on 16 countries that cofund transnational research projects that are also meant to contribute of JPI Ocean Research Agenda and WATERBORNE (https://www.martera.eu/start).
- **Europeans Program for Small Medium Enterprises (COSME)** – Supports SMEs in accessing EUs financial instruments in all phase of the lifecycle. Eases access to loans, guarantees and equity capital. The financial instruments are channelled through the local financial institutions in the respective EU country.
- **European Innovation Centre (EIC) Pathfinder** - The Enhanced European Innovation Council (EIC) pilot aims to support top-class innovators, start-ups, small companies and researchers with bright ideas that are radically different from existing products, services or business models, are highly risky and have the potential to scale up internationally (EIC, 2020).
- **H2020 Research and Innovation Actions (RIA)** - Action primarily consisting of activities aiming to establish new knowledge and/or to explore the feasibility of a new or improved technology, product, process, service or solution. For this purpose, they may include basic and applied research, technology development and integration, testing and validation on a small-scale prototype in a laboratory or simulated environment. Projects may contain closely connected but limited demonstration or pilot activities aiming to show technical feasibility in a near to operational environment (RIA, 2017).
- **H2020 Innovation actions (IA) –** These are actions primarily consisting of activities directly aiming at producing plans and arrangements or designs for new, altered or improved products, processes or services. For this purpose, they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication (IA, 2017).
- **LIFE Program** – The Program is an EU wide instrument in support of environment and climate actions, including biodiversity, conservation, resource efficiency, environmental governance and information (LIFE, 2020).

5.2. Sectoral financial support mechanisms for the Blue Economy in countries of the Atlantic region

This section describes the financial support mechanisms available for BE sectors in general and by specific BE sectors for countries of the Atlantic Region (UK, Ireland, France, Spain and Portugal). The description does not aim to be exhaustive, but provides a characterization of the national funding environment with potential support to BE.

5.2.1. Aquaculture

In UK financial support on national level is provided by UK's research council, now governed under UK Research and Innovation (UKRI). For the aquaculture sector in particular the come from the Biotechnology and Biological Science Research Council (BBSRC). A review of the most recent support grants includes for instance UK's Aquaculture Research Collaboration HUB (ARCH UK) or the Lobster Grower addressing potential (technical, environmental and economic) for new lobster aquaculture industry in the South-Western England (Lobster Grower, 2020). Other support mechanisms in UK include for Scotland the Scottish Aquaculture Innovation Centre (SAIC; co-funding) or Scottish Enterprise.

In Ireland, the Marine Institute provides industry-led funding support for the aquaculture sector. In particular, funding support covers different aspects of the sector such as potential functional food products from Blue withing or for instance the prototyping of novel mooring systems for fish cages that can sustain also adverse weather conditions also in offshore areas (Ouroceanwealth, 2020). Other funding opportunities to Irish enterprises are provided by the Ireland's Seafood Development Agency (BIM, 2020).

In France, financial public aid on national level is primarily operated by three institutions namely, the ANR (National Research Agency) for academic centred projects, ADEME (National Agency for the Environment and Energy Transition) and BPI France (National Investment Bank) for enterprises related projects. Other type of funding mechanism such as private venture capitalist, business angels, loans and crowdfunding that are not particularly Blue Economy specific can be accessible in combination with public funding. In addition to the funding tools, there exist local support services providing guidance to entrepreneurs in accessing customized financial mechanisms in a structured manner

What concerns to the aquaculture, **in France** the nationally- and regionally-managed version of the EU fund called 'EMFF' is a key source of match-funding (mix of EU contribution and national or regional contribution). In particular the article 47 Innovation in Aquaculture is designed to develop technical, scientific or organisational knowledge in aquaculture farms, which, in particular: a) reduces the impact of aquaculture on the environment; b) reduces dependence on fish meal and oil; c) fosters a sustainable use of resources in aquaculture; d) improves animal welfare; e) facilitates new sustainable production methods; f) developing or introducing on the market new aquaculture species with good market potential; g) new or substantially improved products, processes, or management and h) organisation systems and exploring the technical or economic feasibility of innovative products or processes. Other articles within the EMFF can support the development of aquaculture activities. Another yearly call for proposals opens to organizations based in the French region 'Pays de la Loire', operated by the SMIDAP (Syndicat Mixte pour le Développement de l' Aquaculture et de la Pêche des Pays de Loire) on behalf of the Region concerns exclusively aquaculture issues to improve knowledge and boost innovative ideas.

