ProtoAtlantic
Project Impact
and
Pathway for Future Projects

October 2020

University College Cork

Innovation in the Marine Environment

Content Table

Executive Summary

The European Commission's Blue Growth strategy encourages coastal regions to find innovative and sustainable solutions to develop coastal regions by focusing on marine sectors. The Interreg Atlantic Area is rich in marine resources and provides a unique opportunity to develop sustainable growth in the coastal regions geographically and in terms of management of the marine resources. The Interreg Atlantic Area regions provide unique competences thereby enabling stimulation of innovation and competitiveness. ProtoAtlantic, an Atlantic Area Interreg funded project, is the first of its kind accelerator programme aimed at marine-based startups and small to medium enterprises (SMEs) in the Atlantic area particularly in sectors of aquaculture, marine biotechnology, and marine robotics. The Interreg Atlantic area encompasses partner regions in France, Ireland, Portugal, Scotland and Spain. The consortium partners consist of Technopôle Brest Iroise, University College Cork, County Council Cork, INESC TEC, the European Marine Energy Centre (EMEC), EMERGE, and the lead partner, Innovalia Association. The strategic cross-regional collaboration between the partners provided support mechanisms for startups and SMEs across and outside of the Atlantic area.

The ProtoAtlantic consortium took it upon themselves to create a vibrant ecosystem and community with stakeholders in and outside the Atlantic area and engaged the marine startup community, academia and research, policymakers, industry partners, and investors. The aim of this document is to provide policymakers on an international, regional, and local level with a potential avenue and pathway forward for future projects to create and maintain a marine-based innovation ecosystem that can be driven and supported through a variety of stakeholders. The project identified that targeting startup engagement, *triple helix* collaborations, and building social capacity through raising awareness nurture the innovation ecosystem and strengthen community building. Based on the ProtoAtlantic achievements and the Blue Growth policy round table discussions* recommended actions for policymakers on how to create an innovation ecosystem driven through a variety of stakeholders with a particular focus on marine-based sectors are proposed and include:

- Blue Growth strategies that support innovation ecosystems nurturing marine entrepreneurship and the development of emerging marine sectors through interregional collaboration, knowledge and resource sharing, need to be prioritised on an EU level realising the competitive advantage that coastal regions provide
- Take stock of national infrastructures, capacities, and capabilities in the marine sectors to identify research and development gaps, these can be used as capacity building opportunities across the regions
- Create a marine-specific cluster based on regionally available capacities and competencies to increase regional competitiveness

Further recommended actions are presented on a European, national, and regional/local level and provide a pathway for future projects to build on the success of ProtoAtlantic.

*ProtoAtlantic Blue Growth Policy Recommendations – Roadmap for Marine Policies

Introduction

ProtoAtlantic, an Atlantic Area Interreg funded project, launched in 2017 and has since delivered the first of its kind accelerator programme aimed at marine-based startups, entrepreneurs, and small to medium enterprises (SMEs) in the Atlantic area. The Interreg Atlantic Area, which encompasses the regions of France, Ireland, Portugal, Scotland and Spain, is an area rich in marine resources and with a long maritime history which contributes to a wealth of knowledge and capabilities available in these regions. ProtoAtlantic is a collaborative effort aimed to harness the expertise available in each region through the engagement and collaboration of the partners at Technopôle Brest Iroise in Brest, University College Cork, County Council Cork, INESC TEC, the European Marine Energy Centre (EMEC), EMERGE, under the lead of Innovalia Association.

The strategic cross-regional collaboration of ProtoAtlantic benefited marine startups across the regions which availed of business and technical expertise and were provided access to the testing and prototyping infrastructures in the regions. ProtoAtlantic provided access to prototyping and testing infrastructure which enabled startups to develop and test their technology in simulated and real-life marine conditions at the European Marine Energy Centre (EMEC), Lir – Ireland's National Ocean Test Facility, and INESC TEC – Institute for Systems and Computer Engineering, Technology and Science. ProtoAtlantic also facilitated a range of stakeholder events aimed to create an innovation ecosystem thereby contributing to the strengthening of the communities in and across the regions.

Maintaining and strengthening the community around marine startups is vital to ensure the growth and development of these enterprises. The benefits of having a healthy and strong startup community increase entrepreneurship and ensure growth of emerging marine sectors and will attract public and private investment opportunities. ProtoAtlantic approached the innovation ecosystem and community building through:

1. Startup engagement
2. Triple Helix* collaboration
3. Building social capacity

This document will outline the process of building a marine-based innovation ecosystem and will provide some insights on how the ProtoAtlantic partners engaged in fostering a vibrant innovation ecosystem driven through a variety of stakeholders across the Altantic area. Based on these experiences, this document will also offer recommended actions for national and regional policymakers and community builders to develop and strengthen an innovation ecosystem.

*The Triple Helix is based on Henry Etzkowitz (2003), Innovation in innovation: The triple helix of university industry-government relations. *Social science information, 42*(3), 293-337.

Startup Engagement

Marine startups in all the regions have shown a keen interest in the ProtoAtlantic accelerator programme. The accelerator included hands-on workshops on business models and lean business management; the bootcamp which provided workshops on branding and marketing, financial instruments to marine startups, partnership and leadership, and pitching for investment; a 3-month mentorship programme providing one-to-one coaching sessions on business models, and pitching for investment; and the fast-tracking technology development. In total, 63 startups across the regions were able to benefit from the services provided by ProtoAtlantic.

Dedicated Support to Startups in Emerging Marine Sectors

ProtoAtlantic was specifically geared towards marine-based startups in the sectors of aquaculture, marine biotechnology, and marine robotics which all have high growth potential. However, the startup participation (figure 1) shows that most of the support was sought after by startups engaged in the sectors of Marine Renewables and 'Other', which includes ocean digitalisation, seabed mining, shipping, and oil and gas sectors. This indicates that across the Atlantic area, additional startup support, such as the ProtoAtlantic accelerator programme and the services it offers, are needed in the sectors of marine renewables, and others.

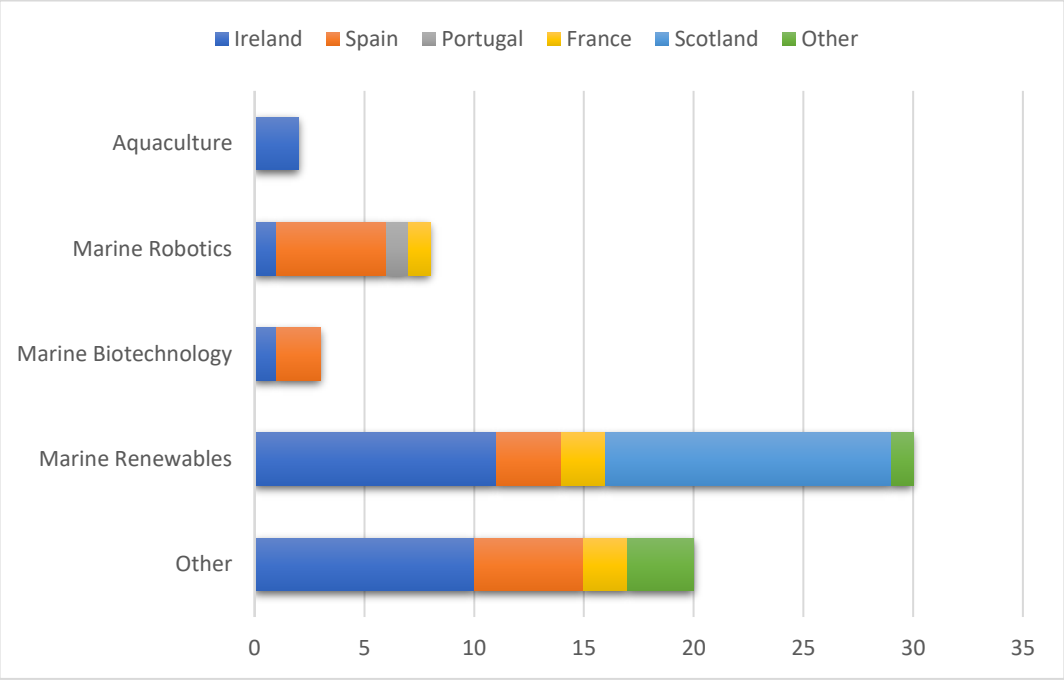


Figure 1: Startup participation in the accelerator programme, including hands-on events and workshops, bootcamp, mentorship programme, and fast-tracking technology development across the ProtoAtlantic regions

Triple Helix Collaboration

ProtoAtlantic has facilitated stakeholder engagement through a range of interactive events targeting the triple helix and aimed to gain a deeper understanding of the potential enablers and barriers to marine-based sectors and community building experienced in each region. The triple helix includes stakeholders from academia and research including research facilities and testing facilities, government represented through policymakers and regional economic development agencies, and industry representatives. The collaboration between the triple helix ensures a cohesive approach to creating a nurturing environment for startups and SMEs. In total, 218 stakeholders across the regions engaged in the ProtoAtlantic Blue Growth policy discussions and actively participated in the decision-making process of developing coastal regions. A visualisation of the triple helix participation (figure 2), shows a keen interest of industry participants to engage in the coastal development. The strong representation of academia and university representatives also indicates an interest in engaging in research and development of marine-related issues within the regions.

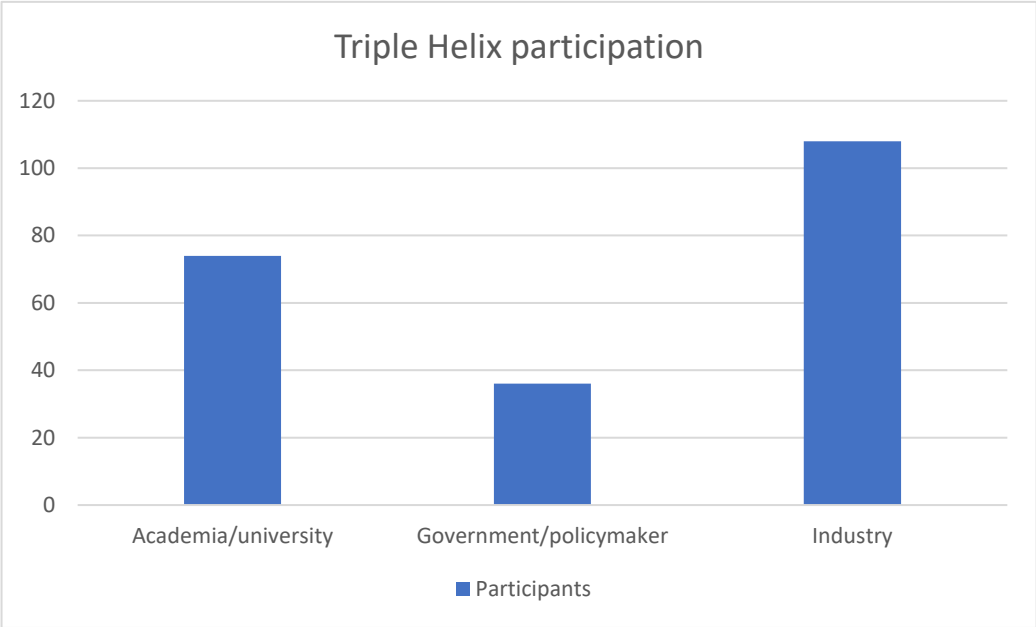


Figure 2: Triple Helix Participation across all ProtoAtlantic regions based on Blue Growth Policy Round Table Workshops

Cluster Development

Marine-based startup needs differ from other sectors due to higher entry barriers to marine sectors and associated higher costs, and access to marine resources and available infrastructures. Stakeholder engagement through the ProtoAtlantic policy round tables also highlighted the need for a marine-specific cluster creation. This would increase regional competitiveness within specific sectors. Startups would benefit from easier access to available soft and hard infrastructures, additionally this would attract public and private investment. Targeting a cluster development through triple helix collaboration could ensure that marine startups receive the support they need.

Building Social Capacity

One of the key issues identified through the ProtoAtlantic policy round tables was building social capacity to meet market demands. This includes encouraging entrepreneurship, providing education and training opportunities, as well as employment opportunities. ProtoAtlantic actively engaged in raising awareness around the available opportunities, capacities and capabilities in each region through the effective use of social media and producing newsletters, newspapers, and promoting ProtoAtlantic in publicly organised events as well as industry-specific conferences and fora.

Community Outreach

Troughout the duration of the project, ProtoAtlantic actively facilitated, hosted, and engaged in community events in person and online. As such, ProtoAtlantic has attended academic and industry conferences; hosted hands-on workshops, the ProtoAtlantic bootcamp, and Blue Growth policy round tables; and actively promoted the project and collaboration between stakeholders. ProtoAtlantic also participated and actively promoted the project during publically organised events which got event attendees interested in the rich marine resources available within each of the ProtoAtlantic coastal regions. Online engagement, particularly over social media and via newsletters, and the ProtoAtlantic online stakeholder platform allowed for even further community outreach across the Atlantic area (figure 3).

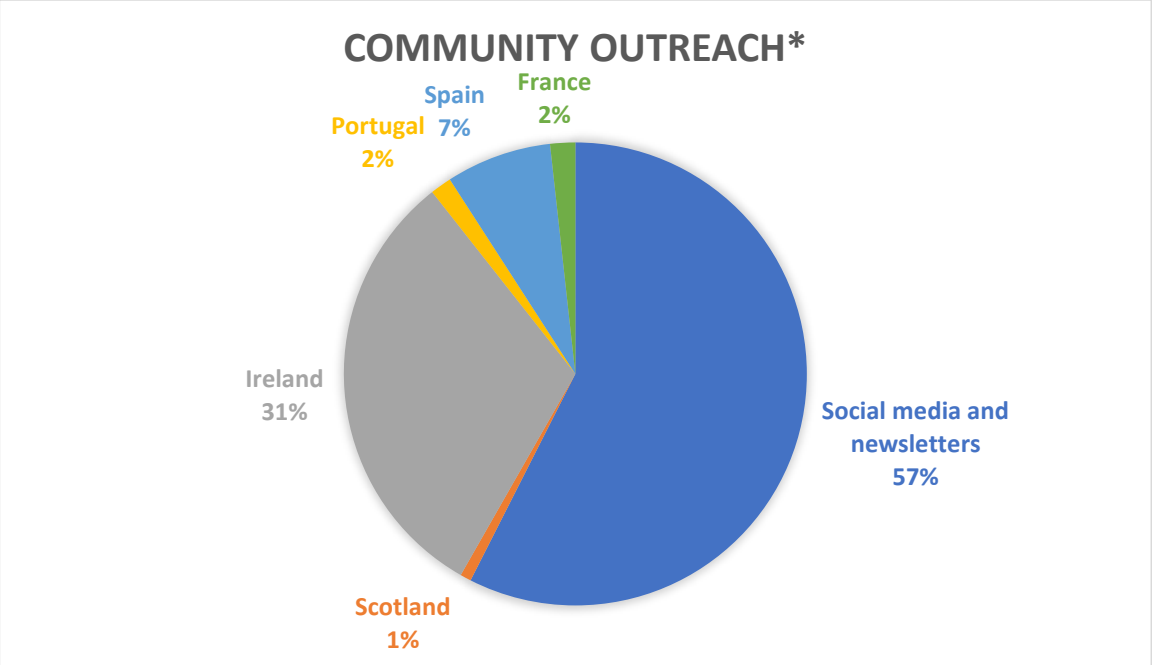


Figure 3: ProtoAtlantic community outreach based on attendance participation in events facilitated, hosted, or participated in by ProtoAtlantic partners.

**Outreach to promote ProtoAtlantic during publically organised events such as the SeaFest Cork or SeaFest Galway not included (more than 30.000 people in attendance)*

ProtoAtlantic Project Impact

ProtoAtlantic's holistic approach to building a strong community has proven to nurture cross-regional marine entrepreneurship. The ProtoAtlantic accelerator programme was designed to provide soft support mechanisms such as business development workshops and mentorship and hard support mechanisms such as access to prototyping and testing facilities. As such, the programme has highlighted some of the enablers and barriers to marine startups across the Atlantic area. The success of ProtoAtlantic has shown that there is room for similar programmes in the future to ensure that marine startups receive the support that they need to succeed.

ProtoAtlantic built a strong foundation for a cross-regional and vibrant innovation ecosystem which provides support for marine-based startups. Through the project's lifetime, ProtoAtlantic supported a total of 63 marine-based startups across the Atlantic area with access and facilitation of knowledge transfer and exchange as well as access to soft and hard infrastructures. To continue the support, ProtoAtlantic produced guidelines for marine startups in the Atlantic areas providing useful information about regional support systems: The Startup Hand book: An Entrepreneur's Guide to Blue Growth (Appendix 1).

ProtoAtlantic online stakeholder platform continues to provide a support infrastructure where marine startups and entrepreneurs can avail of a rich database of online resources. ProtoAtlantic has documented the ProtoAtlantic bootcamp sessions which can also be accessed through the ProtoAtlantic platform

ProtoAtlantic facilitated a number of hands-on events and workshops specifically targeting the collaboration of the triple helix, i.e. academia and research, government and economic development agencies, and industry representatives in and across the region. Building these relationships has enabled policy and economic development consultations in the coastal regions resulting in animated discussions on blue growth and a sustainable pathway forward. 218 stakeholders across the Atlantic area participated in the ProtoAtlantic blue growth policy round tables where marine-specific cluster creation was identified as a key priority to ensure the nurturing of marine entrepreneurship. More details to the policy recommendations can be found at ProtoAtlantic Blue Growth Policy Recommendations Roadmap for Marine Policies (Appendix 2)

The ProtoAtlantic accelerator programme has proven to be a viable way forward to foster innovation and entrepreneurship in marine sectors across the Atlantic Area which has attracted the attention of public and private investment. ProtoAtlantic serves as proof of concept that such programmes accelerate the progress of marine startups. Proof of concept available at: ProtoAtlantic Blue Growth Accelerator Programme: Investment Opportunities and Roadmap (Appendix 3)

ProtoAtlantic's efforts have resulted in an engagement of over 6600 stakeholders across the Atlantic area over the duration of the project, indicating that there is a keen interest in creating a vibrant innovation ecosystem driven through a variety of stakeholders.

Recommended Actions for Future Projects

There is an opportunity to build on ProtoAtlantic's success and strengthen the innovation ecosystem in and across the Atlantic area. The vision is to develop the European Atlantic Margin as a global hub for Blue Growth facilitated by state-of-the-art accelerator programmes available to marine-based startups across the Atlantic area. Vital to this vision is an innovation ecosystem that provides necessary support mechanisms for startups, SMEs, and entrepreneurs. ProtoAtlantic has shown that there is a clear need for accelerator programmes targeting marine-based startups in the Atlantic area. Startups in the sectors of marine biotechnology, marine robotics, and aquaculture benefited from the soft and hard infrastructures that ProtoAtlantic provided. Yet, the development of coastal regions is evolving, and new marine sectors are constantly emerging, requiring soft and hard support structures tailored to their needs. Fostering a dynamic innovation ecosystem driven through a variety of stakeholders that enables growth of marine startups is therefore a critical step in the cross-regional coastal development. The following recommended actions for future projects may build on the success of ProtoAtlantic.