In Spain the financial public aid is mainly granted at two levels: the national- level and the regional level. At the national-level, there exist several calls primarily operated by the Ministry of Agriculture, Fishing and Food and the CDTI (Centre for the Development of Industrial Technology). Several of these public grants are mainly funded or co-funded by the European Maritime and Fishery Fund (EMFF). These calls are targeted to

enterprises and opened to both R&D&I and investment projects. At the regional-level, each regional government tend to have similar grants (i.e. mainly focused on innovation and investment projects).

In Portugal the existing funding support on a national and regional level related the BE sectors in general, there thus not having sectoral specificity. The major support mechanisms are provided by Direção-Geral de Política do Mar – DGPM (Fundo Azul, MAR2020, Bluetech Accelerator, Ocean Invest, EEA Grants calls) and Agência para o Desenvolvimento e Coesão, IP - AD&C (Portugal 2020, Compete 2020, Programa Operacional MAR 2020, Regional PO's, Territorial Cooperation Programs (Interreg MAC, Interreg Atlantic Area, Interreg Europe)). Some national foundations are also committed in funding the Blue Economy sector, such as Fundação Oceano Azul (Blue Bio Value, Ocean Conservation Fund), Fundação Calouste Gulbenkian (Blue Bio Value) and Fundação para a Ciência e Tecnologia – FCT, which supports the scientific community in Portugal through a wide range of funding schemes, tailored for individual scientists, research teams or R&D centres (acting as funding agency for H2020 ERA-Net calls and other programs, R&D grants etc). A vast network of business angels and risk capital companies is also available on a national scale and include key players such as Portugal Ventures, Business Angels Associations National Federation and Business Angels Portuguese Association.

It is important to highlight some of the fundamental areas of study and projects for the development of the sector in which the mentioned actors are actively working: a) UP / CIIMAR (fish nutrition and pathology); b) CIIMAR / ICBAS (fish nutrition, growth and quality in aquaculture, new raw materials, systems and industrial infrastructures; marine macroalgae species capable of commercial exploitation and removal of excess nutrients in fish farming) or the c) IPMA in improving breeding techniques, larval growth and nutrition, new technologies for open sea, development of cultivation of new species (fish and shellfish).

5.2.2. Marine Biotechnology

In UK financial support mechanisms for the marine biotechnology sector derive from the Biotechnology and Biological Sciences Research Council (BBSRC) or by the UK Research & Innovation (UKRI). Biotechnology application related to marine environment has stand - alone applications in support, but has application related to seafood safety in fish food production aquaculture devices, for instance improving viral disease control in aquaculture through genome editing (UKRI, 2019). Other stakeholders providing financial support in the sector include the Industrial Biotechnology Innovation Centre (IBioIC) in Scotland.

In Ireland, the Marine Institute (MI) plays a fundamental role in support of marine biotechnology through strategic funding and research (marine.ie, 2020). The initiatives in particular include NutraMara, a 100% Irish owned and operated blue biotechnology company, developing next generation phytochemical ingredients and formulations through seaweeds (http://nutramara.com/). The MI also supported the All-Island Beaufort Biodiscovery Project aimed at discovering new drugs and advanced biomaterials from marine animals, plants and microorganisms (marine.ie, 2020).

In France R&D is mostly funded through ANR (National Research Agency) and regional councils. In particular, the Brittany region has received strong support to develop macroalgae concepts into marketable products or services while the region 'Pays de la Loire' has more invested in microalgae topics.

In Spain the financial public aid is mainly granted at two levels: the national- level and the regional level. At the national-level the public grants are primarily operated by the Ministry of Industry, Trade and Tourism and mainly focused on R&D& I projects. Overall, the public aids are allocated to both enterprises and public research centres. There also exist some private funds linked to venture capital funds specifically oriented to invest in biotechnology projects (see for instance Caixa Capital Biomed and Caixa Innvierte Biomed II).

In Portugal, the development of marine biotechnology includes the diversity of samples used as substrate, but also the most diverse applications that have been given to marine natural products (FCT, 2019). However, the efficiency of production and processing technologies to obtain bioactive on medium and large scale is still low, given the few available infrastructures in Europe and low practical knowledge of the specificities of each end-use sector, which affects the value chain. On the other hand, there was still much investment in bioprospecting that generated a panoply of existing marine collections scattered throughout the country. The biotechnology sector has been growing slowly but steadily over the last 10 years, and its development has begun to accelerate over the last 3-5 years, in part due to the huge European stimulus to this sector, but also due to national politics commitments and support to entrepreneurship. Portuguese blue national innovation focuses on new antifouling agents for the marine industry, new materials derived from marine by-products, or new marine bioactive compounds for the food, agricultural, cosmetic, pharmaceutical or biomedical. However, the number of companies and blue startups is rather limited, either due to the lack of national incentives dedicated to scientific and sectorial entrepreneurship, or to the lack of dedicated and specialized entrepreneurship training and innovation for these scientists.

5.2.3. Seabed Mining

Seabed mining is one of the most underrepresented sectors identified within this analysis, while comparably sub-sectors related to maritime shipping or port activities are present across the analysed countries. Seabed mining in form of sand and gravel extraction is the main activity of this sector within the Atlantic area countries, such as **France or UK** (e.g. Northern Ireland; UN 2016). According to Miller et al. (2018) in offshore areas of the Atlantic (**France, Portugal, Ireland**) seabed resources include Cobalt-rich crusts, that are used for super alloys production (e.g. aircraft gas turbo engines), in rechargeable batteries for hybrid electric cars. Although the imminent commercialization of seabed mining activity, interviewed experts and literature review suggest that barriers for the sectoral development are related to uncertain environmental impacts, such as sediment plumes, pollution phenomena and disturbance of the seafloor (IUCN, 2018; UN 2016).

5.2.4. Coastal Tourism

In UK the coastal communities fund provided by the UK Government provides support to economic development in coastal and seaside areas. Project have the aim to support job creation and Blue Growth in the field of tourist infrastructure, regeneration of heritage infrastructure or for instance promote leisure yachting (UK Government, 2018). Similar support mechanism for tourism industry is provided in Scotland (Scottish Government, 2020). In Wales funding to tourism is supported by the Business Wales (2020), in particular through the Wales Tourism Investment Fund (WTIF). In Scotland funding support is provided (in particular for tourism infrastructure development) by the Rural Tourism Infrastructure Fund (RTIF, 2019).

In Ireland, the National Tourism Development Authority provides a large set of small and large grant schemes for the implementation of the National Tourism Strategy (Failte Ireland, 2016) with the aim of supporting tourism industry and to boost tourist attractiveness of Irish towns and the diversification of regional and seasonal tourism offer, including coastal towns (Failte Ireland, 2019).

In France the sector of coastal tourism is considered very broad and can be funded by various regional and national funding mechanisms.

In Spain the tourism industry is one of the most important sectors for the Spanish economy. Therefore, there exists public aid primarily operated by the Ministry of Industry, Trade and Tourism and allocated to tourism industry. However, coastal tourism does not appear separately in these calls. Some of the public aid in this domain has been granted to projects aimed at avoiding seasonality in coastal tourism.