European Level

- Blue Growth strategies that support innovation ecosystems nurturing marine entrepreneurship and the development of emerging marine sectors through interregional collaboration, knowledge and resource sharing, need to be prioritised on an EU level realising the competitive advantage that coastal regions provide

National Level

- Take stock of national infrastructures, capacities, and capabilities in the marine sectors to identify research and development gaps, these can be used as capacity building opportunities across the regions
- Accelerator programmes specific to marine sectors available in the regions need to be designed and facilitated to provide education and training, business development resources, and access to hard infrastructures

Regional and Local Level

- Create a marine-specific cluster based on regionally available capacities and competencies to increase regional competitiveness
- A holistic approach to engaging local and regional triple helix (academia, government, and industry) stakeholders in the decision-making process needs to be taken to ensure that the visions for the regional coastal development align
- Community outreach and raising awareness and facilitate public marine activities to create strong community bonds

Interreg Atlantic Area
European Regional Development Fund

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

EMERGE
STARTUPS · INNOVATION

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE
BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES

marine south east

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu

Startup Handbook: An Entrepreneur's Guide to Blue Growth

September 2020
University College Cork

Innovation in the Marine Environment

Table of Contents

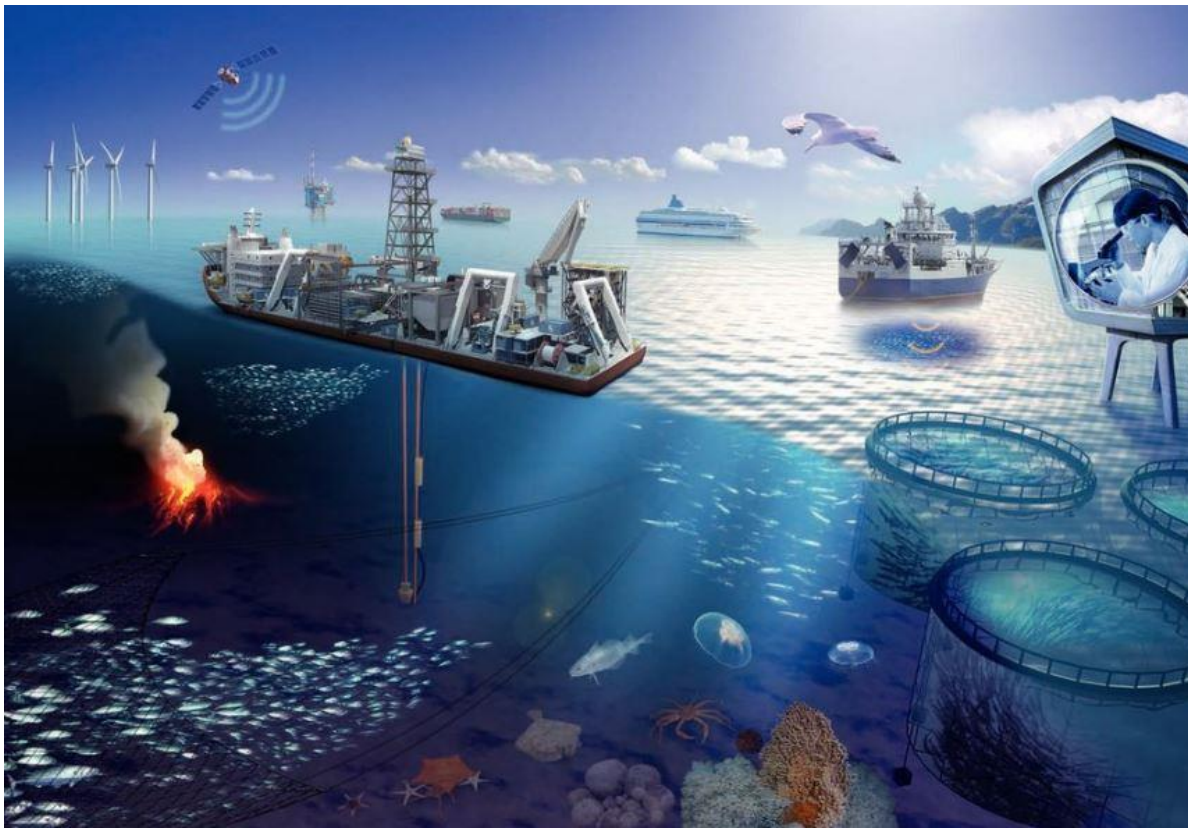
Introduction to the Startup Handbook: What is Blue Growth?

The European Commission defined Blue Growth as “an initiative to harness the untapped potential of Europe’s oceans, seas and coasts” which for the first time identified the rich marine resources as an unique asset for economic development in coastal regions and on islands.

ProtoAtlantic, an Interreg Atlantic Area funded project, supports the transnational collaboration and connectivity between five countries: France, Ireland, Portugal, Spain, and Scotland. The Atlantic Area is rich in resources, both geographically and in terms of the management of the resources. Each Atlantic Area region provides unique competences which enable the stimulation of innovation and competitiveness by fostering resource efficiency by providing technical assistance and business support to our regional SMEs.

This handbook is aimed at aspiring entrepreneurs and marine startups that would like to gain a better understanding of existing maritime development strategies and agencies in the Interreg Atlantic Area, i.e. the coastal regions of France, Ireland, Portugal, Spain, and Scotland. The handbook will shed some light on the existing enabling policies and agencies providing business development support in these regions. The handbook will also illustrate some of the vital and existing test-bed infrastructure available to entrepreneurs and marine startups. Finally, this handbook will provide some best-case examples of how entrepreneurs and startups have navigated and benefited from projects like ProtoAltantic.

What are marine activities?



The marine economy consists of a variety of marine activities which depend on the availability of marine resources, the geographic, and geopolitical context of the coastal regions. Marine activities include shipping and transport, oil and gas, coastal tourism, aquaculture, marine renewable energy which includes offshore wind energy, and kinetic energy such as tidal and wave energy, seabed mining, marine biotechnology, among many others.

The development of marine sectors and economies depend on the rich maritime history, the geopolitical decision making, pioneering policies in marine sectors and marine development, access to the marine resources, and supporting infrastructures for businesses. This means that there is no one-size-fits-all solution for coastal regions, but that every coastal region is unique in their approach to marine sector development.

The needs of startups and SMEs in marine sectors differ greatly from land-based enterprises. The following section provides an overview of available marine and economic development policies and agencies that provide support for marine enterprises.

Marine Policy Infrastructure

From the perspective of a marine entrepreneur the marine policy landscape may appear to be confusing – especially when considering multiple jurisdictions. The policy interventions to support Blue Growth in the Atlantic region are plentiful providing diverse mechanisms to support marine entrepreneurship.

Across the Atlantic region, the local marine and economic agencies provide a wide arrange of business support and elements to startups and entrepreneurs. Local enterprise offices in each region are vital first-contact points for anyone interested in starting their own marine enterprise.

To help understand the complex infrastructure in each of the coastal regions, ProtoAtlantic project partners Technopôle Brest-Iroise in France, Cork County Council and University College Cork in Ireland, INESC TEC in Portugal, Innovalia and EMERGE in Spain, and EMEC in Scotland populated a database highlighting the national, regional, and local mechanisms that enable Blue Growth.

This work has shown a high degree of or a variability between the different jurisdictions. From the database the following regional infographics were created which provide snapshots of marine and economic development policies and agencies available in each of the ProtoAtlantic regions (as available in 2019). The infographics also provide key take home messages for marine startups and entrepreneurs.

You will also find some 'Watch this Space' opportunities where you have access to additional support for your marine startup from business advice to pitching and investment opportunities within the Atlantic Area. In addition to business support, you will also find a test-bed infrastructure which gives you an overview over the available testing facilities in the ProtoAtlantic region.

Icon Legend:

Marine Development Strategies Marine Development Agencies

Economic Development Agencies Economic Development Agencies

Brest, France

National Marine and Economic Development Strategies

National Strategy for the Sea and Coast

Strategy for the North Atlantic and West Channel seafront

National Marine and Economic Development Agencies

Business France

Bpifrance

Regional Marine and Economic Development Agencies

Pôle Mer Bretagne Atlantique

Bretagne Dévelopement Innovation

Bretagne Commerce International

Regional Marine and Economic Development Strategies

Regional maritime and coastal strategy

Regional Strategy for economic development, innovation and internationalization

Local Marine and Economic Development Strategies

Community contribution to the national and regional maritime and coastal strategies

Community strategy for economic development

Local Marine and Economic Development Agencies

Campus Mondial de la Mer

Technopôle Brest-Iroise

Take home message: Startups and SMEs interested in the western Brittany area can find support at Campus Mondial de la Mer and Technopôle Brest-Iroise. They help connect companies with researchers and industries in the marine science and technologies and provide business development advice.

Cork, Ireland

National Marine and Economic Development Strategies

Harnessing Our Ocean Wealth – An Integrated Marine Plan for Ireland

National Marine and Economic Development Agencies

Irish Maritime Development Office

Enterprise Ireland

Local Marine and Economic Development Strategies

Pure Cork, An Action Plan for the City

Local Marine and Economic Development Agencies

Local Enterprise Office South Cork

Take home message: Support for startups and industries interested in the Cork region can be found at the Local Enterprise Office South Cork and Enterprise Ireland which provide intensive business development programmes tailored specifically to the needs of startups and SMEs.

Porto, Portugal

National Marine and Economic Development Strategies

National Ocean Strategy 2013-2020

Estratégia de Investigação e Inovação para uma Especialização Inteligente

Regional Marine and Economic Development Strategies

Norte 2020 – Regional Smart Specialisation Strategy

National Marine and Economic Development Agencies

National Agency of Innovation

Take home message: Porto presents a streamlined process to startups and SMEs. The National Agency of Innovation provides business and funding advice and overall information about Portugal's public and private funding possibilities.

Orkney, Scotland

National Marine and Economic Development Strategies

A strategy for growth for the UK marine industries

Scotland's economic strategy (March 2015)

National Marine and Economic Development Agencies

UK Marine Industries Alliance

Regional Marine and Economic Development Agencies

Innovate UK

Scottish Enterprise

Regional Marine and Economic Development Strategies

Report on Social and Economic Objectives for a Scottish Marine Plan

Local Marine and Economic Development Strategies

Orkney Hydrogen Economic Strategy

Orkney Sustainable Energy Strategy

Orkney Local Development Plan

Local Marine and Economic Development Agencies

Highlands and Islands Enterprise

Take home message: An increasing number of people are choosing to live, work, study, and invest in Orkney – a highly successful and competitive region where Highlands and Islands Enterprise help grow the low carbon economy using Scotland's natural resources sustainably and responsibly.

Canary Islands, Spain

National Marine and Economic Development Strategies

- Marine Strategies Spain
- General Economic Development Economy of Spain – Economy reforms 2017

National Marine and Economic Development Agencies

- Spanish Maritime Safety Agency
- Spanish institute Safety Agency
- MINECO (Minister of Economy and Competitiveness)
- MITECO (Ecological Transition Ministry)

Regional Marine and Economic Development Agencies

- ITC (Institute of Technology of the Canary Islands)
- PROEXCA (Agency for Internationalization and Investments Attraction)
- ACIISI (Canary Agency of Research, Innovation and Society Information)
- SODECAN (The Society for the Economic Development of Canary)
- ZEC (Canary Islands Special Zone)

Regional Marine and Economic Development Strategies

Blue Economy Strategy (currently under development by the ACIISI, ITC, and CETECIMA)

- Action Plan from European Strategy in Canary Islands
- Action Plan for Internationalization of Canary Economy

Local Marine and Economic Development Strategies

- Agreement for the seas (Las Palmas de Gran Canaria Town Hall)
- Las Palmas de Gran Canaria – A model of city

Local Marine and Economic Development Agencies

- SPEGC (Economic Promotion Society of Gran Canaria)
- ITC (Institute of Technology of the Canary Islands)
- PLOCAN (The Oceanic Platform of the Canary Islands)
- CMC (The Maritime Cluster of the Canary Islands)
- CETECIMA (Marine Science Technology Centre)

Take home message: SODECAN helps SMEs and startups to access funding for innovative and feasible business projects. SODECAN specialises in covering gaps in the market by supporting business projects which find it particularly difficult to obtain private funding.

Watch this Space: Opportunities for Marine Startups and Entrepreneurs

ProtoAtlantic Stakeholder Platform

ProtoAtlantic provides access to specialised training material and expert workshops for marine startups and entrepreneurs on the ProtoAtlantic Stakeholder Platform. The platform provides a range of engaging and interesting training sessions on Branding and Marketing, Economic and Financial Plan, Lean Management, Partnership and Leadership, and Pitch to Investors, among others. The platform is an initiative to provide valuable training and access to ocean governance resources, investment and funding opportunities, mentorship programmes, and information on prototyping and testing, free of charge, to marine startups in the Atlantic Area.

http://217.126.154.8:86/login/index.php

Watch this Space: Opportunities for Marine Startups and Entrepreneurs

Marine Research Infrastructures and Facilities Portal

Campus Mondial de la Mer, a collaborative and multidisciplinary community devoted to sustainable development and management of our oceans and seas, developed a portal that provides access to the available marine tools and expertise in the Brittany region. The portal showcases Brittany's extensive infrastructure and facilities devoted to marine science and technology and explains how to access the available infrastructure, the platforms, and the equipment, the terms of access, and the services on offer.

https://www.infras-campusmer.fr/en/

Watch this Space: Opportunities for Marine Startups and Entrepreneurs

BlueInvest Platform

The European Commission supports the development of marine businesses and marine sectors through the BlueInvest platform which provides innovators, entrepreneurs, and startups with support in investment and growth prospects, BlueInvest readiness assistance, and thematic workshops and knowledge exchange between marine businesses. The BlueInvest platform is an initiative spearheaded through the maritime policy that aims to increase awareness and provide support mechanisms for ocean governance and ocean literacy as well as the management and governance of marine resources.

https://webgate.ec.europa.eu/maritimeforum/en/frontpage/1451

Watch this Space: Opportunities for Marine Startups and Entrepreneurs

BlueInvest Day 2020

The European Commission under the European Maritime and Fisheries Fund (EASME) organised the first annual BlueInvest Day held in Belgium in February 2020. The BlueInvest Day brings together innovators, entrepreneurs, marine startups, investors within marine sectors with the objective to generate concrete business opportunities. The BlueInvest Day also is an unique opportunity to increase visibility of any marine business and to connect with industry leaders, make valuable investor connections, and meet high-level representatives from government and the public sector.

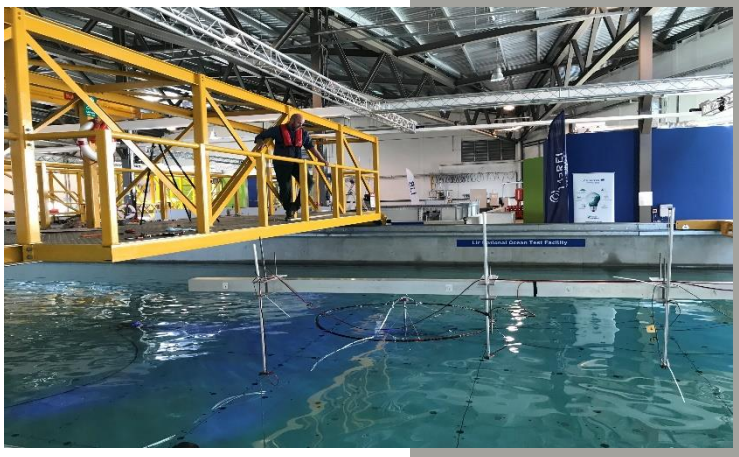
https://ec.europa.eu/easme/en/blue-invest-day

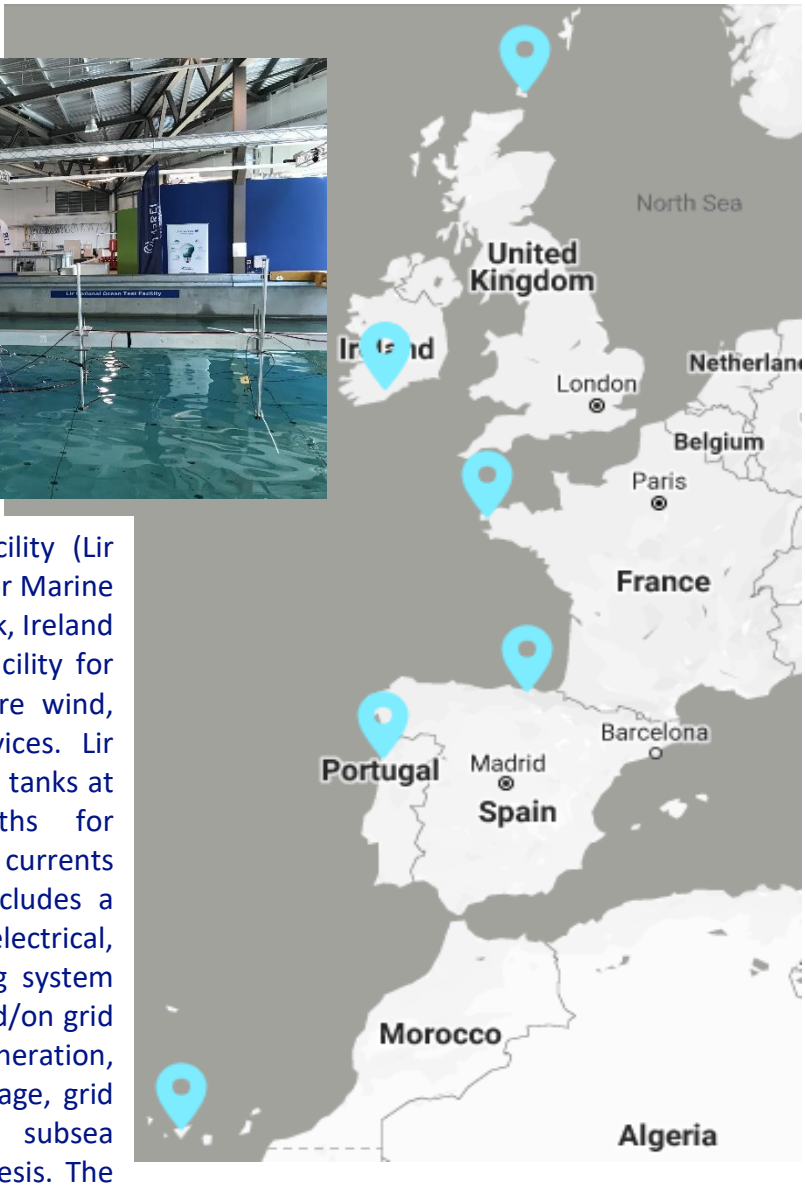
Available test-bed infrastructure: European Marine Energy Centre

European Marine Energy Centre (EMEC) in Orkney in Scotland provides the world's only multi-berth, purpose-built, open sea test facilities for wave and tidal energy converters. EMEC provides the infrastructure and technical expertise to test technology in a real sea, grid connected environment testing the performance of technologies underpinned by the accredited verification process in line with ISO17020 standards.

More information available at:
http://www.emec.org.uk/

Available test-bed infrastructure:
Lir National Ocean Test Facility





Lir National Ocean Test Facility (Lir NOTF) at the MaREI Centre for Marine and Renewable Energy in Cork, Ireland is a custom designed test facility for laboratory testing of offshore wind, wave and tidal energy devices. Lir NOTF provides access to four tanks at various scales and depths for emulation of ocean waves, currents and wind. Lir NOTF also includes a variety of bench test rigs for electrical, power take off and mooring system testing along with a microgrid/on grid infrastructure for test generation, control, power take off, storage, grid integration, power quality, subsea transmission and fault synthesis. The Lir NOTF research infrastructure allows for the wave-to-wire design of wind, wave and tidal renewable energy devices.

More information available at:
http://www.lir-notf.com/

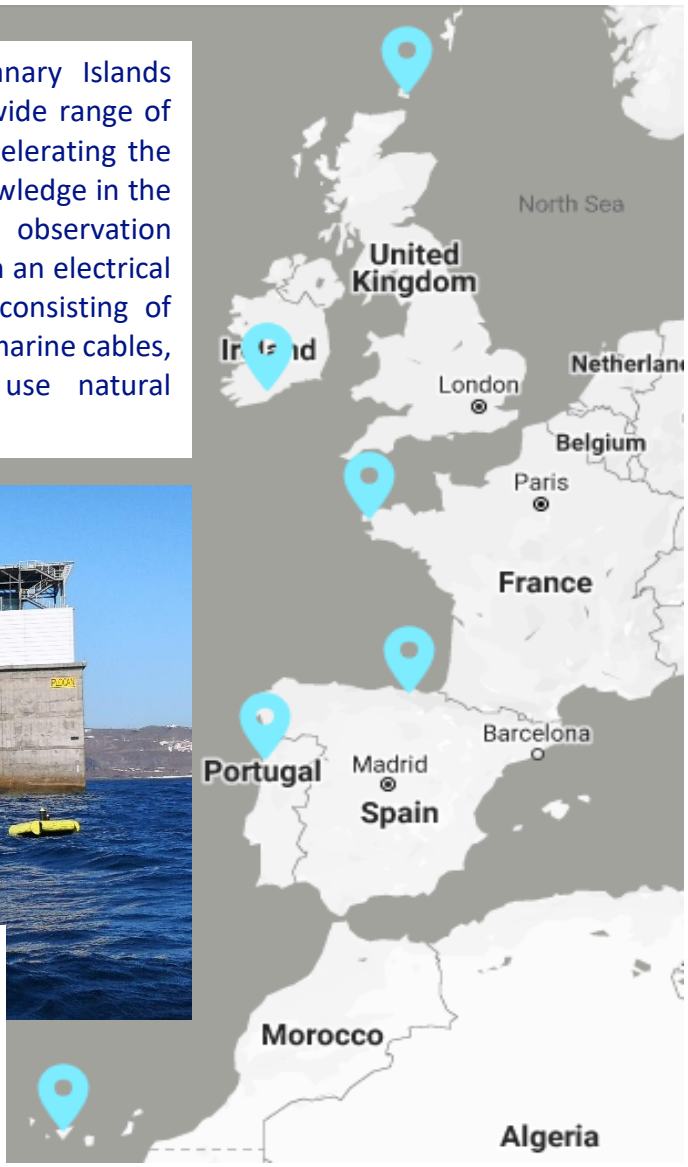
Available test-bed infrastructure:
INESC TEC Centre for Robotics and Autonomous Systems

INESC TEC's Centre for Robotics and Autonomous Systems (CRAS) in Porto, Portugal, develops prototypes for the marine sector with hyperbaric test capacity until 250 bar for devices with volumes until 1000 mm length and 230 mm diameter. CRAS conducts research and development activities in autonomous robotic systems, mobile robotics, among others.