In Portugal, strategic development of the sector was especially promoted Portuguese islands, mainly in the nautical tourism subsector. In this field, the Azores territory stands out due to the fact that there are already some defined parameters regarding the recognition of quality of maritime and coastal tourism (as is the case of the QualityCoast Awards), that are making it possible to overcome the challenges of the region. Portugal has played a prominent role in this, mainly because in terms of the 2014-2020 strategic programming, there was an application of structural funds for integration of coastal tourism and sea tourism. Examples of national projects within "smart" maritime tourism include for instance "Topamepesca" (smart fuel and route optimization), "mobileWaterSafety" (increase safety of boat passengers/fishing fleets) and "Mare-Fi" (novel Wi-Fi technology for the maritime sector).

5.2.5. Ocean Energy[1]

In UK several research grants mechanisms exist for the ocean energy sector. The engineering and physical science research council (EPSRC) development most recent grants ocean renewable energy technology, such as the modelling of Impact of Large Floating Wind Turbines on Offshore Navigation and Safety Critical Radar Systems (EPSRC, 2019a) or HOME-offshore (developing a comprehensive approach for maintenance for energy form offshore wind farms (EPSRC, 2019b). With some overlapping funding support there is as well Crown Estate (Offshore Wind Sector Deal; HM Government, 2019), the Offshore Wind Industry Council (OWIC), Innovative UK, the Energy Technologies Institute (supporting public-private partnerships), the Carbon Trust and the Green Investment Bank.

In Ireland, the Sustainable Energy Authority of Ireland (SEAI) provides research and development funding programs in the ocean energy sector with the final aim of ensuring clean and secure energy transition in Ireland (SEAI, 2019). An example includes the Ocean Prototype Development Fund for tidal energy development (e.g. GKinetics tidal energy development; Marineenergy.biz, 2018). On overall the Irish Government supports through the newly approved Renewable Energy Support Scheme (RESS) a diversification of energy resources including ocean energy (RESS, 2019).

In France, the institute of research and technology called 'France Energies Marines' runs a yearly call for proposals to fund R&D projects. Similarly, to the yearly call for proposals operated by the SMIDAP on aquaculture issues, the WEAMEC (Western Atlantic Marine Energy Community, 2020) is operating various R&D calls that can benefit to research labs based in the Region 'Pays de la Loire'.

In Spain, R&D is mostly funded through the Institute for Energy Saving and Diversification (IDAE) at the national-level and regional governments, frequently in collaboration. For instance, Biscay Marine Energy Platform, S.A, is an infrastructure operating in real marine conditions for the research, demonstration and operation of marine energy collector devices (https://bimep.com/pages/info#info02). It was set up as a public-sector company by the Energy Saving and Diversification (IDAE) and the Basque Energy Agency.

In Portugal, the development of wave energy technologies is one of the most prominent ocean renewable sectors. In the last 10 years, this activity has focused mainly on air turbine oscillating water column technology, the one that has experienced the greatest international expansion and was used in the Pico pioneer in the Azores, which ceased its operation in 2018. In wave energy production, national activity has focused on the development of floating systems, and the development of new types of air turbines and their control, for installation on various types of oscillating water column converters (from integrated to breakwater to floating). In offshore wind energy, a more recent initiative related to the WindFloat Atlantic Project and has focused on the characterization of the resource, technology monitoring and support for the installation and monitoring of a prototype in Portugal (EDP, 2020). Studies have been performed on wave

[1] Results of the analysis included offshore wind energy.

action in floating structures, moorings and underwater electrical connections, which have application in both marine energy systems (FCT, 2019)

5. Conclusions & Recommendations

Blue Economy is not by itself an industrial sector. This made the identification and categorization of stakeholders in the proposed database a major challenge throughout the BE stakeholder directory. Depending on the country, industrial codes (e.g. SIC – Standard Industrial Codes for UK) applied may not be accurate enough to fit BE or related sub-sectors (Morrissey., 2014). Similarly when identifying the funding portfolio of EU supporting mechanisms and national authorities there was the need to perform a dedicated search of keywords, with project portfolio portals such as CORDIS (https://cordis.europa.eu/, 2019). In some case a stakeholder may play multiple roles, as for instance national MSP authorities may act as supporting policy and decision makers, but may act as well as financier for national level implementation projects. Acknowledging the lessons learned from the compilation and analysis of BE Stakeholder Directory we are able to define a set of conclusions and recommendations (Figure 12) on the BE stakeholder landscape of the Atlantic Area.