More information available at:
https://www.inesctec.pt/en

Available test-bed infrastructure:
PLOCAN Oceanic Platform of the Canary Islands

PLOCAN Ocean Platform of the Canary Islands provides an offshore test side for a wide range of marine technologies dedicated to accelerating the development of technologies and knowledge in the marine environment, with deep-sea observation systems. The test site is equipped with an electrical and communications infrastructure, consisting of two medium-voltage (5MW each) submarine cables, for connecting technologies that use natural resources to generate electricity.



PLOCAN, as part of the Multipurpose Offshore Platform VIMAS (Underwater Vehicles, Instruments and Machines), provides a permanent service of operational support through a multidisciplinary fleet of cutting-edge autonomous ocean platforms and instruments related to ocean monitoring.

More information available at:
https://www.plocan.eu/en/
https://www.plocan.eu/en/test-site/
https://www.plocan.eu/en/vimas-2/

Best case practices: Startup Testimonies

ProtoAtlantic has since 2017 provided the local and regional startup communities in the Interreg Atlantic Area region with support mechanisms such as training sessions on Lean Startup, Business Models, Branding and Marketing, Economic and Financial Planning, Lean Management, Partnership and Alliances, Pitching for Investment, mentorship programmes for business model and pitching preparation, and prototyping and testing opportunities at EMEC (Scotland), LIR NOTF (Ireland), and INESC TEC (Portugal). As such, the startups and SMEs were able to accelerate their business development and have since been able to also progress further along the Technology Readiness Level (TRL) scale.

ProtoAtlantic was able to support startups and SMEs in the Atlantic Area region and beyond particularly in marine robotics, aquaculture, marine biotechnology, monitoring and operation of offshore wind development, communications, and many more. The following section provides a small selection of the companies supported and the benefits that ProtoAtlantic was able to provide.

Best case practices: Startup Testimonies

Subsea Mechatronics S.L. is a marine robotics company based in Las Palmas, Spain and have been developing a robotic dredger for precision works *Toolbot* and a pipe inspection remotely operated underwater vehicle (ROV), *PIPEYE.* Toolbot offers a solution for the last mile dredging operations where spots are hard to reach, where underneath infrastructures have to be maintained or when conventional methods are oversized to actuate with precision. Toolbot is of particular interest in ports, dams, reservoirs, and environmental impact projects. PIPEYE is a pipe inspection hybrid autonomous underwater vehicle (AUV) for the pipe inspection of industrial plants such as desalination ones, equipped with intervention tools, together with a methodology to provie the services in an efficient and safe manner. More information about Subsea Mechatronics S.L.: https://www.subseamechatronics.com/

Subsea Mechatronics S.L. attended the bootcamp training sessions on Lean Startup, Business Model, Branding and Marketing, Economic and Financial Plan, Lean Management, Partnership and Alliances, Pitching for Investment, and received mentorship in Business Model Preparation and Pitching Preparation.

What Subsea Mechatronics S.L. says about ProtoAtlantic: *"ProtoAtlantic is a special platform where we have been able to find expertise in the marine sector and specifically in the robotics domain. With the support of EMERGE and the technical advice and prototyping facilities of INESC TEC, SSM is accelerating its path to the market, testing sensors and tools of the PIPEYE hybrid inspection robot. ProtoAtlantic was able to raise SSM's visibility and provided access to the end users of our technology."*

Best case practices: Startup Testimonies

Sea Wave Energy Ltd (SWEL) is a R&D company based in the UK & Cyprus that has been focused on the design and development of its wave energy converter (WEC) – The "Wave Line Magnet", a wave energy converter that has been evolved for more than 10 years achieving numerous patents. The company's technology is a robust and durable WEC that can supply substantial power on demand at a low cost, with minimal maintenance and can be deployed in any wave environment. The target market is power production, namely electricity and hydrogen, and also desalination, coastal erosion prevention and fish farming. More information about SWEL: https://www.swel.eu/

SWEL qualified for the Fast-Tracked Product Development at the LIR NOTF in Cork and was able to test their wave and tidal technology which subsequently progressed from TRL 3 to TRL 4.

What SWEL says about ProtoAtlantic: "*ProtoAtlantic is a valuable platform for developers in an array of industries to enrich the efforts of companies by facilitating them with a straightforward route for gaining access to facilities and expertise. Through the ProtoAtlantic route SWEL was able to progress its understanding of the technology further and gather valuable data for the WEC. The whole experience was both educational and constructive, setting a solid milestone on the road towards commercialization. Additionally, SWEL had the opportunity to network and meet people in the industry*."

Interreg Atlantic Area
European Regional Development Fund

EUROPEAN UNION

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

EMERGE
STARTUPS · INNOVATION

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE
BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES

marine southeast

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu

ProtoAtlantic
Blue Growth Policy Recommendations

Roadmap for Marine Policies

June 2020

University College Cork

Innovation in the Marine Environment

Content table

Executive Summary

Blue Growth Policy Recommendations – Roadmap for Marine Policies

The European Commission's Blue Growth strategy encourages coastal regions to diversify their economy while finding innovative opportunities to sustainably use marine natural resources. The Interreg Atlantic Area especially carries importance with its rich marine resources, both geographically and in terms of management of the resources. Each region within the Interreg Atlantic Area provides unique competences which enable the stimulation of innovation and competitiveness by fostering resource efficiency through providing technical assistance and business support to start-ups and small and medium enterprises (SMEs).

ProtoAtlantic, an Interreg Atlantic Area funded project, aims to develop and validate a model for the prototyping and exploitation of innovative ideas in the maritime sector in the Atlantic Area. To support this model, ProtoAtlantic hosted Blue Growth Policy Round Table Workshops targeting the development of potential regional Blue Growth strategies by inviting local and regional policymakers, business and industry stakeholders, academia, and aspiring local entrepreneurs to discuss the marine potential in all partner regions. The workshops aimed to understand the current state of the available marine resources and infrastructures in each region and to discuss Blue Growth strategies as potential pathways to coastal development. The ProtoAtlantic partner regions include Brest in France, Cork in Ireland, Porto in Portugal, Orkney in Scotland, and the Canaries in Spain.

Across the Atlantic Area region five major common themes emerged to Blue Growth and to design effective strategies to achieve Blue Growth aims. The overarching themes are a categorisation of requirements to ensure sustainable development in the coastal regions. These themes include:

1. Political will needed to overcome economic barriers
2. Building social capacity to meet market demands
3. Pipeline of opportunities for development and investment
4. Nurturing innovation and entrepreneurship
5. Marine cluster creation to increase competitiveness

Recommendations for Blue Growth strategies and the development of marine sectors were based on a European level, a national level, and a regional and local level. The workshops emphasised the need for political leadership in the marine spaces with a long-term vision for regional development, strong industry and research connections, and the need for private and public investment opportunities to foster the marine sectors.

Introduction

The European Commission defined Blue Growth as "an initiative to harness the untapped potential of Europe's oceans, seas and coasts" which for the first time identified rich marine resources as an unique asset for economic development in coastal regions and on islands. The European Commission has identified the development of five marine sectors which have the highest growth potential, which include aquaculture, marine renewable energy (i.e. offshore wind energy, tidal, and wave energy), seabed mining, marine biotechnology, and coastal tourism. From the European level these Blue Growth strategies have cascaded to the individual national levels where European countries have identified regionally specific marine development strategies in line with the overarching Blue Growth strategies.

Blue Growth carries importance especially within the Interreg Atlantic Area which supports the transnational collaboration and connectivity between five countries: France, Ireland, Portugal, Scotland, and Spain. The Atlantic Area is rich in marine resources, both geographically and in terms of the management of the resources. Each Atlantic Area region provides unique competences which enable the stimulation of innovation and competitiveness by fostering resource efficiency through providing technical assistance and business support to start-ups and small and medium enterprises (SMEs). The management approach to each of these regions requires special attention as the geographic and geopolitical assets vary between the regions. While the European Commission focused on the development of specific sectors with high return, the national Blue Growth strategies need to consider the existing marine competencies already available to implement strategic policy measures for the sustainable development of the coastal regions.

ProtoAtlantic, an Interreg Atlantic Area funded project, targets these regional differences and marine competences and supports the sustainable development in coastal regions. ProtoAtlantic provides marine-specific support mechanisms to start-ups and SMEs, including business support through the accelerator and mentorship programmes, enabling companies to fast-track their product development through access to prototyping and testing facilities in all partner regions. ProtoAtlantic also aims to provide policymakers with high-level policy recommendation to foster Blue Growth.

To achieve this objective, the ProtoAtlantic consortium has held Blue Growth round table in each of the Interreg Atlantic Area partner regions. The workshops aimed to 1. gain a deeper understanding of the enablers and constraints of the regional development in each region; 2. to envision potential regional Blue Growth strategies. The outcomes of the regional workshops are presented in this document and can be used as a resource for Blue Growth policy recommendations.

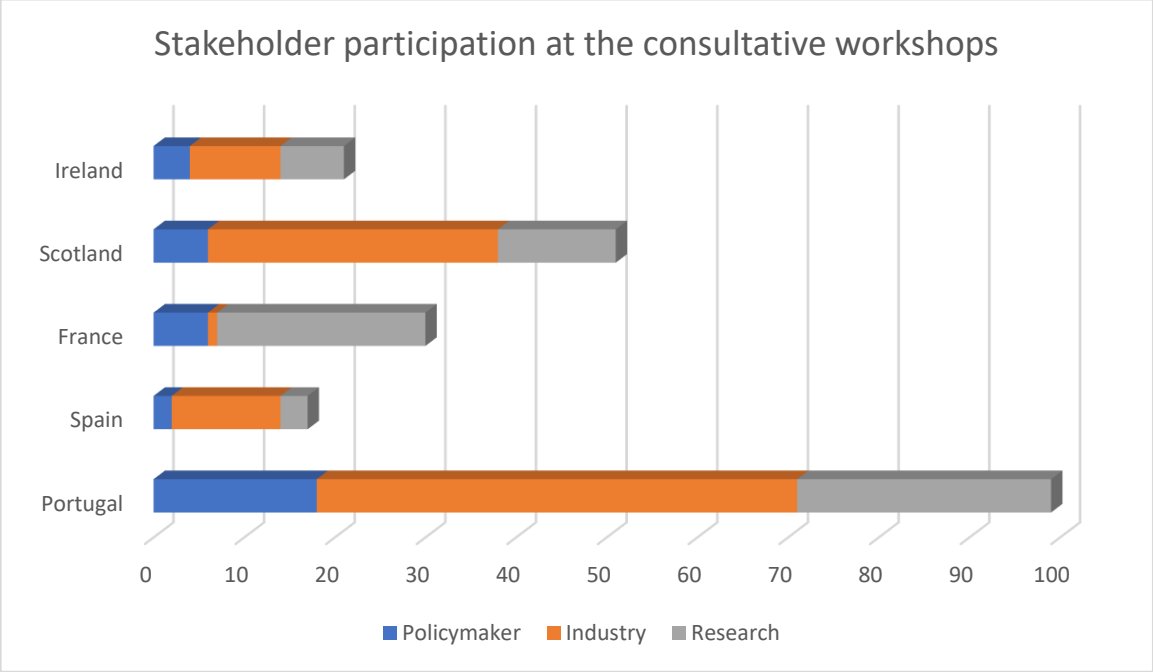
The Interreg Atlantic Area refers to the partner regions as supra national regions encompassing all partner regions (i.e. France, Ireland, Portugal, Scotland and Spain). Within the context of this document, national approaches refer to the countries individually, regional and local approaches refer to the specific geographic regions and cities in which the partner organisations are seated (i.e. Brest, Cork, Oporto, Orkney, and the Canaries).

Workshop Methodology

5 interactive consultative workshops were held in the partner regions between December 2018 and November 2019. The first consultative workshop was held in December 2018 in Cork, Ireland, subsequent workshops were held in Edinburgh, Scotland in February 2019, in Brest, France in June 2019, in Santa Cruz de Tenerife, Spain in June 2019, and in Porto, Portugal in November 2019. All workshops followed a similar template which was designed and tested at the University College Cork.

The aim of the workshops was twofold, 1. to understand the enablers and constraints for the regional development in the Interreg Atlantic Area as experienced by marine stakeholders; 2. to envision potential regional Blue Growth strategies for the Interreg Atlantic Area. To achieve this the half-day workshops used two methodologies: 1. The PESTLE-method to understand the Political, Economic and Business, Social, Technological, Legal, and Environmental mechanisms in each partner region nurturing and/or curtailing the development of marine sectors, 2. The SWOT analysis to determine Strengths, Weaknesses, Opportunities, and Threats of potential marine development strategies as identified by the stakeholders.

The outcomes of the regional workshops differed greatly, in part depending on the stakeholder participation, the geopolitical context, the state of development of the marine sectors, and the currently implemented marine policies. All regional workshop reports can be found in the Appendix. Stakeholder participation varied across regions with most attendees representing industry and research/academia.



High-level Findings

While the regions share many commonalities in existing infrastructures and support mechanisms available for Blue Growth as evident in the regional workshop reports, i.e. all regions provide business support and advice for start-ups and SMEs, regional differences and priorities are also crystallising. For example, some regions seem to actively encourage research and development from academic institutions to drive innovation, while other regions encourage industry to foster innovation. This showcases that Blue Growth strategies are regional specific albeit with overarching aims of achieving sustainable development in coastal regions focusing on the effective and efficient harvesting of marine resources.

Across the partner regions four major common themes emerged which the stakeholders felt are necessary to examine to design effective strategies to nurture Blue Growth, which were informed by the regional workshop reports and can be found in the Appendix. The overarching themes include:

1. Political will needed to overcome economic barriers
2. Building social capacity to meet market demands
3. Pipeline of opportunities for development and investment
4. Nurturing innovation and entrepreneurship
5. Marine cluster creation to increase competitiveness

The stakeholders have highlighted that these themes need to be addressed at the national level, while effects may take place at the regional and local level. One key message that has emerged from the analysis of all workshop reports is the importance of Blue Growth strategies to incentivise strong collaboration efforts between the government, industry, and academia to ensure economic development in marine sectors.

High-level Findings

1. Political will needed to overcome economic barriers

Across all regions stakeholders identified that policymakers have an opportunity to take leadership in the development of marine sectors. Long-term vision and strategies can aid in the development of marine sectors in coastal regions, stakeholders in all regions observed. The stakeholders identified two main issues regarding Blue Growth and the political will: 1. A need for a decision-making process considering the need to translate economic development strategies from a national level to regional and subsequently to local levels; 2. The decision-making process needs to be informed by the regional baseline environmental marine conditions to effectively support marine sectors.

1.1. Translating national development strategies

Stakeholders across all regions noticed a lack of transcendence from national policies into regional and local development strategies specific to regional marine capabilities and capacities. Irish stakeholders found that the national policies represent opportunities for Blue Growth development, yet there is a need to translate the policies into concrete regional development strategies. Scottish stakeholders highlighted that the Scottish government is generally supportive of the development of marine renewable energy (MRE) especially in offshore wind energy. Yet, other MRE technologies such as tidal and wave energy are not supported in the same way which poses significant economic barriers for these emerging sectors as industry needs in these sectors are not being met. Spanish stakeholders have strongly supported a 'Sea Regional Council' that would specifically address the challenges and opportunities related to the marine industries and sector development in the Canaries. Spanish stakeholders also recognised a disconnect between the government and industry caused by policymakers setting objectives with limited collaboration from industry partners which a dedicated council to the marine sectors and development of these could address more easily than centralised policymakers.

1.2. Understanding environmental conditions to support marine sectors

The stakeholders observed that the decision-making process needs to consider the state of the existing marine resources and the access to the resources to effectively and efficiently support the development of marine sectors and to meet industry needs. A regional analysis of the available infrastructure currently used for the exploitation of marine resources and improvement measures to increase efficiency, eliminate redundancy, and nurture innovation in production processes and services to develop marine sectors was observed as necessary by the stakeholders across all regions. In the Irish context, stakeholders highlighted the anticipation of emerging marine sectors and the need to research baseline environmental conditions to determine which marine activities are sustainable and efficient for the region. French stakeholders also highlighted that investment in environmental research could strengthen the collaboration efforts between industry and research thereby encouraging innovative solutions to overcome challenges experienced by industry and addressing global environmental issues.

High-level Findings

2. Building social capacity to meet market demands

The stakeholders across all regions identified the need for capacity building especially in providing education and training opportunities in the marine sectors. Additionally, stakeholders observed a necessity to building strong community bonds between the marine ecosystem, marine activities, and the community which may help in attracting interest from the public to seek marine-related employment opportunities. Irish stakeholders observed an opportunity to develop the marina for public marine-related activities and projects such as a harbour boardwalk or aquariums highlighting the national marine wildlife and marine heritage. At the same time, across all regions stakeholders noticed an unmet workforce demand in the marine sectors. This imbalance between workforce demands and industry needs represents an opportunity for coastal regions to meet market demands by pursuing stronger collaboration between academia and industry.

2.1. Education and training opportunities

Across all regions a lack of training opportunities was observed as a key issue in sustaining a local workforce in marine sectors. French stakeholders stated that enabling conditions for academic and industry collaboration to facilitate industry-focused training would encourage an inclusive approach to economic and societal challenges. Irish stakeholders noted that providing industries with a highly-skilled and competitive workforce would create regional employment opportunities and encourage industries to engage with academia, research institutes, and universities to create an industry-specific curriculum that ensures a match between the available employment opportunities and the needed skills. Portuguese stakeholders recognised the availability of highly skilled workforce in ICT based in the region as a competitive asset. Strategies targeting knowledge transfer across sectors, including from non-marine-related sectors to and from marine-related sectors, could benefit the regional development by nurturing an indigenous marine sector built on already existing regional competitive assets.

2.2. Employment opportunities

Employment opportunities for skilled workforce in marine sectors was highlighted as a major concern by the stakeholders. Irish stakeholders identified that workforce returning from the sea has difficulties finding employment opportunities in their field of expertise, leading to brain drain i.e. highly skilled workforce moving outward of the region and in many cases also outside of the marine sectors. Similarly, Portuguese stakeholders stated that creating employment opportunities in coastal regions related to the marine sectors as a vital issue to maintaining a highly skilled workforce in the region. In the Scottish context, an opportunity was recognised to incentivise workforce to return to coastal regions by building a supply chain favouring local content. Stakeholders identified a need to create regional employment opportunities for the local and regional workforce by creating investment opportunities for industry in the coastal regions.

High-level Findings

3. Pipeline of opportunities for development and investment

Across all regions, it can be noted that there was overall enthusiasm for Blue Growth development, yet stakeholders highlighted a need for planning strategies targeting a 'pipeline of opportunities' to incentivise long-term investment strategies from private and public funding. Irish, Portuguese, and Scottish stakeholders pointed out challenges associated with the licensing of marine spaces and the uses thereof. Portuguese stakeholders also identified a lack of critical mass in marine industries caused by the fragmentation of some of the marine sectors. French stakeholders highlighted that competition from other coastal regions with strong marine and maritime capacities dilute investment opportunities for industry. In the Irish context, it was noted that de-risking marine development projects could further incentivise investment from private funding. Scottish stakeholders observed that integrating multiple marine sectors such as aquaculture with marine renewable energy may provide more private investment opportunities as this would speak to a broader range of marine stakeholders. The overarching regional marine development challenges discussed in terms of funding and investment opportunities for public and private investors span across all regions, similarly it was noted that marine-related start-ups and SMEs face additional hardships.

3.1. Marine specific support mechanisms

Stakeholders across all regions observed that regional and local economic development agencies provide ample programmes for business and development support and accelerator programmes among other support mechanisms for start-ups and SMEs. However, a lack of available public and private funding specific to marine-related start-ups and SMEs and the scaling up of these ventures was identified as a major economic barrier across all regions. Stakeholders noted that the challenges experienced by start-ups and SMEs in the marine sectors differ from land-based activities and therefore require different types of support mechanisms. In the Irish context, it was recognised that there is room for improvement for enterprise development tailored specifically to Blue Growth. Portuguese stakeholders recognised the lack of access to venture capital for start-ups and new business ventures. Spanish stakeholders identified a need to streamline the bureaucratic process to obtaining funding support for start-ups and SMEs. The Society for Economic Development of Canary (SODECAN) based in Spain targets specific gaps in the market where start-ups and SMEs find it particularly difficult to obtain private funding, providing these ventures with funding opportunities. Initiatives such as this, aimed specifically at marine ventures, would minimise the competition faced from land-based ventures where funding may be more readily available.

High-level Findings

4. Nurturing innovation and entrepreneurship

The need for innovation has been a reoccurring theme, as the challenge experienced across all regions, is to create a nurturing environment for innovation and entrepreneurship. Across the regions, a need to encourage entrepreneurship to achieve Blue Growth strategies was discussed. The stakeholders highlighted a need to foster an environment that encourages and supports entrepreneurial ventures with engaging business support mechanisms such as matchmaking between large-scale industries, mentorship programmes, business advice, among others. Spanish stakeholders highlighted that regional policymakers, such as the proposed Sea Regional Council, could also strengthen principles of innovation and entrepreneurship policies as part of local development strategies, thereby ensuring the nurturing of local start-ups and SMEs to overcome economic barriers, which was also identified as key issue in the Canaries.