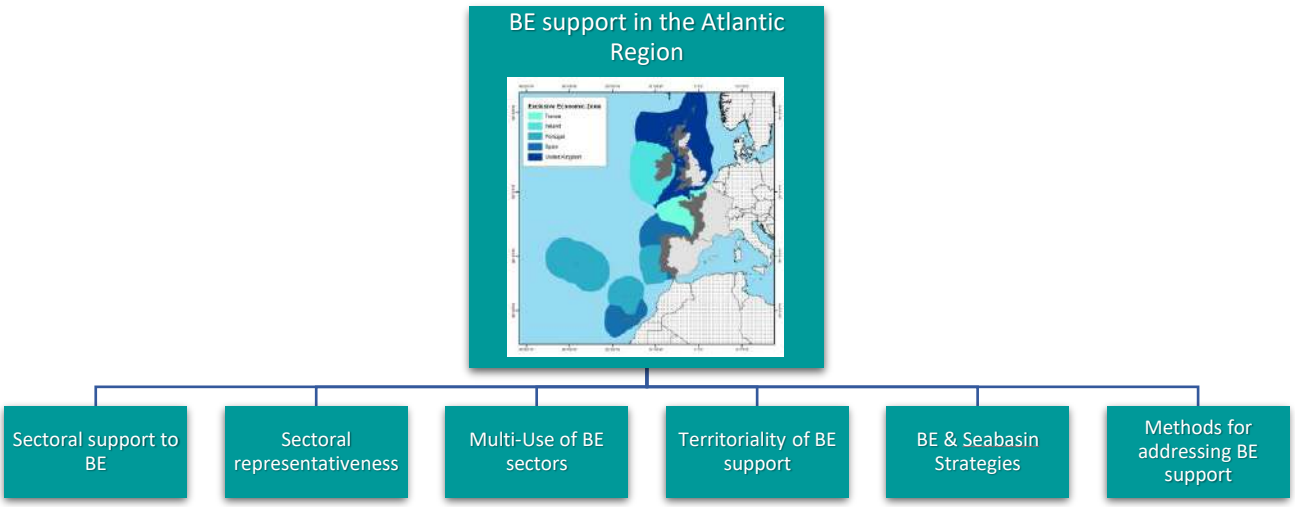


Figure 12. Overview of conclusions and recommendations for BE support in the Atlantic Area. Source: UNEXE.

5.1. Sectoral support to Blue Economy

The analysis of stakeholder directory results in 72% of stakeholders providing financial support independently from the BE sector (see Table 3 - "*BE in general*"), in particular, public institutions (EU and national), research institutions, higher education/academia. National/regional public institutions are promotors and implementers of national BE strategy, marine spatial plans, enforcement of Atlantic regional strategy and therefore need to ensure a balanced, BE sector-neutral support mechanisms. Moreover, public authorities on EU and national/regional level give primary importance to the social and environmental impact of the funding support provided, that implies a less focused sectoral focus on BE. While this is an advantage, and increases opportunities for public and private actors, having BE sector oriented and or BE sub-sector oriented support would provide faster growth potentials and a better monitoring of the implementation and sustainability of BE activities and its progress on a sea basin level. Nevertheless, according to expert interviews and literature reviewed, the European Union and its funding mechanisms remain the most

prominent and in some cases unique promoter for research and international cooperation in the Blue Economy arena.

Recommendations:

- Design funding mechanisms that address opportunity and challenges for blue economic growth on sectoral level.
- Define monitoring mechanisms on EU and national level on the progress of the BE implementation on single sector level and BE as whole.