4.1. Access to testing and prototyping marine technologies

The technical support infrastructure for start-ups and SMEs to prototype and test has been noted of high importance across all regions. The importance of programmes, such as ProtoAtlantic which enable the fast-tracking of technologies, are of high importance to support the start-up and SME community. French stakeholders noticed that the available sea-trial facilities accelerate the development of new technologies in marine sectors. An opportunity to further develop the technical capabilities and capacities in the existing marine testing facilities for marine renewable energy was recognised by Irish and Portuguese stakeholders.

5. Cluster creation to increase competitiveness

When discussing overall Blue Growth strategies, stakeholders observed that start-ups and SMEs could benefit from cluster initiatives which may also help gain competitive advantages and help unite fragmented marine sectors. Creating marine clusters, it was identified, could help local industries to compete in an international market, as observed in the wave and tidal cluster and the companies related to the industry in Orkney. In the Irish and Spanish contexts, marine-specific were discussed as opportunities for regional development and to ensure that regions are competitive. Irish stakeholders observed that incubation centres could positively contribute to creating a critical mass of marine-related industries in the region to unite fragmented marine sectors. French stakeholder also observed that the cluster development would enable easier access to cross-cutting collaborations between academia and industry and would enable knowledge transfer between non-marine related fields in the marine sector development.

Recommended Actions

The ProtoAtlantic Blue Growth policy round table workshops which were held between December 2018 and November 2019 in France, Ireland, Portugal, Scotland, and Spain highlight the vast potential of Blue Growth strategies and the marine sector development in the Interreg Atlantic Area. Each region represents interesting opportunities and challenges. Most notably, the workshops emphasised the need for political leadership in the marine spaces with a long-term vision for regional development, strong industry and research connections, and the need for private and public investment opportunities to foster the marine sectors. Recommended actions are given below addressing the European, the national, and regional/local levels to effectively support the creation and implementation of Blue Growth strategies aimed to sustainably develop coastal regions and marine sectors.

European Level

- Blue Growth strategies for the sustainable development of coastal regions and marine sectors need to be prioritised on an EU level realising the competitive advantage that coastal regions provide in terms of providing food and nutrition, renewable energy, competitive advantages on global markets, and employment opportunities

National Level

- The regulatory framework for marine spatial planning and licensing of marine areas needs to be available for existing and future marine activities
- Development of marine sectors needs to build on long-term Blue Growth strategies that ensure continuous investment opportunities in marine sectors, for example through a pipeline of marine development projects thereby providing employment opportunities in the coastal regions
- Strong focus on innovation and entrepreneurship policies and cluster development to help foster the development of coastal regions including a cross-cutting approach that ensures collaboration between all stakeholders and across sectors

Recommended Actions

Regional and Local Level

- Blue Growth strategies need continuous assessment and reassessment which should be ensured through top-down and bottom-up approaches through stakeholder meetings
- Blue Growth strategies should aim to effectively and efficiently utilise marine resources based on a firm understanding of existing and potential avenues of marine sector development, continuous monitoring of marine resources to ensure marine activities enhance or in the least not degrade marine resources
- Creating strong bonds between the public and marine activities through public outreach programmes, i.e. developing marine spaces for leisure activities and educational purposes
- Training and education in marine-related fields with a strong industry-lead should be prioritised to ensure an industry-ready workforce
- Provide business support mechanisms specifically for marine related start-ups to nurture innovation and entrepreneurship
- Enable technical support infrastructure for prototyping and testing of marine technologies to fast-track technologies and the start-up and SME community
- Marine-specific cluster creation to increase regional competitiveness and eliminate marine sector fragmentation

Interreg Atlantic Area
European Regional Development Fund

EUROPEAN UNION

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

EMERGE
STARTUPS · INNOVATION

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE
BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES
A world of possibilities

marine south east

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu

ProtoAtlantic Blue Growth Policy Round Table Workshop Report

Workpackage 3 – Capitalisation

6 December 2018

University College Cork

This report was written by
Dr. Val Cummins (University College Cork (UCC)) and Jessica Giannoumis (UCC)

We would like to thank Dr. Lawrence Dooley (UCC) and Dr. Jordan Declan (UCC) for their valuable contributions in the ProtoAtlantic Blue Growth Policy Round Table Workshop.

We would also like to thank Zoë O'Hanlon (UCC) and Kyle Fawkes (UCC) for their support in organising the workshop and contributing to this workshop report.

Contents

Executive Summary

Blue Growth encourages coastal regions to diversify their economy while finding innovative opportunities to sustainably use marine natural resources. Given Cork's geographic position and readily available marine resources, Cork has the potential to become an international hub for marine activities, most notably for marine renewable energy production, such as offshore wind. The ProtoAtlantic Blue Growth Policy Round Table Workshop targeted the development of potential regional Blue Growth strategies by inviting local and regional policymakers, business and industry stakeholders, academia, and aspiring local entrepreneurs to discuss Cork's marine potential.

The aim of the workshop was twofold, 1. to understand the enablers and constraints for Cork harbour's regional development as experienced by the marine stakeholders; 2. to envision potential regional Blue Growth strategies for the Cork harbour. One notable outcome of the workshop was the importance of leadership and vision for sustainable Blue Growth development. Local authorities, together with industry, and academia have to assess the existing resources and build a pathway for future economic opportunities. Third level institutions have the opportunity to tailor teaching curriculum to match industry needs, to ensure that the local workforce will be readily available for employment creation in the marine sectors. Capacity building in teaching, education, and outreach is also essential for the Cork harbour population. Outreach programmes should include building community appreciation for the harbour and its marine resources.

Introduction

Cork has the potential to become an international maritime hub, leading Ireland into a new era of Blue Growth. Blue Growth is the sustainable development focusing on human-centred well-being, in emerging marine sectors. While *Blue* refers to the sustainable use of readily available marine resources, *Growth* refers to multidimensional aspects of regional sustainable development, including: the growth of human-centred well-being, providing people living in coastal regions with opportunities to thrive; the growth of sustainable economic development by building regional resilience and capacity; and the emergence of marine sectors that are in their initial stages of development with rapid growth potential. Cork's harbour has a diverse marine environmental ecosystem as it is the second largest natural harbour after Sydney, Australia. Cork County has a coastline of 1,094 km, second only to county Mayo. Given Cork's geographic position and available natural resources, a regional Blue Growth strategy could aid in creating employment opportunities.

ProtoAtlantic, an Interreg project, aims to develop and validate a model for the prototyping and exploitation of innovative ideas in the maritime sector in the Atlantic Area. The ProtoAtlantic consortium consists of international partners INNOVALIA and EMERGE based in Las Palmas (ES), Technopôle Brest Iroise and Brest Metropole in Brest (FR), INESC TEC in Porto (PT), the European Marine Energy Centre (EMEC) in the Orkney Islands (UK), Cork County Council and University College Cork (IE), each of which providing a unique approach to the Blue Growth sector development. ProtoAtlantic will provide a review of the policy support for maritime enterprise nationally and at an Atlantic Area level. ProtoAtlantic aims to provide sustainability measures with practical guidelines on policy frameworks and as such will hold consultative Blue Growth Policy Round Table Workshops in the ProtoAtlantic partner regions.

On December 6th, 2018, University College Cork in collaboration with Cork County Council hosted the first ProtoAtlantic Blue Growth Policy Round Table Workshop, targeted at Blue Growth stakeholders including local and regional policymakers, business and industry stakeholders, academia, and aspiring local entrepreneurs. The consultative policy round table workshop was attended by 21 participants (see Appendix I for list of attendees). The policy round table is one of a series of five sessions, which will be taking place across the Atlantic Interreg region over the coming months, with events planned in Las Palmas, Brest, Porto, and Orkney in 2019.

The objectives of the workshop were to:

- Gain an understanding of Blue Growth challenges experienced in the Cork region
- Identify potential strategies for the Blue Growth development in the Cork region

The workshop kicked off with an introduction to the ProtoAtlantic project and Blue Growth potential in Cork by Dr. Val Cummins, Principal Investigator of the ProtoAtlantic project in UCC. This was followed by a presentation of the regional perspective of county Mayo presented by Michael O Boyle, Senior Engineer, Mayo County Council. Ronan Carey, founder of ARQ Asset Solutions, shared his experience of participating in the ProtoAtlantic Las Palmas marine innovation bootcamp held in Gran Canaria from November 26th - 30th, 2018. ARQ Asset Solutions was one of two marine start-up companies selected to attend the marine innovation bootcamp from Cork, following a programme of supports provided by the ProtoAtlantic team, held in the Creative Zone in the Boole library at UCC in November and December 2018. The other successful start-up was SyMO3 – Systems Engineering for Microalgal Omega-3s, fronted by Dr. Linda O'Higgins. (For the agenda and to view a full list of companies that are participating in the ProtoAtlantic project see Appendix I and II).

Approach to the Workshop

The Policy workshop was delivered by the Cork ProtoAtlantic team and facilitated by Jessica Giannoumis. It consisted of three parts.

1. The first part included a presentation of **case studies on marine innovation** in the ProtoAtlantic partner regions, with a view to identifying lessons to be learned for Cork.
2. In the second session, participants examined Cork's **current state Blue Growth potential**.
3. The final session examined Cork's **Blue Growth potential** from a **short-term and long-term perspective**.

Case studies

The key characteristics of the marine economy in Cork were outlined, as well as insights to the marine economies of Partner regions – in Scotland, France, Portugal, and Spain. The objective of presenting the case studies was to set the scene for current marine strategies. A summary of the insights harnessed and shared is provided below. The strategic approach to the development of an Integrated Marine Strategy for Mayo was also presented, with an opportunity for knowledge transfer between the two local authorities. Key messages from the Mayo presentation are also summarised below.

Unique characteristics of Blue Growth in Cork

Harnessing Our Ocean Wealth, the Integrated Marine Plan for Ireland has set specific measurable goals and targets to ensure Blue Growth development by focusing on three core areas: driving innovation, ensuring that Irish enterprises are competitive in an international market, and diversifying both Ireland's product mix and investor mix. Cork has a research and development capacity and easily accessible research facilities, such as the Centre for Marine Renewable Energy (MaREI Centre) at UCC and the National Maritime College of Ireland among others, which could further drive innovation in Blue Growth sectors. Cork's geospatial characteristics as the world's second largest natural harbour and Ireland's second longest coastline provide readily available untapped natural resources, such as offshore wind and waves for marine renewable energy production. Ireland, and specifically Cork, has proven to be thriving investor hubs for Foreign Direct Investments (FDI) as multinational corporations are building headquarters in the Cork region, to the benefit of indigenous small and medium-sized enterprises (SMEs) and start-ups.

Cork has a strong enterprise support capacity, with organisations such as Enterprise Ireland and the Local Enterprise Office, providing expertise, financing, and information on export opportunities to SMEs and start-ups.

Developing a Blue Growth Strategy in Mayo

County Mayo has Ireland's longest coastline of 1,168 km, and with the potential of marine resources of that coastline in mind developed a regional Blue Growth strategy in line with *Harnessing Our Ocean Wealth*. County Mayo's Integrated Marine Strategy is rooted in the principles of innovation ecosystems, thereby developing a Blue Growth strategy specific to the region's unique assets. The Blue Growth strategy in Mayo is the product of a public engagement process to promote the potential of the available marine resources. The initial stages of the Blue Growth strategy development also involved a comprehensive evaluation of existing marine resource assets, which included the assessment of the built infrastructure. Centred in the process is community engagement and partnership, including academia, to develop regional growth driven by the community and supported by a shared approach to service provision. There is opportunity for growth for Mayo to nurture entrepreneurial activities in rural areas. The strategy is currently under formulation, however, its development marks a milestone as county Mayo is Ireland's first local authority to develop such an initiative for regional Blue Growth.

Unique characteristics of Blue Growth in the Orkney Islands, Scotland

In 2010, the Scottish Government developed a Blue Growth strategy and as such identified Scottish Marine Objectives which were adopted in 2015 and included the creation of an innovation cluster. The Orkney Islands realised an opportunity to utilise marine resources to develop an energy strategy, including a focus on hydrogen. Their hydrogen energy development strategy aimed to achieve 50% or greater external funding, which incentivises Orkney's cluster to increase internationalisation while also developing regional economic growth through foreign investments. The strategy transformed the Orkney Islands to a world-renowned hydrogen expertise hub, finding new ways of using hydrogen gas to provide energy. Hydrogen derives from offshore wind which is converted to hydrogen gas. Currently, hydrogen gas is used to power a ferry, demonstrating a future form of transport. Entrepreneurial activities, such as this, are supported by a well-established start-up network which provides business advice and training opportunities to SMEs and start-ups.

Unique characteristics of Blue Growth in Brest, France

France utilises a national Blue Growth strategy set out to develop an innovation enabling infrastructure to support SMEs and start-ups in emerging Blue Growth sectors. Brest has identified three areas of interest to develop this infrastructure: education, cooperation between private and public stakeholders, and financial support mechanisms for SMEs. Brest fosters education and professional training within the emerging sectors driving innovation by providing intensive research-based and industry-led training opportunities at local third level universities. Brest offers a research infrastructure devoted to marine science and technologies providing support and skills to business and research teams, thereby actively engaging the public and private stakeholders in collaboration and as a support mechanism for an innovation enabling infrastructure, facilitated by Campus Mondial de la Mer. Financial support in the form of taxation reduction is provided for SMEs in Brest; other forms of financial support are also available to SMEs. There is room for improvement in facilitating easier access to that funding, as comprehensive information about funding opportunities are limited.

Unique characteristics of Blue Growth in Oporto, Portugal

Portugal has the largest Exclusive Economic Zone in the European Union; its marine territory is 18 times larger than the Portuguese mainland territory. As such, and in combination with the Douro River which runs through the city and extends into Spain, Oporto has a competitive advantage compared to other coastal areas. For centuries, Oporto was the leading European hub for maritime trade, exporting regional products such as regionally grown produce and Port wine. While Oporto has experienced a significant decline in entrepreneurial activities and international financial investments, marine related businesses are still concentrating in Oporto. Portugal's Blue Growth strategy seeks to develop marine activities along the coastal areas by enabling faster and easier processes to promote growth, investment, and research. There is a lack of available networks for SMEs and start-ups on a regional level, consequently there is an opportunity for Oporto to develop an infrastructure enabling innovation to increase regional competitiveness in marine sectors. Oporto hosts Portugal's most influential research institute, INESC TEC which provides R&D in power and energy, and industry and innovation, among others. Oporto's geographic characteristics and their R&D expertise provide a unique opportunity for the sustainable development of regional marine sectors, such as maritime trade, tourism, innovative boat designs, and marine robotics.

Unique characteristics of Blue Growth in the Canaries, Spain

The Canaries in Spain are in a unique geospatial position that allows them to utilise European and African investors to concentrate marine technology activities in Las Palmas. The port of Las Palmas is a critical enabling feature of Blue Growth development in the Canaries. It caters for offshore oil and gas off the Western coast of Africa and includes two shipyards. It further caters for tourism such as cruise ships, and yachting. The port of Las Palmas also supports marine renewable energy production, thereby diversifying their regional assets. Well-established networks and technology transfer centres provide business advice and funding opportunities for SMEs and start-ups, this aids the Canaries in attracting entrepreneurial activity in the region. Taxation reductions are provided for SMEs in the Canaries; however, most funding opportunities are provided by the established network. Generally, the regional policies in the Canaries are more developed than the national policies which facilitate the regional innovation enabling infrastructure, supported by the networks such as the Spanish Association of Regional Development Agencies. Spain's national marine strategy focusing on marine waste, encourages entrepreneurial activities to combat this environmental threat. The local Blue Growth strategy (work in progress) attempts a broader approach to facilitating marine innovations in emerging Blue Growth sectors.

Observations from the case studies:

- All presented case studies show that regional marine developments are rooted in policy context, either nested in national Blue Growth strategies or in specific regional and local marine development strategies.
- All regions take advantage of their geographic positions and the unique physical and natural characteristics to gain competitive advantages and strengthen their economic positions.
- All regions provide mechanisms for Blue Growth support such as enabling policy, favourable taxation, investment in R&D, support for start-ups and SMEs, opportunities for training of workforce.

Results

Ice breaker/short story session

A Design Thinking Exercise was adopted as an ice breaker to the breakout session. The results of this process are presented below (Table 1). Stakeholders were asked to describe what Blue Growth means to them in six words. The statements developed by the participants reflected the need to change the approach to the development of Cork harbour, to realise new opportunities, based on innovation and sustainability.

Table 1: Blue Growth 6-words stories: What does Blue Growth in Cork mean to the stakeholders? Selected examples from workshop participants:

Turn the tide and recognise our coasts!
Your grandchildren flourishing in their harbour
Marine thought exchange, regional, global impact
It's time to see the sea
1. Sustainable eco-tourism 2. Sustainable fisheries 3. Awareness 4. Stewardship
Huge opportunity we need to sea!
Untapped potential - Create something new, exciting
A global Innovation hub in Cork
Sustained national social economic awareness & development

PESTLE Analysis

The PESTLE framework was used to analyse the current state of Cork's marine sectors highlighting the **P**olitical, **E**conomic and Business, **S**ocial, **T**echnological, **L**egal, and **E**nvironmental enablers and barriers as experienced by the stakeholders. Below you will find the overarching questions that have been posed and a short summary of the discussions around the six focal areas.

Political: *How do legal issues and government regulations affect the probability of a business being successful and profitable in Blue Growth sectors in Cork?*

- The participants were generally in favour of enabling planning mechanisms that drive forward opportunities in Blue Growth sectors. Marine spatial planning was mentioned as the participants identified a need to progress plans at an appropriate scale.
- Participants identified a need for developing and enhancing skills in marine sectors and that an opportunity exists because of unique local and available assets.
- The principles of *Harnessing Our Ocean Wealth* need to transcend from national to local level for Blue Growth strategies.

Economic and Business: *What role do economy and business play to support business in Blue Growth sectors in Cork?*

- Support systems such as Enterprise Ireland enablers, Local Enterprise Office grants, PLATO – Business Support Network for Owner-Managers, and a vibrant start-up community in Cork, are available and may assist in obtaining public and private funding. Yet, there is room for improvement for enterprise development tailored to Blue Growth.
- The participants identified key sectors for economic development such as offshore wind, production of hydrogen, and a support base for offshore hydrocarbon.
- With regards to the latter point, a key barrier in the form of social license to operate was noted as something that needs to be addressed in anticipation of potentially controversial port development, such as provision of berths for oilrigs.
- Economic development needs to be progressed in the context of appropriate assessment including knowledge of baseline environmental conditions in Cork harbour.

Social: *How do social and cultural factors influence markets, consumer demands, and drivers of social perception?*

- An opportunity for a visionary Blue Growth strategy for the sustainable development of Cork harbour was identified.
- The participants mentioned a need to raise public awareness with respect to marine activities by designing outreach programmes to inform the public regarding marine assets and the socio-economic opportunities, such as the development of Irish offshore wind energy production.
- Making marine areas more accessible to the public, for example through boardwalks, was recognised as a way to encourage the public to partake in marine leisure activities.

- Collaboration and synergy between Cork harbour's research institutions, MaREI Centre and NMCI, the Cork County Council, and industry to support and nurture innovation and entrepreneurial start-ups needs to be facilitated.
- The participants identified industry-based training opportunities in marine areas to create a desired workforce in Blue Growth sectors as an opportunity for the Cork region to develop as a Marine Innovation Destination.
- Participants proposed and discussed the merit of an aquarium to highlight the abundance and diversity of marine life at the coast.

Technological: *How do technological factors influence Blue Growth in Cork?*

- An efficient grid infrastructure to connect renewable energy from indigenous renewable marine resources to provide energy to the Cork region, and beyond, was noted as an opportunity for Cork.
- Cork has an opportunity to tap into the digital world, as communication technology already exists, and offshore data storage could be a strategic advantage in developing Cork as a marine hub.
- Research facilities based in Ringaskiddy to provide an offshore testing site for technological equipment need to be further developed.

Legal: *How do legal factors (health and safety, product safety, standardization) influence Blue Growth in Cork?*

- The participants recognised an opportunity to streamline the foreshore licencing process by strengthening the capacity of the foreshore group to progress the Marine Area and Foreshore Amendment (MAFA).
- The identification of pre-consented sites was noted to allow easier access for the implementation of renewable energy installation.
- Implementation of legislation to ensure the protection of Special Areas of Conversation was discussed.

Environmental: *How do environmental issues/changes influence the Blue Growth potential in Cork?*

- The participants identified a need to implement appropriate assessment procedures to further knowledge of baseline environmental conditions in Cork harbour.
- Marine plastic pollution and the thereby resulting degradation of marine areas and marine biodiversity was mentioned as a key issue that urgently needs to be addressed.

SWOT Analysis

The stakeholders identified several potential Blue Growth objectives. One objective related to the need to build social bonds between Cork communities and with the harbour itself. Additionally, the stakeholders identified an objective for long-term growth such as a knowledge-based strategy for Blue Growth, marinising the innovation ecosystem, and third level commercialisation of research. These objectives were analysed through the SWOT framework (table 2), identifying the strengths, weaknesses, opportunities, and threats of the objectives.

Table 2: SWOT analysis of Blue Growth objectives

INTERNAL FACTORS	
STRENGTHS (+)	**WEAKNESSES (-)**
Support System - First mover advantage - National policy framework for Blue Growth through *Harnessing Our Ocean Wealth* Existing Infrastructure - Natural deep-water harbour provides access for large and heavily loaded ships - Third level present at NMCI and MaREI Centre - Port of Cork is developed and accessible - Foundation for development of more harbour related tourism available, building on success of Spike Island, Fort Camden, and other projects	Lack of Leadership - Need leaders with big vision and will to implement policies - Government policy is too general Lack of Infrastructure - Physical infrastructure to access the natural harbour (deep-water port) not available - No access points for infrastructure; needs to be strategically located in coastal towns - Need parking - Space constraints in coastal areas - Lack of public access through public buses for commuters Lack of Education - Lack of marine sector specific expertise and workforce capacity - Limited access to marine specific big data Lack of Investment - Innovation ecosystem not developed in Cork for Blue Growth - Investment opportunities for industry not present - Funding opportunities are not readily accessible

EXTERNAL FACTORS	
OPPORTUNITIES (+)	**THREATS (-)**
Economic Opportunities and Support for Indigenous Marine Sectors - Cork as marine technology hub - Marine sector specific investment strategies for Cork harbour development - Incubation centre (e.g. marine industry service centre) to cater to small businesses around the harbour - Third level and large business collaboration to cater to industry needs - Develop a national shipwright strategy and supply chain for naval architecture - Cluster for custom designed boats (reference: Silverstone Formula 1 for boat races) - European funding opportunities available Marine Renewable Energy Growth Opportunities - Supply chain development in relation to offshore renewable energy production - Develop NMCI and MaREI Centre as testing facilities and support structures - Production of green clean energy production – hydrogen - Train for glass reinforced plastic products and carbon fibre Opportunities for Cultural Change - Inclusive regeneration (leisure) and social identity with the marine environment - Create a stronger social identity with the marine environment - Identify stakeholders with long-term vision - Willingness to collaborate (business/academia/government) - Develop inner harbour as recreational and tourism area (restaurants, diving school, etc.) - Build state-subsidised local link to provide public access (reference places: Vancouver or Gothenburg for city integration) Potential to - Become amenity for local population - Encouragement for tourism - Increase in health and well-being for the local population - Reduce carbon footprint - Opportunity to take cars out of city	Cultural constraints - Needs a 'champion' – someone to drive Blue Growth objectives - Lack of action/implementation - Opposition from some stakeholders - Slow progression - Risk aversion - Cultural change – aversion to public transport - Must be inclusive/'poverty proof' - Health and safety Financial constraints - Uncertainty around Brexit (excises/tariffs for trading with the UK) - Lack of knowledge of funding/financing/risk by public authorities - Limited investment opportunities although international corporate organisations are already present - Competition from other coastal regions Other - Weather and climate conditions

Discussion

The participants recognised a wide range of challenges including the lack of awareness regarding marine issues and the lack of a strategic vision for the Cork harbour. A visionary Blue Growth strategy targeting sustainable growth in the marine sectors while also ensuring economic development was acknowledged to potentially have transformational effects on the Cork region. The workshop sparked lively group discussions on regional Blue Growth challenges and potential strategies. Three themes emerged from the group discussions:

1. The need for leadership envisioning sustainable, innovative, and transformative Blue Growth development in the Cork region;
2. The need for education on, and opportunities for, training in marine related subjects; and
3. The opportunity to transform Cork into a vibrant ocean community emerging as an innovative marine hub

The stakeholders discussed the need for a transportation infrastructure enabling easy access to the harbour to the wider public. Observations were also made on the need to raise understanding and awareness of key areas of growth potential such as future trends in marine renewable energy sectors. Participants flagged the need for a greater level of discussion between local stakeholders, local authorities, and other relevant agencies, to create achievable regional marine objectives. There was consensus that the Cork region lacks visionary leadership focusing on sustainable, innovative, and transformative Blue Growth development. The lack of marine spatial planning and the lack of the implementation of the *Harnessing Our Ocean Wealth* initiative at the local authority level (perhaps with the exception of the Mayo case previously presented) was flagged.

Recommendations

The Blue Growth pilot consultative policy round table workshop in Cork, hosted at County Council Cork, on December 6th, 2018 was attended by 21 stakeholders with invested interest in the Cork harbour. All stakeholders, but one, were working in or based in the Cork region and informed the following recommendations which address regional medium- to long-term perspectives on Blue Growth opportunities. As the recommendations are the result of the stakeholder engagement in an initial policy workshop, it would be advisable to hold Blue Growth workshops in other coastal areas along the Cork coast, inviting local stakeholders to participate. Detailed recommendations are also given below to address regional capacity building in education, training, and outreach among local institutions and actors.

1. Develop Cork's deep-water port for marine sectors such as marine renewables to support offshore wind production
2. Facilitate access to Cork harbour for yachting to promote the region and facilitate the expansion of the supply chain for marine leisure
3. Develop a sea-based transportation infrastructure to improve access to the harbour linking Ringaskiddy, Cobh, and Spike Island, among others
4. Promote a Blue Growth strategy via the local political agenda to transform the Cork region
    a. The City and County councils should facilitate a planning process for the Blue Growth sectors in the Cork region, including economic analysis and strength testing of value proposition
    b. All stakeholders, i.e. industry, academia, City and County councils, national policymakers, and citizens with a stake in Blue Growth should participate in the decision-making process, to ensure a Blue Growth approach from top-down and bottom-up
    c. Develop a Blue Growth strategy that can be regularly assessed, monitored, and evaluated
    d. Local authorities should design an implementation strategy that takes into account Ireland's decarbonisation targets
    e. The development agencies should streamline the start-up and innovation process by providing easy access to funding tailored to incentivising Blue Growth indigenous coastal development

f. Third-level institutions should take an active role in providing better access to research resources and facilities for marine start-ups
g. Third-level institutions should actively seek out industry collaboration for the furthering of Blue Growth development

Recommendations on education, training, and outreach to inculcate an appreciate of Cork's Blue Growth Opportunity

5. Raise public awareness regarding marine issues, marine opportunities, economic and environmental opportunities from early childhood on to instil accountability and stewardship of the marine environment and to fuel interest in marine related areas via e.g. school programmes
6. Provide suitable training and education in marine related subjects at second and third level institutions to ensure that job creation in the Blue Growth sectors will be matched with a regional highly skilled workforce
7. Promote knowledge exchange infrastructure and entrepreneurship through collaboration incentives between industries including start-ups and entrepreneurs, universities and academia, and government
    a. Marine facilities such as the National Marine College Ireland (NMCI) and the Marine and Renewable Energy Ireland (MaREI Centre) should be the first instance to encourage innovation and student ventures
    b. Third level facilities such as NMCI and MaREI Centre should encourage business and student relationships
8. Promote strong bonds between the general public and the marine resources through easy access to 'open' ocean activities
    a. By continuing to support annual public marine events such as the Cork Harbour Festival to celebrate Cork harbour's heritage
    b. Installing a public aquarium highlighting marine biodiversity and cultural heritage
9. Nurture a safety net for start-ups and entrepreneurs with financial incentives and tax breaks specifically for the marine sectors
    a. Implement a specialised tax breaks or innovative financing mechanisms, for the marine sectors, especially for marine renewables

Conclusion

The ProtoAtlantic Blue Growth Policy Round Table Workshop highlighted potential Blue Growth objectives for regional development. The results of the workshop identified Cork harbour's unique opportunity to develop a visionary Blue Growth strategy in anticipation of emerging Blue Growth sectors and the opportunity to train and educate a highly skilled workforce, create employment opportunities, and to build long-lasting regional resilience and capacity.

Cork's geographic position and available marine resources provide an ideal opportunity to develop indigenous Blue Growth sectors, such as marine renewables, and coastal tourism. The development of indigenous Blue Growth sectors would provide employment opportunities, allowing Cork to pre-emptively build capacity to meet future workforce demands. Strengthening the collaboration between third level institutions, research centres, and industries provides an opportunity to attract marine start-ups and national and international investment opportunities, ensuring resilient and sustainable regional economic development. There is a need for process design to ensure sustainable Blue Growth development, e.g. through an economic analysis which includes stocktaking of the marine assets and the available built infrastructure.

Taking the lessons learnt from other coastal regions, Cork has an opportunity to show leadership by developing a Blue Growth strategy that supports sustainable development focusing on human-centred well-being in relevant marine sectors.

Appendix I: Blue Growth Policy round table workshop agenda

ProtoAtlantic – Blue Growth policy round table workshop December 6th, 2018, Cork County Council

8.30-9.00	Registration
Scene Setting	Welcome: Sean O'Sullivan, Cork County Council Blue Growth in Cork - Dr. Val Cummins, UCC - Michael O'Boyle, Mayo County Council - Ronan Carey, ARQ Asset Solutions Ltd. - Jessica Giannoumis, UCC
Morning Session	Understanding Cork 'as is' Open Forum – Group Discussion
11.15-11.30	Coffee break
Mid-Morning Session	Cork's opportunities, 'what could be' Open Forum – Group Discussion
13.00	Closing Statement - Dr. Declan Jordan, UCC, Department of Economics - Sean O'Sullivan, Cork County Council

Appendix II: Attendees

Last	First	Organisation
Carey	Ronan	ARQ Assets Solutions
Crowley	Eileen	National Maritime College Ireland
Cummins	Val	University College Cork (UCC)
Dooley	Lawrence	UCC
Fitzgerald	Martin	Clashrock Capital
Fitzgerald	Liam	Marine Research Environmental Institute
Foley	Aiden	Raceix
Giannoumis	Jessica	UCC
Grehan	Patrick	Dare Technology
Jordan	Declan	UCC
Kandrot	Sarah	UCC
Keaveney	Emer	Ocean Research Conservation Ireland ORCireland
Kelly	Margaret	Cork Chamber
O Boyle	Michael	Mayo County Council
O Keeffe	Jane	Cork Institute of Technology
O Suilleabhain	Darragh	Cork County Council
O Sullivan	Sean	Cork County Council
O Reilly	Anthony	Cork County Council
Ronayne	Dave	Mainport Shipping
Walsh	Cian	Marine User Experience
Whelan	Mike	SolarMarine

Interreg Atlantic Area
European Regional Development Fund

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

emerge

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES

marine southeast

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu

ProtoAtlantic Blue Growth Policy Workshop

Work package 3 – Capitalisation

Scotland Workshop – 26 February, Edinburgh, UK

Innovation in the Marine Environment

Introduction

ProtoAtlantic, an Interreg project, aims to develop and validate a model for the prototyping and exploitation of innovative ideas in the maritime sector in the Atlantic Area. The ProtoAtlantic consortium consists of international partners INNOVALIA and EMERGE based in Las Palmas (ES), Technopôle Brest Iroise and Brest Metropole in Brest (FR), INESC TEC in Porto (PT), the European Marine Energy Centre (EMEC) in the Orkney Islands (UK), Cork County Council and University College Cork (IE), with each providing a unique approach to the development of the Blue Growth sector.

Work package 3 in ProtoAtlantic will provide a review of the policy support for maritime enterprise nationally and at an Atlantic Area level. Work package 3 further aims to provide sustainability measures with practical guidelines on policy frameworks and as such will hold consultative Blue Growth Policy Round Table Workshops in the ProtoAtlantic partner regions.

The objectives of these workshops are to:

- Gain an understanding of the current state of marine areas from the stakeholders' perspective
- Identify potential strategies for the Blue Growth development

The workshop is aimed at regional stakeholders including local and regional policy makers, business and industry stakeholders, academia, and aspiring local entrepreneurs. The policy round table workshop is one of a series of five sessions, which will be taking place across the Atlantic Interreg region over the coming months, with events in Las Palmas, Brest, Porto, and Scotland in early 2019.

This document concerns the workshop in Scotland.

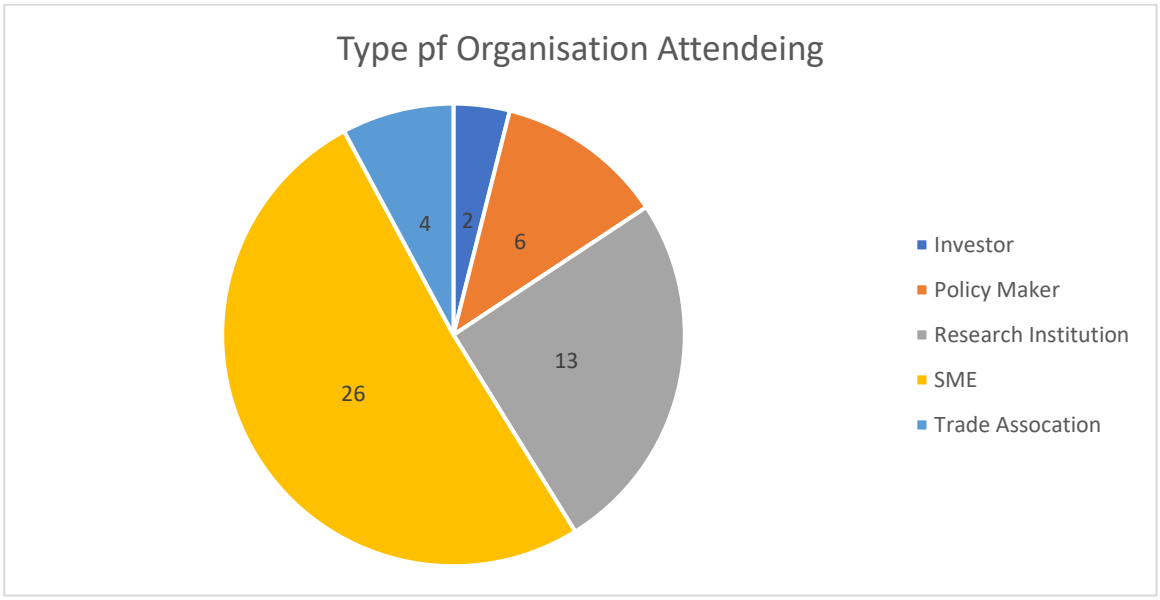
This workshop brought together leading organisations and individuals in the marine renewable energy sector to discuss the opportunities for marine renewable energy development around the globe and how the sector can help tackle some of the world's most pressing environmental, social and economic challenges including climate change adaptation, decarbonisation of the global energy sector, rural electrification, poverty reduction, food security, provision of clean water and energy security.

The symposium covered various possible applications for marine renewable energy including electricity generation (utility scale and micro-grid/'off-grid' applications), provision of energy for offshore applications including aquaculture, offshore infrastructure and instrumentation, desalinisation and production of alternative fuels such as hydrogen.

In addition, In Section II of this report, EMEC has added an overview of the policy initiatives underway in Orkney, Scotland and the UK with regards the maritime economy.

Section 1: Policy Workshop

Attendees



Structure

The workshop began with introductions and welcomes from the three organising organisations. Six case study presentations were provided by relevant stakeholders to introduce the target markets under discussion.

Following this, six breakout groups were formed to discuss these six target market opportunities. The six markets identified were:

- Utility scale energy generation
- Off-grid/distribution scale energy systems (including rural electrification)
- Aquaculture
- Desalinisation
- Offshore applications (including energy infrastructure, platforms, ocean observations etc)
- Hydrogen from marine energy

The break-out groups generated information and data to inform the development of a high level roadmap to support the sustainable development of each market.

Each group was supported by one facilitator, one 'technical lead' (case study presenter in most instances) and one scribe. All attendees had the opportunity to discuss three market applications, moving around the tables at designated intervals. The facilitators, leads and scribes remained at one table focussing on one market application.

Participants were allocated to groups in advance by the organising team.

There now follows a summary of the data collected at the workshop via discussions and a PESTLE analysis exercise.

PESTLE Analysis Summary

It is clear that there are several market opportunities open to the marine renewable energy sector. This is driven mostly by key USPs derived from generating offshore, and a political and social will to generate energy using renewable sources.

Many of these markets face significant barriers in the form of technology and regulatory challenges, most of which ultimately feed into an economic barrier which means that the product under development becomes more costly than the incumbent.

The key challenge therefore is to generate the political will necessary to enable these sectors to compete. This will be achieved through R&D and market deployment funding.

PESTLE Analysis

Utility markets

Political opportunities	• Support in Scotland for wave energy initially • Strong support in Wales for wave/tidal via ERDF funding • €10bn EU Innovation Fund • Find smaller opportunities where there is political will and stitch them together and match them up with the developers • Need to know what the potential for these energy sources is to impact climate change or to help politicians to meet targets • Move to investment- eco investment
Political Challenges	• The challenge with this is that political support changes quite rapidly. Difficult to sell MRE in this arena as appopsed to offshore wind- its easier to understand
Economic opportunities	• 100GW of ocean energy in Europe by 2050 • 10% of Europe's electricity demand • Billions in capital investment • Regional development
Economic challenges	• Generating enough political support to deploy technology to get down the cost curve • Offshore and floating wind powering forward

Social opportunities	• W&T are both very well suited to peripheral economies. Very synergistic in islands communities
	• Need to remember that this is at the utility scale
	• When bring in O&G, they do not want to spend money on decommisisioning, so if there can be an excuse to bring a new use to those pipelines
	• Social opportunity to be an
	• Social conscience
	  ○ Climate change
	  ○ Social opportunity
	  ○ School kids striking at schools against climate change

Social challenges	• Close to shore- visible stuff • Potantially negative ecologically effects

	• Need to have reliable power delivery- especially at the utility scale • Do we deal with the companies in the middle east- the big oil companies?
Technology challenges	• Improving efficiency • In order to improve – need to put things in the water • Need 500 running hours before anyone will lend you money • Cavitation is a challenge- but use the pitch system to mitigate this but then need a pitch system under water which is a challenge • Learn a lot from wind, but there has been a lot of funded R&D done before • Investor confidence is the most valuable thing • Tend to use the technologies that have been proven in wind as this improves investor confidence
Legal challenges	• Brexit
Environmental opportunities	• Reduce uncertainty and thereby learn, make consenting easier etc. etc.
Environmental challenges	• If negative effects are realised, this wil have to be managed.

Off-grid markets

Political Opportunities	• Promoting low carbon energy source. • Socio-political support for rural communities (poverty, lack of resources etc., economic decline in rural communities and changing demographics). • Skills benefit. • Island/peripheral economies, different outlook. Political support for these communities. • Better access, security of supply, political support. • Mainland customers may have higher bills to subsidise higher cost of providing to rural communities.
Political challenges	• Stranded assets i.e. failed technologies invested in by government. • Revenue support • Political bias

Economic Opportunities	• Job creation • Fuel poverty reduction, even in developed countries • Development of supply chain, indirect economic development, local content • Building community energy may reduce need for grid improvements (capital investment) • Reducing pressure on grids, power loss • Access to reliable, affordable energy is enabler to other economic activities/industries
Economic challenges	• Subsidising diesel generation • Providing electricity at level playing field • Capital cost of replacing existing infrastructure • Project financing in general – attracting financing. Too low investment for key players. • Some local communities have high rate of payment, lowering risk.
Social Opportunities:	• Higher standard of living • Incentivise re-population (bring back those with technical skills) • Basic access to electricity – reduces societal concerns • Greater technical/high-skilled employment opportunities • Orkney case study
Social challenges	• Acceptability/perception • Other sea users
Technology	Opportunities:
	Challenges:
Legal	Opportunities:
	Challenges:
Environment	Opportunities:
	Challenges:

Aquaculture

Political	Opportunities:

	• Marine Scotland has been very supportive
	Challenges:
Economic	Opportunities: • Willingness to pay a premium for energy from green sources • Currently fish farms contract for the diesel generators and are maintained by the supplier. Preferable to buy power, fish farmers do not want to become marine energy experts. This depends a bit on the risk as well. • Fish farming companies may have better access to project finance. One issue is the lack of finance for small projects, although some debt finance options may be available with a strong PPA. • Could be paired with providing power to the local community to improve business case. Demand is often for providing power for lighting at night and for making ice for fish storage during transport • Solar resources often pair well with the need for air conditioning while wind and wave may pair well with lighting needs at night. This is an opportunity to combine resources to reduce storage needs while providing a consistent resource • More development is taking place in the southern hemisphere: Chile, also in China. Nova Scotia is using diesel gen or feed barges. • Ocean 1 Platform: Has two 180 kW generators onboard. Could this be replaced with marine energy • Semi-closed systems require far more energy then open-net pens. This is to grow the small fish up to the 1 kg size before they can be put into open-net pens • Onshore aquaculture: more of this is happening, need to pump water from the sea or there are complications with using saline bore water, cost of production is high for salmon, there is a large project in Florida to build an onshore salmon farm. • Of the 170 farms in the UK, there are probably ~20 that have an available wave resource. The others may have other resources available such as on shore wind. • The resource increases as fish farms move further offshore, this may become a better fit.
	Challenges: • One barrier to attaining finance is the lack of performance data. • Government incentives needed to get to scale • Current holders of PPAs need to be involved in new system developments

	• Norway has a lot of activity in aquaculture. Lots of hydropower available to help this industry
Social	Opportunities: • More protein needed to feed the world's population • Large increase in demand for seafood
	Challenges:
Technology	Opportunities: • With about 5 years of proven track record these systems could be considered part of the site resources • Other options for aquaculture than wave: on shore wind that is cabled to the barges, floating solar with storage • Semi-closed system under development in Scotland, energy required goes up from 50 kW to 250 kW versus a closed system. • Freshwater fish farming: trout, catfish, carp, tilapia… These would use grid power. The driver for saltwater fish is the market for carnivorous fish.
	Challenges: • Using pumped water to grow small smolt up to 1 kg to cut down the open pen timeframe to 12 months • More understanding of the load profiles for fish farms is needed to design the energy systems • they still need to have the diesel as back up if the system is not reliable. This requires a storage solution, but must be able to fit on the barge that is available. • Energy converters, storage systems, barge manufacturers require different suppliers. Should find a common source to integrate solutions – supply chain integration • Farmers are worried about unproven equipment breaking and damaging the farm, this is a common issue with other suppliers to the industry • Risk associated with the unproven technology, fish farmers may not want to own the equipment • There is no turnkey package. Programs need to push not just the technology development but the full system development. Need the microgrid developers to get involved.