5.2. Sectoral representativeness in BE

Among the BE sectors identified within this research, seabed mining is substantially underrepresented in the analysis. According to the literature reviewed and the expert interviewed reasons include that the sector is a new use of the sea space at an early stage of development (EU), related with high investment and costs that cannot be tackled through EU-wide and national financial support mechanisms. In addition, the development of the sector is related with unclear regulatory frameworks for licensing of seabed mining activities and unclear effects on the marine environment. According to experts interviewed most feasible investment mechanisms for seabed mining seem to be the attraction of private investors for joint venture investment projects. A similar condition seems to be experienced for the ocean energy sector, where substantial integration with private sectors are needed.

Recommendations:

- Increase the scientific knowledge on the short and long-term environmental effects of seabed mining on marine ecosystems and deep sea environments of the Atlantic Region.
- Identify the spatial and resource conflicts of emerging sea uses (e.g. seabed mining) with other traditional sea uses of the Atlantic Region (e.g. commercial fishery or shipping) and analyse the potential environmental and socio-economic trade-offs.
- Develop certain legal frameworks that can regulate the sector and ensure that exploitation technologies ensure highest environmental standards and sustainability principles. In particular, member state duties related to the UNCLOS Article 145* in relation to the protection of the marine environment from harmful effects derived from the exploitation of the sea.

UN Convention on the Law of the Sea, Section 2: Principles Governing the Area.
Link: https://www.un.org/depts/los/convention_agreements/texts/unclos/part11-2.htm

5.3. Support Blue Economy through Multi-Use

In recent years substantial opportunities and funding have been provided for the analysis and demonstration of potential ocean multi-use (MU) platforms. The term Ocean MU is defined as "*the joint use of resources in a close geographic proximity either by a single or multiple user*" (Schupp et al., 2019). The concept exists since the 2000s referring to structural, operational and spatial connections of offshore wind farms with aquaculture devices in the German Bight (Buck et al., 2001). Ideally financial instruments that support a synergic co-location or interaction of the sea space in form of MU can promote mutual benefits for traditional and emerging sectors of the BE. Recently implemented and ongoing project on MU identify the Atlantic Region as key area for MU development (Calado et al., 2019; Przedrzymirska et al.,2018): H2020 MUSES (Multi Use of European Seas; https://muses-project.com/) exploring opportunities and challenges of MU implementation to boost Blue Growth (Schultz-Zehden et al., 2018) in European Seas, or the H2020 MARIBE

Project (Marine Investment for the Blue Economy; MARIBE, 2020), addressing socio-economic and technical/non-technical opportunities and challenges in the development MU platform or MU of the sea space (MARIBE, 2020). To mention MUSICA (Multiple Use of Space for Island Clean Autonomy) providing a test site for synergic use of BE sectors within a multi-use platform (e.g. renewable energy devices supporting shipping infrastructure or aquaculture facilities). MU sea areas have the fundamental advantage that they can combine biotic and abiotic marine resource exploitation in sea areas, where the single sector may not exist and create environmentally and socio-economic win-win conditions. It was noticed that the only financial instrument within the analysis that actively supports a soft MU deployment on local scale is the CLLD with pescatourism (small scale fishery or aquaculture and coastal tourism) activities, enhancement of the natural/cultural heritage with sustainable seafood harvesting or production.

Recommendation:

1. Enforce the development of MU concepts across key BE sectors of the Atlantic Area that can tackle Atlantic key challenge for the use of sea space and create beneficial trickle-down effects (e.g. cost sharing, create jobs and new specialization, joined infrastructure) for involved sectors and their value chain.
2. Share best practice in the Atlantic Region on MU development and address the value chain that MU can provide in terms of environmental and socio-economic benefits.

5.4. Territorial specificity of financial support

The Atlantic region is ecologically and socio-economically a very diverse region (Calado et al., 2019). Financial support mechanism should be better designed towards the dependency of the beneficiaries acting in sub-areas and the dependency to specific biotic and abiotic marine resources. This may lead also to geographically and sectorial specializations that can provide new opportunities to showcase products, services and qualifications with a high value in the Atlantic Territory and beyond.

Recommendation:

1. Design financial support mechanisms that take into account the biophysical, economic, social and technological gradient of the Atlantic Area as ecoregion.
2. Consolidate the development of systematic monitoring and observation systems, to better design research and disclose financial incentives within ecoregions and their local/regional technological and innovation potential.
3. Support mechanisms that facilitate data collection on environmental and socio-economic resources relevant for Blue Growth, that can better direct regional and sub-regional funding priorities and funding strategies (see also recommendation 5.6.).

5.5. Align Blue Economy support to the Atlantic Strategy

The spatially explicit representation of the performed analysis of BE stakeholders (see Annex 1) allowed to identify a series of regional clusters in the Atlantic Region. These includes for UK (London, South-Western England), Ireland (Dublin), France (Bretagne and Pays de la Loire), Spain (Galicia) and Portugal (Porto and Lisbon area). During the analysis and the performed interviews it emerged that the Atlantic suffers from the absence of BE support mechanisms that could operate in similar mechanisms as established in other European sea basins, such as the BlueMed-Initiative or the Facility for Blue Growth in the Black Sea. Further

investigation should be performed in the analysis of peripheral coastal areas and provide support and network among clustered and weakly clustered areas.

Recommendations:

1. Share experiences and best practice within other Strategic Research & Innovation Initiatives across EU seabasins and EU maritime nations, such as the BlueMed Initiative (http://www.bluemed-initiative.eu/), the Facility for Blue Growth in the Black Sea (https://blackseablueconomy.eu/).
2. Facilitate the creation of cross- or single sector maritime clusters. Efforts should include the integration and networking of clusters across the Atlantic Area.
3. Shift from business as usual approach (single actor development) towards a bioeconomy-oriented vision of BE development. This would allow to incorporate multiple sectors in the value chain an provide environmental and socio-economic benefit across sectors and territories.

5.6. Methodologies for addressing BE support on sea basin level

The developed BE stakeholder mapping methodology provides a scalable and flexible approach in the analysis of BE landscape in the Atlantic Region. The BE stakeholder database (BESD) will be part of a set of online services (https://fanbest.eu/online-services/) within the FANBEST Project to support technology transfer in BE in the Atlantic region and will be kept lively throughout its project lifetime. The design of BESD provides opportunities for further integration towards for instance a pan-European pilot study. Other potentialities include the extension of the analysis towards quantitative assessment of the actual financial supports provided by the identified financiers of the database in different territories of the Atlantic Region.

Recommendations:

1. Share experience on methodological approaches for the analysis of BE sectors and stakeholders that can be applied across geographic scales.
2. Define classification systems of economic activities on national level (e.g. SIC in UK) and on EU-wide level (NACE - Statistical classification of economic activities in the European Community) that have higher level of precision and accuracy in accounting BE sectors.
3. Strengthen collaboration among national, sea basin and EU wide initiatives that support systematic collection of data on BE assessment best practices and BE progress (e.g. Maritime Data Hub; EU Atlas of the Sea; EU MSP Platform; EU BlueInvest).

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7. Annex

A1. Clustered analysis of BE stakeholders of the Atlantic Area. The map illustrates the distribution of BE stakeholders in the study area: the regions of the Atlantic Area with highest aggregation of BE clusters are listed in Table A1 along with geographic representation Figure A1.

Table A1. Atlantic Area regions representing aggregating BE stakeholders.