Legal	Opportunities: • Marine Scotland has been very supportive
	Challenges: • Development of planning and marine license issues
Environment	Opportunities:
	Challenges: • invasive species issues around aquaculture generally

Desalinisation

Political	Opportunities: • Movement towards clean economy means getting rid of diesel generators
	Challenges: • Political fore sighting needed
Economic	Opportunities: • Desalination is energy intensive • Wave energy for brackish water more attractive than seawater • 60 - 80% energy cost • Micro grid with local utilities • Currently powered by diesel generation
	Challenges: • Water treatment Undervalued • Project development is needed

Social	Opportunities: • Immediate disaster relief and longer-term sustainable livelihood
	Challenges: • Education
Technology	Opportunities: • Graphene membranes • Reverse osmosis boat – treats fish in the bath (kills off marine parasites) • Offshore rigs freshwater provision • Benchmarking
	Challenges: • Infrastructure and supporting technology 50% efficiency • mechanical fatigue, membrane resistance, • flow and pressure control • Bringing onshore, • membrane replacement (Capex and Opex); • 2 times membrane replacement because of wave energy variability
Legal	Opportunities: • Subsidies • Publicly available material – share knowledge • Literature review of failures
	Challenges: • Managing risks • Supply chain questions (local supply chain) • Local content • IPs – mistakes never learned
Environment	Opportunities:
	Challenges:

	• brine; potentially be able to be mitigated by combining with salt production

Offshore applications (including energy infrastructure, platforms, ocean observations etc)

Political	Opportunities: • Economic growth in SE Asia. Route to market. • O+G inertia and market competition
	Challenges: • Educate the regulators to what MRE can achieve. Crown Estate and O+G authority – completely different perspective. Regulators to be more aligned. Need to move at pace, in order to be investable.
Economic	Opportunities: • 100 suspended subsea wells – need distributed power generation. • Customers: Marine agencies, Tier 1 service providers (e.g. Wood) – could purchase the technology, Data Company (to then sell to the operator), Salvage companies.
	Challenges:
Social	Opportunities: • Consider alternative uses for existing infrastructure
	Challenges:
Technology	Opportunities: • Underwater Vehicles – for underwater inspection • Automated system for a converter station for floating wind/geo thermal • Supply chain to provide low cost mooring systems, composite materials, understanding of marine impact/environmental

	impact/design codes to increase lifespan of infrastructure and components
	Challenges: • Do we maintain 'back up'/wave and RE back-up • Intermittency needs to be smoothed out • Infrastructure supporting technology to enable MRE use • Power management/remote command and control/sub-sea comms/secure and robust through water comms/interaction with marine uses and fishermen; all common to both O+G and MRE
Legal	Opportunities:
	Challenges:
Environment	Opportunities: • Proximity to wind/wave/tide/solar resource • Decommissioning strategy. • Reduce number of structures required to decrease impact of accumulative effects, cluttering the N Sea.
	Challenges: • No reuse/recycle component to R.E. e.g. can't lifecycle/circular economy composite materials. This gives an opportunity for circular economy.

Section II: Policy information

Smart Specialisation

The maritime economy makes a substantial contribution to the Scottish and UK economies. It is estimated that the maritime sector in Scotland provides £9.3 billion in turnover, £3.6 billion in GVA and 39,300 jobs in Scotland in 2015 (CEBR (2017). The largest constituent industry is the offshore oil & gas sector, which directly contributed £2.9 bn in GVA and 30,900 jobs in 2015.

The main Blue Growth focus in Scotland is on offshore renewable energy, and Scotland is the joint-leader in Smart Specialisation in the area of Marine Renewable Energy, along with the Basque Country.

By leveraging its world-leading expertise and infrastructure in offshore energy extraction, Scotland aims to lead the world in offshore renewable energy. Scotland's natural assets and long-run public-private investment in wave and tidal have given it a lead technology development and testing in this still pre-commercial field (notably via EMEC and the cluster of related companies in Orkney). The commercial deployment of wave energy is supported via the Wave Energy Scotland initiative.

This is supported by Scottish energy policy, which sets a target of 50% of Scotland's overall energy consumption from renewable sources, and near 100% decarbonisation of the energy system by 2050.

Food and drink is a second key priority area of the Scottish Government and fishing and fishing products are an economic cluster in which Scotland has a strong specialisation. Aquaculture is a key priority (notably in the Highlands & Islands area) and the Scottish Aquaculture Innovation Centre has been funded to support the sector. Blue biotechnology related activities are also emerging and fall under the broader life science priority.

The Scottish Marine Institute has a specific centre focused on blue biotech (SAMS, n.d.) and the European Centre for Marine Biotechnology has been developed including business incubation facilities for blue biotech firms (European Centre for Marine Biotechnology, n.d.).

Blue biotechnology is one element of a drive to enhance Scottish industrial biotechnology potential (with marine biomass one focus area) that is being developed. Scottish partners are active in EU FP projects in this field, for example Sea Biotech ("SeaBioTech", n.d.)

Innovation Priorities

Marine renewables

Scotland is a joint leader in the Interregional partnership for Smart Specialisation on Marine Renewable Energy. The innovation priorities in this area have been identified as:

- manufacturing of large components;
- power transfer and conversion;
- corrosion in water;
- sensing, instrumentation and monitoring;
- O&M optimisation;
- testing and demonstration in real environments.

Aquaculture

Aquaculture is an increasingly important industry for Scotland, helping to sustain economic growth in the rural and coastal communities of the north and west. Involving the farming or culturing of fish, molluscs, crustaceans and seaweed, aquaculture produces our most valuable food export. The Scottish aquaculture industry is led by Atlantic salmon farming, but also produces significant quantities of Rainbow trout and mussels.

The Scottish Government supports the Aquaculture Industry Leadership Group as it seeks to deliver the industry's growth strategy by 2030. The strategy aims to:

- double the economic contribution of the sector from £1.8 billion in 2016, to £3.6 billion by 2030
- double the number of jobs to 18,000 by 2030

Literature List

CEBR. (2017). The economic contribution of the Maritime sector in Scotland. Retrieved from downloads/Cebr_Maritime_UK_Scotland_finalised.pdf

- SAMS. (n.d.). [Biotechnology; The Scottish Association for Marine Science]. Retrieved December 19, 2018, from https://www.sams.ac.uk/science/blue-economy/biotechnology/
- European centre for Marine Biotechnology]. (n.d.). Retrieved December 19, 2018, from http://www.ecmb.org/index.htm
- (SeaBioTech). (n.d.). Retrieved December 19, 2018, from http://spider.science.strath.ac.uk/seabiotech/index.php

Interreg Atlantic Area
European Regional Development Fund

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

emerge

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES

marine southeast

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu

CAMPUS MONDIAL DE LA MER

REGIONAL CONFERENCE ON HIGHER EDUCATION AND RESEARCH – CONTRIBUTION OF THE MARINE AND COASTAL WORKING GROUP

SUMMARY OF THE PRIORITY SCIENTIFIC ISSUES

VERSION 3.1 / 26 JUNE 2019

Summary of the work of the Marine and Coastal working group by coordinators Yves-Marie Paulet (University of Western Brittany/Board of the Campus Mondial de la Mer), Alice Vanhoutte-Brunier and Jérémie Bazin (Technopôle Brest-Iroise, Campus Mondial de la Mer).

With the involvement of the members of the Marine and Coastal working group: Nadia Améziane (MNHN Concarneau), Louis-Pascal Baron (Department of Finistère), Anne Choquet (Brest Business School), Catherine Boyen and Dominique Davoult (Roscoff Biological Station), Stéphane Doll and Stéphane Le Floch (Cedre), Yann Doutreleau (ENSTA Bretagne), Antoine Dosdat, Luc Dréves, Valérie Mazoric (Ifremer), Ronan Fablet (IMT Atlantique), Fred Jean (IUEM), Matthieu Leclerc (Ecole Navale), Christelle Le Hir and Mireille Nibéron (Brest Métropole), Nadine Le Hir (ADEUPa Brest Bretagne), Cédric Letort (SATT Ouest Valorisation), Céline Liret (Océanopolis), Marie-Françoise Le Quentrec-Lalancette (Shom), Anne-Marie Tréguier (ISblue), Philippe Monbet (Pôle Mer Bretagne Atlantique), Luis Tito de Morais (IUEM).

And the contributions by Pascal Pinot (ENSTA Bretagne), Franck Florin (Thales) and Vincent Kerbaol (CLS).

Recipients	Regional Conference on Higher Education and Research
Document date	19/12/2019
Version	Version 3.1

Table of Contents

CONTEXT

In June 2016, Brest Métropole adopted its Metropolitan Economic Development Strategy (MESD), defined in close cooperation with the region's public and private actors.

Among the MESD's short-term priority actions was the creation of a Regional Conference on Higher Education and Research, responsible for examining the major issues in these fields and determining a development plan for higher education.

This desire to move forward together was affirmed during the inaugural session of the Regional Conference on Higher Education and Research held on 29 November 2017 in the presence of some 40 actors: heads of companies, directors of research organisations, national government officials and regional elected representatives.

Seven key areas were identified:

- marine and coastal;
- digital;
- security and defence;
- health;
- agri-food, agro-industry and bioeconomy;
- arts, culture, heritage, design;
- construction.

The choice was made to entrust thematic working groups with the task of specifying the positioning of metropolitan France on these key areas by targeting priority actions. This work falls within the preparation process for the State-Region Planning Contract (*Contrat de Plan Etat-Région*, CPER), which is due to be launched in 2020.

For the "marine and coastal" field of expertise, Brest Métropole suggested that the Campus Mondial de la Mer (World Sea Campus) coordinate the work. This working group is led by Yves-Marie Paulet, member of the Board of the Campus Mondial de la Mer, with the support of Jérémie Bazin, Campus Coordinator, and Alice Vanhoutte-Brunier, Project Coordinator at the Campus.

Organised under the auspices of the Brest Métropole Regional Conference, the Marine and Coastal working group worked between December 2018 and June 2019 on the sharing of the results of the previous CPERs, the weight of the public research sector and its scientific output (based on the work of ADEUPa Brest Bretagne), and the analysis of scientific issues and challenges. The debates organised and written feedback have led to this summary document, a convergence of the views of the members of the Campus community.

The first expected outcome of this working group, and the purpose of this document, was to contribute to the definition of priority issues concerning the development possibilities for which the region has proven or potential comparative advantages. The second outcome, worked on between September and December 2019, involved identifying structuring, promising and innovative actions/projects that could have a leverage effect on the region's economy.

The Campus Mondial de la Mer is involved in the "ProtoAtlantic" Interreg Atlantic Area project via the Technopôle Brest-Iroise, a partner in the project. One of the project's objectives is to identify issues/recommendations to encourage maritime innovation in the partners' different regions.
The Technopôle Brest-Iroise drew on the work of the Marine and Coastal working group to identify these issues and challenges.

THE CAMPUS MONDIAL DE LA MER

The Campus Mondial de la Mer is France's foremost community of experts dedicated to the study of oceans and coasts and to the development of marine resources. Finistère is the leading French department for employment in the maritime field with some 40,400 jobs, representing 11% of total regional employment at the end of 2016 (source: ADEUPa Brest Bretagne).

For the public research sector, the predominantly "Marine and Coastal" research units (see mapping in Appendix 1) total some 721 researchers and lecterer-researchers, as well as 444 PhD students and post-doctoral fellows, for an average annual scientific production of 1,000 publications between 2016 and 2018 (source: ADEUPa Brest Bretagne, estimate made within the framework of this working group). The academic actors of the Campus notably include Ifremer (the French Institute for Ocean Science, its biggest national establishment as well as its head office) and the European Institute for Marine Studies (IUEM) of the University of Western Brittany (UBO), recognised in Shanghai Ranking's Global Ranking of Academic Subjects 2018 for Oceanography. The Campus actors also include two internationally renowned marine stations: Roscoff (Sorbonne University) and Concarneau (National Museum of Natural History, MNHN).

This community also benefits from the marine engineering activities of top engineering and management schools recognised nationally and even internationally (Ecole Navale, ENIB, ENSTA Bretagne, IMT Atlantique, ISEN Brest and Brest Business School). Finally, it includes government departments and agencies, notably the Cedre (Centre of Documentation, Research and Experimentation on Accidental Water Pollution), the Shom (Naval Hydrographic and Oceanographic Service), the Agence Française pour la Biodiversité (AFB, French Biodiversity Agency), the French Polar Institute Paul-Émile Victor (IPEV), and Météo-France (the French national meteorological service). It also boasts a first-rate scientific mediation centre, Océanopolis. Each of these actors has its own scientific strategy, also often at the heart of national and international priorities.

This community (through Europôle Mer, LabexMer, and the Sea and Coastline research department of Université Bretagne Loire) has regularly conducted analyses on its strengths and opportunities, as well as on the threats and weaknesses it proposes to face collectively (see Appendix 2).

THE CAMPUS MONDIAL DE LA MER COMMUNITY AT THE HEART OF MAJOR INTERNATIONAL CHALLENGES

The Sustainable Development Goals (SDGs) defined under the United Nations Sustainable Development Programme for 2030 provide a framework for understanding the challenges facing the planet today, global ownership of which is indisputable. While Goal 14 “Life Below Water” offers a specific place for the future of ocean and coastal systems, it is clear that the oceans are the actors and targets of many other SDGs, among which we can cite as examples Goal 3 “Good Health and Well-Being”, Goal 7 “Affordable and Clean Energy” and Goal 13 “Climate Action”.

This central place occupied by ocean and coastal challenges has also been recognised as an international priority through the Intergovernmental Panel on Climate Change (IPCC) in its *Special Report on the Ocean and Cryosphere in a Changing Climate* (published in September 2019) and through the launch of the United Nations Decade of Ocean Sciences for Sustainable Development (2021-2030). Moreover, the ocean is not exempt from the alarming loss of biodiversity established by the International Platform on Biodiversity and Ecosystem Services (IPBES, 2019).

It is by clearly placing themselves at the heart of these international dynamics that the actors gathered within the Campus Mondial de la Mer are defining their CPER forecasts. To this end, they base their work on the reference documents *The Ocean Economy in 2030* (OECD, 2016), *Ocean State Report* (Copernicus, 2018), *Navigating the Future V* (European Marine Board, 2019) and *The EU Blue Economy Report 2019* (European Commission, 2019). Regional and national positioning through the Regional Sea and Coastal Strategy, the National Sea and Coastal Strategy, and the measures adopted by the Inter-ministerial Committee for the Sea (*Comité interministériel de la mer*, CIMer) also constitute elements of the reflection framework highlighting the crucial need for knowledge, considered insufficient today.

Inspired by JPI Oceans (Joint Programming Initiative Healthy and Productive Seas and Oceans), the Breton marine science and technology community is harnessing its strengths to promote knowledge and use of the oceans. By leveraging the excellence and diversity of its expertise, it also aims to contribute to the emergence of the innovations and solutions required for the sustainable development of societies. Indeed, with increased knowledge today of the consequences of its actions, in particular through a better – albeit incomplete – understanding of natural systems and the development of science based on observations, data and modelling tools, humanity is committed to the sustainable use of oceans and coasts. The new technological and social innovation challenge today for marine science and technology concerns the preservation of the natural capital for future generations, ensuring equitable access to the associated advantages.

As an actor in international issues, the community of the Campus Mondial de la Mer is aware of the need to take into account national, regional and local frameworks for managing these issues. Marine science and technology, factors contributing strongly to the attractiveness of the region, also constitute a wealth of innovations for the Breton peninsula, essential to the success of the societal transitions currently at work.

THE CHALLENGES FOR THE CAMPUS MONDIAL DE LA MER COMMUNITY

The major asset of the Campus Mondial de la Mer community lies in the broad spectrum of expertise, diagnosis and intervention capacities of the region's stakeholders, and in the desire to make full use of existing complementarities. This can be achieved by combining both research and collective facilities such as the Pôle Mer Bretagne Atlantique cluster, SATT Ouest Valorisation and France Energies Marines, as well as more applicative research centres and institutes. The latter include the Cedre, the Cerema (Centre of Studies and Expertise on Risks, the Environment, Mobility and Development), the Shom and the AFB.

With 1,600 students studying marine-related courses (source: ADEUPa Brest Bretagne), the region also boasts recognised training know-how, intrinsically linked to the quality of research and associated infrastructures. This is reflected in the ability to attract international students on Master's degree courses, for example within ISblue, as well as the best students from preparatory classes throughout the country on engineering courses. Some examples include the top-level courses, unique in France, offered in naval architecture, hydrography and French Navy officer training. These courses, provided by the Ecole Navale and ENSTA Bretagne, enable the region to position itself on technological innovation in the maritime sector.

This organised concentration of knowledge, skills and users is unique in France, conferring legitimacy on the region in this field, recognised by scientific research as well as by companies and regions.

This legitimacy is fully expressed on three main themes as well as on crosscutting subjects, described below.

1. KNOWLEDGE OF THE OCEANS (OCEAN / CLIMATE AND DEEP SEAS)

The Campus Mondial de la Mer community is strongly involved in international projects and networks related to observation and knowledge of the oceans. At the heart of its concerns are the understanding and modelling of thermal accumulation in oceans, major biogeochemical cycles and their variability, ocean floor dynamics, ocean/solid surface interactions, and the evolution of marine biodiversity in deep seas. Some of the major projects in which the community's actors are strongly involved are the EMSO network,[1] the international Argo programme,[2] the European EuroGOOS observation programme,[3] as well as the JCOMMOPS[4] and the "Euro-

[1] EMSO, the European Multidisciplinary Seafloor and water column Observatory, is a European Research Infrastructure Consortium (ERIC) whose objective is to study, in real time and over the long term, the different environmental processes related to interactions between the geosphere, the biosphere and the hydrosphere, and notably natural hazards.

[2] Argo is an international ocean observation programme that uses a fleet of autonomous underwater robots to collect real-time measurements of temperature, salinity and currents.

[3] EuroGOOS, the European Global Ocean Observing System, aims to improve the quality and cost-effectiveness of operational ocean observation systems, focusing more specifically on the high seas.

[4] The JCOMMOPS, Joint Technical Commission for Oceanography and Marine Meteorology in situ Observations Programme Support Centre, coordinates, controls and monitors all in situ meteorological and oceanographic measurements on behalf of the World Meteorological Organization (WMO) and UNESCO's Intergovernmental Oceanographic Commission (IOC).

ARGO" European Research Infrastructure Consortium, both located at the heart of the Campus Mondial de la Mer.

The challenge here is to better understand and model the present in order to anticipate future environmental issues and problems, within the framework of ongoing global changes. In this context, understanding past events also constitutes a key concern.

2. COASTAL AND SHORELINE SYSTEMS AND THE LAND-SEA INTERFACE

2.1. TRAJECTORY OF SOCIO-ECOSYSTEMS: TOWARDS A TRANSDISCIPLINARY APPROACH

The marine sciences, natural sciences and social sciences community actively participates in the diagnoses and development of public action related to the implementation of European policies on fisheries management, the healthy ecology of the marine environment, and maritime spatial planning. The AMURE Joint Research Unit (Ifremer/UBO/CNRS), in cooperation with the Agence Française pour la Biodiversité, ensures the national coordination of the Economic and Social Analysis (ESA) as part of the six-yearly review of the implementation of the Marine Strategy Framework Directive (MSFD) and the sea and coastal section of the French National Biodiversity Observatory (ONB).

The challenge here is to demonstrate that by carrying out knowledge-based diagnoses, involving natural and societal dynamics, it is possible to contribute to the development of public policies towards a sustainable future for shorelines and coastal areas.

2.2. RISKS AND POLLUTION

Coastal and shoreline systems and the land-sea interface are greatly affected by all types of risks: erosion, flooding, seismic activity, eco-toxicological hazards, etc. Beyond being directly concerned by these risks, the Breton peninsula is home to many of the highest-ranking actors in these fields, including notably the Cedre, IUEM, Ifremer, Cerema and Shom.

With regard to coastal or ocean pollution, the Cedre is a unique partner on the national scale, enabling the development of experimental and applied research related to operational issues in collaboration with academia.

In addition, the VIGISAT satellite image receiving station is responsible for about 75% of the operational satellite monitoring of oil spills in European waters (CleanSeaNet/EMSA European public service).

The challenge here is to consolidate the region's expertise in observation, prevention and crisis management, while developing new skills for the treatment of the pollution of water masses by plastics. The ability to develop nature-society interfaces, particularly on issues of erosion and flooding, represents a strength of the region that must be further reinforced.

3. OCEANS AND COASTAL AREAS UNDERGOING TRANSITION

3.1. MARINE BIO-RESOURCES: FISHERIES, AQUACULTURE AND BIOTECHNOLOGY

Within the current context of global change, resource assessment, exploitation and management are at the heart of profound conceptual, technological and methodological evolutions. Ecosystem-based management is becoming the norm, but requires very substantial advances in knowledge through both observation and experimentation. Aquaculture must also be innovative and must be considered “part of the ecosystem”, while fishing must constantly adapt to new societal and environmental challenges (commodification of access rights, zero discharge, spatial planning, etc.).

The potential of biotechnology is today well established and growing rapidly, meeting a triple objective: sustainable resource management, the production of new food sources and even new medicines, and the implementation of environmentally-friendly models.

The Breton region constitutes an exceptional “natural laboratory” for the development of this research and associated innovations. It also boasts experimental infrastructures that are unique in Europe, and must remain so, with the resulting innovations offering the keys to a successful ecological and economic transition of maritime areas.

The challenge here is to contribute to the necessary changes in the use of living marine resources by integrating the sustainability of natural systems and the quality of production. The optimal development of marine biomasses and biomolecules, based on the region’s exceptional expertise in the field of marine biotechnology, also represents a major objective of the community.

3.2. MARINE ENERGIES

The TheoREM research infrastructure operated by Ifremer and Ecole Centrale Nantes enables the carrying out of research activities and collaborative projects in the field of renewable marine energies with French and international industrialists. The equipment tested in the basin will then take advantage of local potential to implement mesoscale validations within continuum modelling, testing of 1/10th scale models, and sea trials.

The challenge here is to provide the region with a testing infrastructure at the highest European level, implementing original tools, open to the higher education community and attractive for developers of new concepts, while avoiding duplication with the work of other French actors.

3.3. MATERIALS IN MARINE ENVIRONMENTS

The community benefits from strong visibility at national level in the field of mechanical engineering applied to maritime issues. This is notably due to the group composed of the CNRS IRDL Joint Research Unit (and in particular the MASMECA mechanical test platform at ENSTA Bretagne), the Ifremer laboratory for testing the behaviour and ageing of structures at sea, and the Research Institute of the Ecole Navale (IRENav).

The challenges in marine engineering are the mechanical design and reliability of mechanical and electromechanical systems in interaction with the marine environment. It is notably vital to increase the capacity to analyse the interaction between materials and the marine environment (fatigue stress, impact resistance, effects of water intake and marine ageing, use of additive manufacturing). Other challenges

include reducing emissions, the creation of new propulsion techniques, and developments towards autonomous vessels.

These topics make it possible to envisage a use of the ocean through systems that are more respectful of the environment, developed by a network of companies present in the region in collaboration with the academic actors of the Campus.

3.4. MARITIME SAFETY AND SECURITY

The Campus community boasts extensive expertise in the field of maritime safety and security, in particular with respect to regulations, governance of the seas and oceans, knowledge of the oceans and the monitoring and protection of maritime activities, as well as in observing and predicting disruptions in the particularly vulnerable polar oceans, notably the Arctic. In particular, the Shom is the national body responsible for nautical information (hydrography, cartography, regulatory nautical documentation).

The challenge here is to contribute to a sustainable, secure and equitable use of maritime areas by drawing on the multiplicity of skills of the Campus actors. From in situ or satellite observation to expertise in the law of the sea and maritime law, as well as modelling and technologies for monitoring at sea, the scientific community has all the skills and means necessary to establish itself as an international authority on these issues.

4. CROSSCUTTING CHALLENGES

4.1. BIG DATA ANALYTICS

The community is required to manage a considerable flow of observational data, a veritable ocean of information and studies. The main challenges involve making digital platforms accessible and interoperable, deploying state-of-the-art technological solutions for processing, storing and archiving large volumes of marine data in order to develop the creation dimension of new services.

Several actions and resources are already moving in this direction and deserve to be reinforced or further developed. These include the Marine Data and Processing Centre (PCDM) and the DATARMOR supercomputer, which allows numerous marine science projects to benefit from the processing, calculation and storage of marine data.

In addition, programmes and activities have been set up to promote the meeting of stakeholders from various backgrounds using marine data. Examples include the Ocean Hackathon®, a 48-hour non-stop challenge to produce new products and services, and ALLOHa, a centre for collaboration and innovation, bringing together both the marine science and data science communities.

The challenge here is to provide scientists, companies and users of the sea with ways of accessing, processing and archiving marine information, within a context of extraordinary growth in data flows, and in order to create value on existing and new data.

4.2. EXCELLENCE IN MARINE SAMPLE ANALYSIS IN ALL FIELDS, FROM GEOSCIENCE TO BIOLOGY

The development since the 2000s of the Ocean Spectrometry Centre of Excellence (PSO) is probably the most striking example of the scientific synergies within the Campus. The Breton peninsula is renowned, on both a regional and international scale, for the excellence of its measuring equipment, sample storage facilities and specialised teams. The increased attractiveness of the site for international researchers, experts, students, post-PhD students and companies will be supported by a better organisation of analytical platforms allowing the pooling and streamlining of equipment and facilities.

The challenges inherent in marine sample analysis are many, and notably include: (i) dating geological processes; (ii) tracing the cycles of matter from coastal areas to the ocean depths; (iii) reconstructing past states of the ocean system and its biodiversity to better predict the future; and iv) analysing the carbon cycle at the ocean interfaces.

In addition, recent years have seen advances in genomics, transcriptomics, proteomics and metabolomics of marine organisms, which have made it possible to draw up inventories of the various molecular actors involved in biological functions.

The challenge is now to develop cellular and molecular scenarios describing in real time the interactions, regulation and architectural dynamics of these different actors. This is an opportunity to bring together the interdisciplinary community of biologists, materials specialists and physicists to further develop the imaging of living matter.

4.3. COLLECTIONS AND ARCHIVES

The Campus community – primarily Ifremer, the IUEM, Shom, Roscoff and Concarneau marine stations, and Historical Defence Service – boasts many collections and archives, whether physical (sedimentary, mineral, documentary, historical, cartographic, etc.), biological or digital. These collections are essential not only for scientific advances but are also evidence of past and present ecosystems and the state of our knowledge.

The challenge here is to maintain, increase and further enhance these resources while developing the services and facilities necessary to access them.

4.4. FACILITATED ACCESS TO THE SEA

Beyond having the longest coastline of metropolitan France, the Campus region boasts a privileged field of experimentation and testing, notably constituted by Brest harbour. The sustainable exploitation of the oceans and the need to safeguard the fast-growing maritime and port activities reinforce the need for high-performance equipment and facilities. Their development requires the ability to test new algorithms or acoustic or robotic equipment at sea. This essential step in the development process for research or industrial projects requires the implementation of technical means that are difficult to assemble or are extremely expensive.

Based on the Ecole Navale site and implemented by the scientific and industrial community since 2008, the Sea Test Base allows tests to be conducted at depths up to 30 metres, and to reach marine sites up to 200 metres

below the surface from seven naval platforms. These sea trial facilities make it possible to accelerate the development of new technologies. This structure supports the industrial tests of local actors, particularly in the field of robotics, and its growing importance would make it possible to attract other actors at national and European levels.

The pooling of spaces and technical and nautical resources on the Campus scale would increase our research potential, interest the business sector, and enhance the national and international attractiveness of the Breton peninsula.

The challenge here is to mobilise all public and private partners interested in the development, experimentation and testing of innovative marine technologies around a common infrastructure (possibly the Sainte-Anne du Portzic – Plouzané mole).

4.5. THE NECESSARY ASSOCIATION OF PUBLIC INSTITUTIONS AND COMPANIES TO MEET ECONOMIC AND SOCIETAL CHALLENGES

The member structures of the Campus Mondial de la Mer, such as the Pôle Mer Bretagne Atlantique, SATT Ouest Valorisation or the technopoles and incubators within the partner schools, all participate actively in the dynamics of collaborative R&D projects between public research structures and companies. These dynamics are reinforced within several emerging industrial sectors such as renewable marine energies or the intersection of the space, digital and maritime fields, and include the necessary training component.

The development of a sustainable maritime economy, recognised internationally as a response to ecological and societal challenges, requires development of a common innovation roadmap, programming the actions, and designing the engineering of the resources and their implementation in synergy. Priorities must be focused on supporting regional start-ups and SMEs, fuelled by consultation with large groups and other structures in a position to recommend or refer.

The main issues identified include: i) scientific sourcing in fields with high development potential, mainly upstream (TRL 2); ii) the detection of scientific results of interest to our companies, which could be the subject of co-development, co-design (TRLs 2 to 4) or co-maturation (TRLs 4 to 7), on the basis of economic models in risk taking shared between public and private actors, promoting the emergence of deep tech products and services; and iii) the creation of start-ups and the acceleration of their development on disruptive maritime markets.

In a more crosscutting way, the following challenges have also been identified: iv) facilitating the emergence of open innovation tools that meet citizen commitments to new uses; v) increasing and monitoring research partnerships between laboratories and companies; and vi) promoting and opening up to SMEs of experimental and analytical platforms for technologies and equipment with high added value, restructured for this purpose, and combining the skills of the research teams.

4.6. INVOLVEMENT OF SOCIETY, PARTICIPATORY SCIENCES, MEDIATION

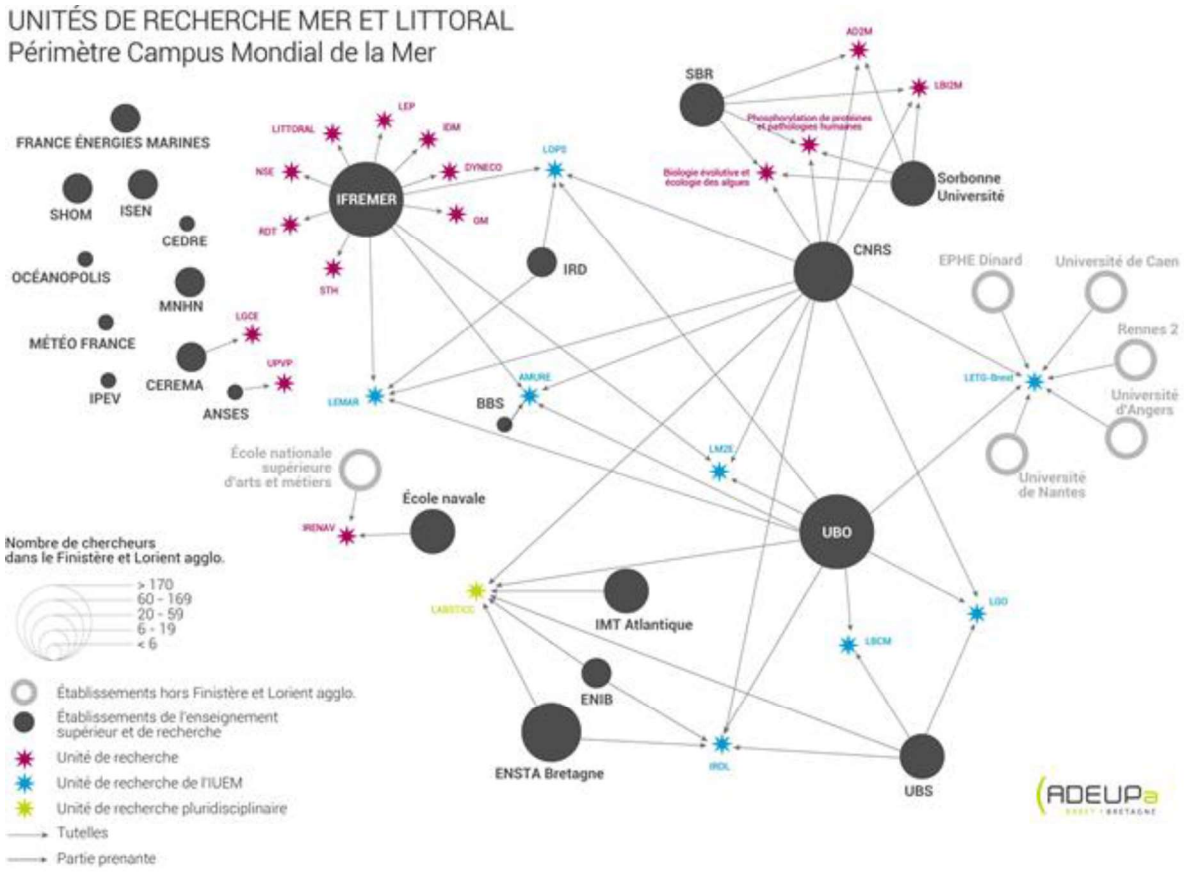
The consideration given by societies to the oceans and coasts is an essential element in the success of the changes to be achieved for a sustainable world. For example, around a conceptually simple problem, namely that of the pollution of oceans by plastics, companies and political organisations at the highest level have been able to take action.

The community's experience in this field is unique, rooted for almost thirty years in a scientific requirement coupled with an implementation of the tools and methods of mediation at the highest level. The first group of research laboratories set up within Océanopolis opens a new era of societal appropriation of marine issues.

The challenge here is to continue and expand this dynamic. Sharing with society the issues related to the erosion of biodiversity within the context of the Holocene extinction, the impact of ocean acidification or that of underwater noise, is a little more complex than raising awareness about plastics. It is therefore up to us to redouble our efforts.

APPENDICES

Appendix 1. Map of the "Marine and Coastal" research units (ADEUPa Brest Bretagne, June 2019).



Appendix 2. SWOT analysis (Strengths - Weaknesses - Opportunities - Threats)

Strengths	Weaknesses
Local access to the resource and remarkable biodiversity, deployment capabilities on all the world's seas Diversity of marine sector organisations in the region from education to industrial and cultural domains, including fundamental and applied research and expertise. Concentration of knowledge and skills found nowhere else in France A concentration of academic institutional actors and public agencies (IFREMER, UBO, CNRS, UBO, *grandes écoles* [leading colleges of higher education], SHOM, MNHN, Cedre, CEREMA, Océanopolis, UBS,...) able to organise themselves together (Europole Mer, then Labex) Numerous research units focused on major environmental and societal issues Attractiveness of training, research, links to businesses in the naval engineering sector (IRDL: top Breton laboratory for CIFRE PhDs) Unique experimental infrastructures: panel of experimental infrastructures (e.g. Datarmor), means of testing and observation (e.g. Vigisat, Sea Test Base, drones...), heavy equipment (e.g. PSO) open to public and private partners, whose access procedures can be consulted through a portal Legitimacy of the region, national and international recognition, international cooperation, participation in numerous European projects "Public-private" collaborations via Pôle Mer Bretagne Atlantique, France Energies Marines, Campus Mondial de la Mer Campus of maritime industry careers and qualifications Vitality in the field of scientific mediation and participatory science	Valorisation, research transfer: scope for improvement. Relations with industry, sometimes tenuous or highly conjectural (few mixed public-private labs exist) Difficulty in attracting industrial partners meeting the needs of the region; the ecosystem requires strengthening at the industrial level In some areas, research strategies are insufficiently developed in in connection with companies or need to be more consistent with the training offer Insufficient cross-functionality between marine and other disciplinary fields Network functioning, or insufficient as a real ecosystem (more permanent solutions should be developped), no organisation to "hunt as a pack" at the European or international level Lack of world-league leadership (difficulty of creating an institutionalised international centre) Lack of reputation and clarity of some maritime and marine training. Identification of what is missing in the region, a more general, national or international approach Precariousness of young researchers

Opportunities	Threats
Continue the federation of actors: Campus Mondial de la Mer Transfer of IFREMER's headquarters to Brest Matching high expectations: from society in terms of environmental protection; from companies and laboratories for access to research infrastructures Exploitation of the potential of the MRE (polder, tests, etc.), of the Marine Data and Processing Centre Startups such as Eolink and Eodyn, supported by the Technopôle Brest-Iroise Disciplinary crossovers between marine/healthcare, marine/IT, marine/social and human sciences, etc. European opening of Competitiveness Clusters (Phase IV)	Industry investments oriented towards Nantes (e.g. Naval Group on the Bouguenais Technocampus site) Room for progress to "embrace" the Sea in all its dimensions: the Ocean as an object of study, but also shipbuilding and repair, logistics, the maritime industry of the future, naval cyber defence, etc. Future of certain traditional maritime sectors established in the region Have a policy of maintaining large equipment in operational condition Avoid dispersion and organise the community's response to feedback from projects, by taking full advantage of complementarities and mutualisation. Expanding the scope of the Campus Mondial de la Mer

WP3 - Round Table: Blue Growth

Policies to support entrepreneurship in the marine sector

Santa Cruz de Tenerife, Spain
28 June 2019

Innovation in the Marine Environment

Objectives

- **Provide stakeholders with an opportunity to formulate a regional Blue Growth strategy.**
- **Gain deeper understanding of the current regional state of the marine sector and Blue Growth strategy from a stakeholder perspective.**
- **Formulate recommendations for policy makers from Tenerife and the Canaries and planning guidelines for marine enterprise within an innovation 2.0 ecosystem.**
- **Achieve stakeholder engagement (industry, academia, government) and community building in the marine sectors.**
- **Raise awareness of the ProtoAtlantic policy round table workshops, mentorship programme, and prototyping and testing opportunities.**
- **Promote the ProtoAtlantic project.**

Executive Summary

On Friday 28th June 2019, ProtoAtlantic partners Innovalia Association and EMERGE hosted the first regional ProtoAtlantic Blue Growth Policy Round Table in The Canaries. The stakeholder event was well attended by a variety of key marine stakeholders in the region, including; SODECAN, ITC, PLOCAN, PROEXCA, Universidad de la Laguna (ULL), FEMETE, Puerto de Tenerife, INTECH, Factoría de Cohesión, Fundación General Universidad de La Laguna, ITER, Spanish Institute of Oceanography (IOE), and the Chamber of Commerce of Santa Cruz de Tenerife.

With the aim of obtaining a holistic view of the Blue Economy in the Canary Islands, a key workshop has been proposed with stakeholders from different related sectors: University, Government of the Canary Islands, Island Government, Accelerators, public and private companies, port authority... The idea was to address what is being done now and the strategies to be followed for the future in order to promote the blue economy. These strategies should be based on the feedback received from the stakeholders in the environment.

In order to achieve that, a session with different blocks has been organized following this agenda:

- Introduction of the workshop
- PESTLE Analysis
- SWOT analysis

The purpose of these analyses has been to address the perspectives of each stakeholder involved in the round table in relation to the blue economy based on their experience. We want to know the main issues identified in terms of infrastructure, economic promotion, employability, linked with other sectors, attraction of investment and expected results.

Once the current issues and limitations of the blue economy in the Canary Islands have been discussed, different ways of mitigating them and promoting the region's strengths will be explored. Thus, the SWOT matrix can be built as a tool to do it.

Agenda

8.30-9.00	Reception + Coffee
Scene Setting	Welcome: Jorge Galván, Innovalia Blue Growth in Canary Islands - Atlantic Area - Protoatlantic Project - Ice breaker
First Session	The Canary Islands situation (PESTLE analysis) Open Forum – Group Discussion
Second Session	The future of the Blue Economy in the Canary Islands (SWOT analysis) Open Forum – Group Discussion
12.00	Closing

1) Introduction

The workshop was introduced by Innovalia, host of the meeting and leader of the Protoatlantic Project. At this point of the session, Jorge Galván provided basic blue economy concepts so that all session participants had at least a starting point. Later, the objective of the Project was explained, as well as the partners who participate, the activities that have been carried out and those that remain to be done in ProtoAtlantic.

Within this explanation, the importance of work package 5 took on a bigger role because of its stronger relationship with the current situation in the Canary Islands. Entrepreneurship and support for employability are fundamental elements of the strategies that the Canary Islands address related to the blue sector.