Country	**Regions**
United Kingdom	London, South West, North West, Wales, Scotland and Northern Ireland
Ireland	Leinster, Munster and Connacht
France	Bretagne, Pays de le Loire and Paris
Spain	Galicia, Asturias, Basque Community and Madrid
Portugal	Norte, Centro, Metropolitan area of Lisbon, Autonomous Regions of Azores and Madeira

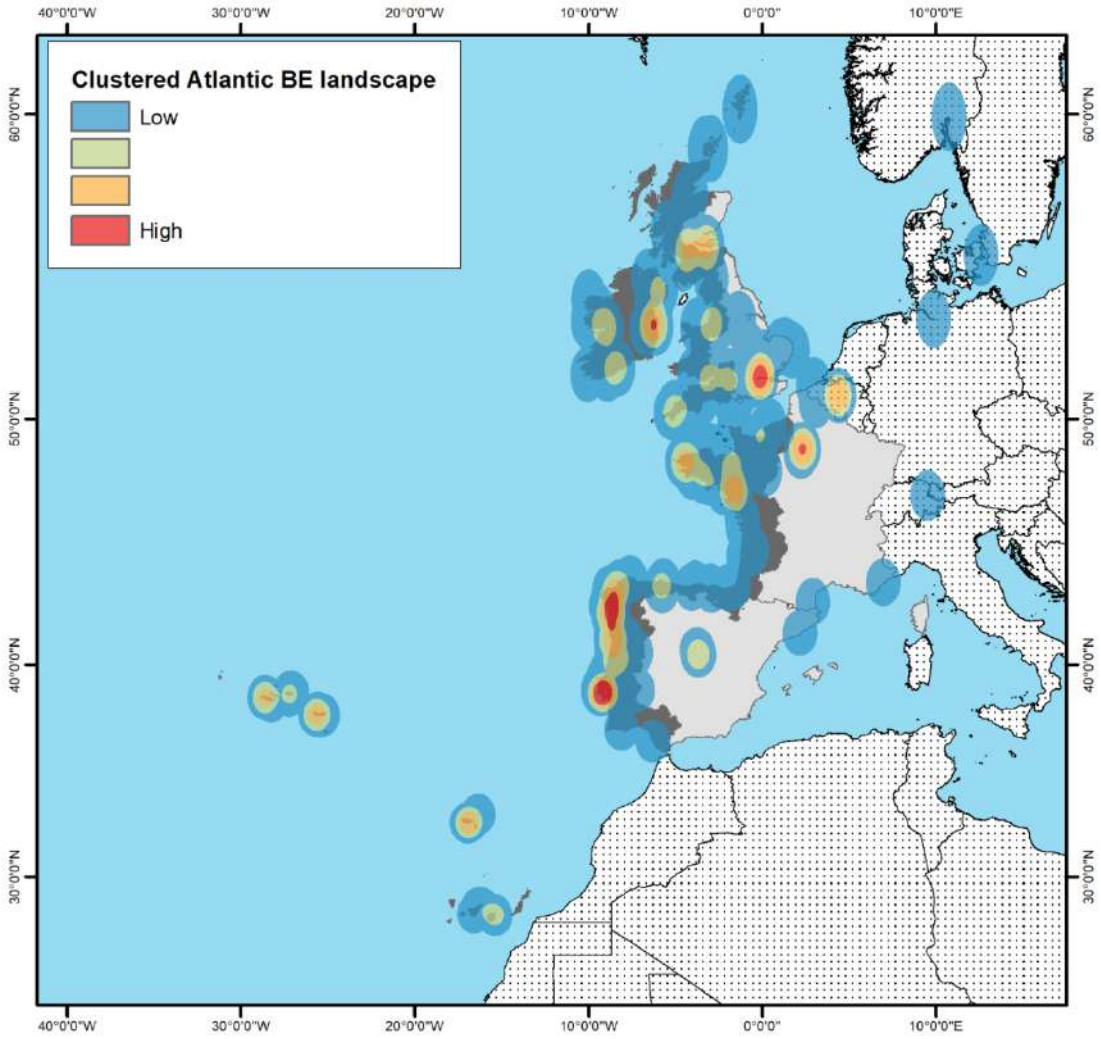

Figure A1. Atlantic area regions with highest relevance in BE stakeholder distribution. Source: UNEXE.