Below are the slides shown during the introduction:

Interreg Atlantic Area
European Regional Development Fund

Proto Atlantic

Interreg Atlantic Area
European Regional Development Fund

Proto Atlantic Innovation in the Marine Environment

Mesa redonda – Blue Growth
Políticas de apoyo al emprendimiento en el sector marino

Tenerife, Junio 2019

www.protoatlantic.eu

Canarias
Orkney
Cork
Brest
Oporto

Southampton
Casablanca

A model for prototyping and exploitation of innovative ideas in the maritime sector

Nov 2017 to Nov 2020

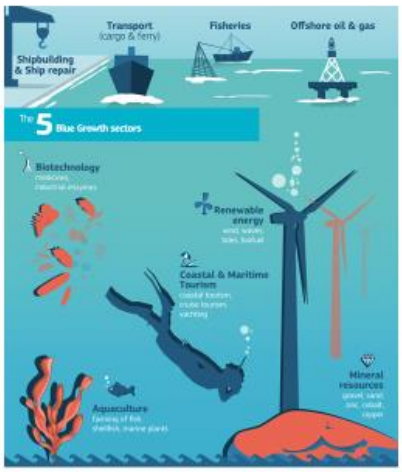
www.protoatlantic.eu

Capitalisation
Policy and infrastructure and funding analysis

Idea to Market
Process modelling and community building

Acceleration
Programme and business support

Prototyping
Fast Track Product Development



"The focus on 5 innovative maritime sectors has delivered"

- ❑ Explosive growth in offshore wind farms, now accounting for 150,000 jobs
- ❑ Roadmap for wave and tidal energy
- ❑ Regulatory barriers to aquaculture
- ❑ Marine tourism growing
- ❑ Market penetration for marine biotech products
- ❑ Tech for impact assessment of deep-sea mining

Challenge: Insufficient investment to take maritime innovation to the market

2) PESTLE analysis

Once the current context of the blue economy was exposed and the location of this workshop, we proceeded to open a discussion segmented by topics. The PESTLE served as a starting point to identify the current situation in each of the important issues selected to be discussed during the session surrounding the blue economy in Tenerife and the Canary Islands.

The PESTLE discussed the political, economic, social, technological, legal and environmental situation in an open way in order to know the points of view of every stakeholder in the Canary Islands.

Through questions prepared beforehand, the topics were presented to the attendees themselves to be able to participate by sharing their viewpoints.

The following questions were presented to the audience to guide the discussion:

- What influence do legal and regulatory factors have in the Canary Islands on the probability of success and profitability of the business in blue growth sectors?
- What are the investment and financing access conditions for a new business located in the Canary Islands in the blue growth sectors?
- What social, cultural and educational factors have a bigger impact on entrepreneurship in the Canary Islands in blue growth sectors?
- How can we use the technological component and infrastructures available in the Canary Islands to stimulate entrepreneurship in blue growth sectors?
- How does the environmental factor affect the blue growth in the Canary Islands?
- Is the Blue Economy developing its full potential in the Canary Islands?
- How can we improve and extend the impact of innovation projects? Is there a mapping of all the existing ones? How can we guarantee the sustainability of their results?
- What is the role of Ports as hubs? How can Ports guarantee the sustainability of cities? What can be the impact on the Canary Islands of the State Funds for innovative ideas and projects?
- Involvement of large maritime companies in innovation. Open Innovation: Why are there still barriers to SME and entrepreneurs?

- What milestones should the Canary Islands reach before 2025?
- Does the Canary Islands have enough specialists with the skills/knowledge for the growth of the blue economy? How can it be promoted (FP, specialized master's degree)?
- Public versus private capital. What is the situation? How can we attract more private investment from the Canary Islands?
- What kind of leadership is needed in the Canary Islands in order to advance the objectives pursued by the Canary Islands Government's Blue Economy Strategy?

At this point it could be observed how the different institutions discussed about different issues although in most of the cases had similar opinion and impressions about Blue Growth in the Canaries.

Innovalia and Emerge teams moderated the session and took note of what was discussed in the workshop.

Below it is presented the slide that was shown during the PESTLE analysis:

3) SWOT Analysis

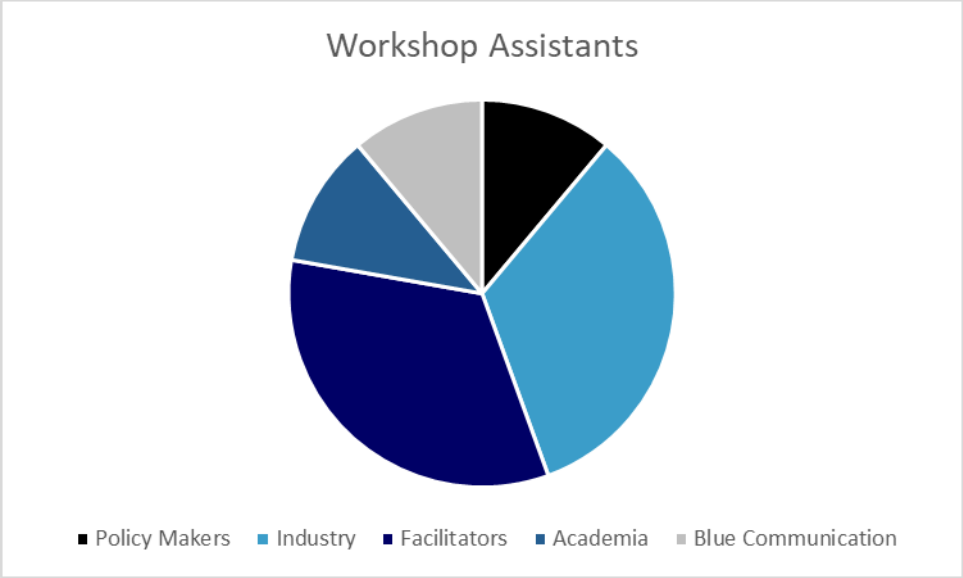
The initial idea was to schedule a second session at 10:30am after the PESTLE analysis in which participants would be divided into groups and analyze the current state of the Blue Economy in the Canary Islands. However, the conversation during the PESTLE analysis contributed to the creation of a friendly environment to develop the SWOT analysis in the same format, so this part of the session was developed in the same way nested with the first one.

This part of the session contributed to clarify the internal aspects of the blue sector in the Canary Islands listing the weaknesses and strengths. On this basis, an open discussion was generated to identify the aspects that threaten the sector and the opportunities for future growth.

As shown below it is presented the slide that was displayed during the SWOT analysis:

Lessons to be learnt in Canary Islands

The main stakeholders involved in the Blue Growth Strategy of the Canaries attended the round table. The attendees come from the following sectors:



Attendees agree on the need for a stronger influence within Europe in terms of blue economy. Canary Islands occupy a privileged geographical position that allows it to be the link between three continents: Europe, Africa and America. From this, the attendees achieve the following conclusions:

1) There is a lack of support from the government to ensure that the actions of the government and the companies go in the same direction. It is necessary a clear mission and vision defining the roles of every stakeholder of the ecosystem. In this way, it is difficult to advance in terms of entrepreneurship in the blue sector if the binomial business-government is not clear.

2) It is necessary to understand that entrepreneurship policies can be supported by other kind of initiatives, such as innovation policies. In spite of the fact that public authorities (which are the ones that promote them) tend to be confused, it can be considered that some of them feed each other.

However, it is important that the entities that make up the Canary Islands economy understand that investments in entrepreneurship, research and innovation are not dependent on each other and that some should be carried by companies and some others should be promoted by public

administrations. It is suggested that Ports of the Canaries and the Government of the Canaries could be more coordinated in order to work together to convert the Canaries into a reference in the Blue Growth Economy.

3) It is concluded that Canary Islands companies are investing a very small amount in R&D compared to other regions and, therefore, two actions are required:
   - To raise awareness about the benefits of R&D&i. The companies that invest in R&D&i have clear benefits.
   - Channel public funds towards tangible objectives, which could be specified in the blue growth strategy.

4) There is consensus that greater incentives to promote entrepreneurship and innovation are needed within the Canarian economy and, especially within the Canarian Blue Economy. These incentives can be basically defined as economic resources through financing, grants or foreign investment attraction. This is all necessary to ensure that the blue sector has a greater influence within an economy that is required to face the sea.

5) It is suggested that it would be easier for entrepreneurs and workers in the sector to recover their "enthusiasm" through incentives. From another point of view, illusion exists in the canarian blue sector. A large number of startups and companies want to come to PLOCAN facilities to advance with their projects, but many of them find difficulties due to excessive bureaucracy.

6) In the Canaries, there are two financing options for companies in the sector: Loans and Guarantees for companies offered by SODECAN, Cervera subsidies from the CDTI and the Fondo Canarias Financia I, which 85% is contributed by ERDF Funds.
   The blue financing scheme in the Canary Islands is distributed as follows:
   - For R&D Actions: Grants - **CANARIAS FINANCIA 1** and **CDTI. CDTI funds in the Canaries are not covered completely in the last calls.**
   - For Innovation Actions: Credits – **SODECAN. It is also discussed that time dedicated to justify this kind of credits should be reduced by decreasing the number of documents that have to be delivered.**

7) The largest open-innovation fund for the port-logistics ecosystem, Ports4.0 is also discussed.. This project aims to promote the development of the Spanish ports through the enhancement and facilitation of the transition from the logistics-port sector to the smart ports. It is addressed for disruptive ideas and projects in all development phases. This is proposed as the main solution for the lack of funding in the blue industry at the national level.

8) There is a strong focus on the fact that the Canarian government situation is not favorable to the uniform promotion of the blue sector because the authorities and competences are completely decentralized. It is agreed that the most favorable way to promote this sector would be the existence of a "Sea Regional Council" to lead a clear strategy for the Canary Islands as a whole. This barrier could be minimized if similar departments are converted into only one. In the Canaries, 7 different sectors have been identified related to blue growth. Every sector has their own competences, and it is necessary to centralize into only one.

9) In accordance with the need to have a collective and centralized strategy and the existing disorder on the lines to be followed, the lack of leadership on the part of blue companies is one of the main obstacles.

10) It is proposed that the Government of the Canary Islands should coordinate a strategy based on the strengths and opportunities of the islands so that all the participants in the sector can focus on a specific direction, so that synergies can be exploited through alliances between companies in the blue sector.
PLOCAN is currently working on the Canary Islands Blue Economy Strategy in collaboration with the Government of the Canary Islands. In this way, a solution could be found to the lack of guidelines in the blue sector of the Canary Islands economy. This new strategy will be tailored to the Blue Growth of the European Union coordinating all the value chain, such as Administration, Industry, Academy and the society

11) We are not taking full advantage of the opportunities offered by the Zona ZEC to attract investment and large projects that promote job creation within the sector.

12) From the Canarian Government's viewpoint, it is important to highlight the aquaculture because currently the development level is very low for a coastal region.

13) Special emphasis is placed on the promotion of activities such as desalination, water treatment, renewable energies and blue biotechnology. Although the latter is expensive and it is difficult for companies to find a profitability.

14) The lack of financing in the sector is directly related to the shortage of blue products and services in the Canary Islands. INTECH tries to improve and adapt the products and services from companies in other sectors to the blue sector in order to promote its growth.

15) It is not easy to find Canarian companies which work in blue economy, so it is difficult to know what is being done in blue issues and who is carrying it out. This lack of information within the sector itself, makes it difficult to find partners to advance faster and more efficiently. In short,

each company does its job and advances slowly over what it considers appropriate. There are no synergies.

In order to provide a solution to this issue, it is proposed that the companies need to be proactive and showwhat they are working on in order to promote entrepreneurship and achieve synergies to mitigate the complexities of the sector.

16) In the Canary Islands, there are predefined ideas that limit entrepreneurship and economic growth. In relation to this, there is a special tendency to the university entrepreneurship model (based on creativity) and other kinds of entrepreneurship are left aside. The University of La Laguna said that 90% of entrepreneurs are demotivated and they do not believe in their own projects. Moreover, talent is leaving the Canaries and going abroad.

17) PLOCAN identifies an increase in the intention of investment and company creation despite the existing obstacles.

18) Attendees usually attend workshops and meetings about this subject and specific conclusions are usually reached. However, they show their concern for the poor response of governments to solve current problems and advance based on strengths and opportunities.

SWOT Results

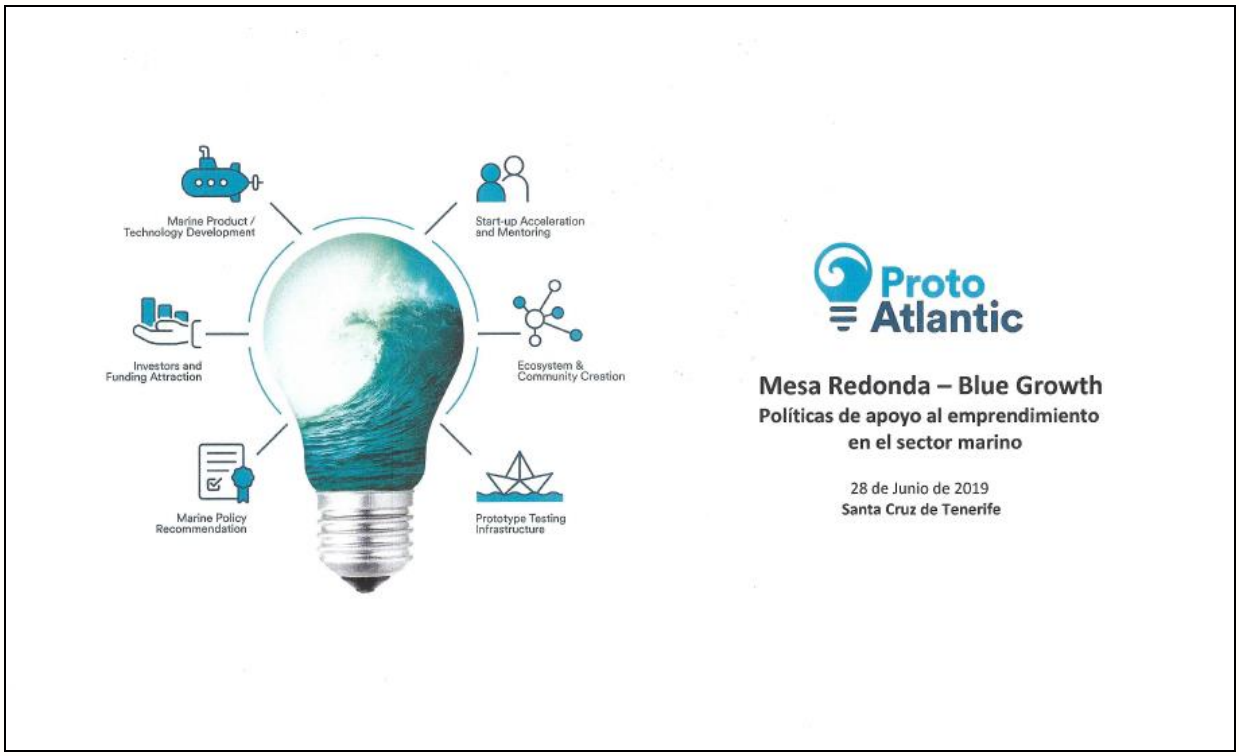
STRENGTHS	WEAKNESSES
- The Canary Islands is a region where entrepreneurship is stimulated. - Many companies want to come to the Canary Islands to test their products with the infrastructures available. - The authorities have a clear idea about how to canalise the funds according to their objective.	- Lack of a "Sea Regional Council" and/or collective strategy for the development of the Blue Economy in the Canary Islands. - Lack of agreement between public administrations and companies about the latter's needs. - Lack of coordination between all the stakeholders involved in the Blue Growth Economy. - Lack of information about what is happening in the sector from the companies themselves. - Entrepreneurs are still not aware of the need to invest in R+D+i. - Entrepreneurs are not aware of many aids available within the sector for research and innovation. - Lack of leadership by companies in the sector. - The entrepreneurship model promoted is based on the same bases and is not versatile. - Lack of specific training in blue economies
OPPORTUNITIES	**THREATS**
- Many initiatives to enhance innovation and entrepreneurship. Many of them are complementary - New financing and development opportunities with Ports 4.0 - Zona ZEC is a great way to attract foreign talent and funding. - Activities in which there is potential for improvement: aquaculture, desalination, water treatment, renewable energies and blue biotechnology.	- The blue sector in the Canary Islands is missing opportunities because of the lack of awareness. - Excessive bureaucracy represents a barrier to entrepreneurship - Many of the main activities on which the new strategy can be built are very expensive or unprofitable in the short term.

Goals/Milestones for the future (2025):

At the end of the session the main stakeholders were asked to list the main milestones that the Canary Islands should achieve in order to promote a blue economy. The answers were the following:

1. Fostering basic research in the sector
2. Advance towards renewable energies
3. Starting to build developments on blockchain technologies
4. Promote specialised training, so that it has an impact on research.
5. Link these stakeholders, so they can move forward together and achieve mutual benefits.
6. Remove non-technological barriers (mainly bureaucracy)

Annexe: List of participants



28 de Junio de 2019
Santa Cruz de Tenerife

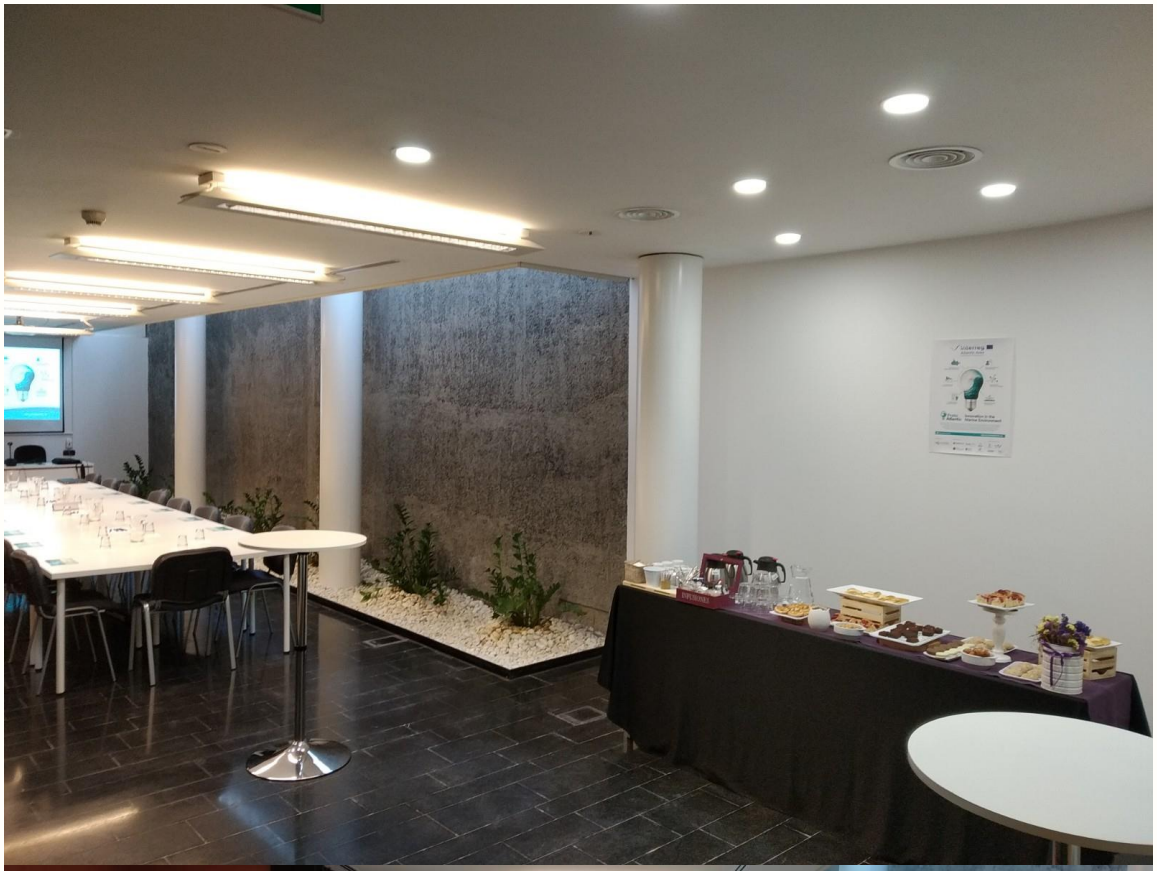
No	Nombre y apellidos	Entidad	Firma
1	MIRIAM RUEDA MARCEGA	ENERGE	
2	MARÍA NARANJO ALMEIDA	EMERGE	
3	JOSE JOAQUIN BETHENCOURT PADRON	SODECAN	
4	JOACA V. BARRIOS NDEZ	INTECH TENERIFE	
5	JUNIA TABRAUE ORTIZ	PROCEXCA	
6	RUMEN JUSTO REYES	emprende ULL - FGULL	
7	ALMA CRUZ DIEZ	INSTITUTO TECNOLÓGICO DE CANARIAS, ITC	Alma Cruz
8	Alicia R. MEDEROS	CEO EUROPA Rup - Azul Rup	
9	JESÚS RODRÍGUEZ ÁLAMO	INSTITUTO TECNOLÓGICO Y DE EN. RENV.	
10	EUGENIO FRAILE NUEZ	INSTITUTO ESPAÑOL DE OCEANOGRAFÍA	
11	AYOZE CASTRO ALONSO	PLATAFORMA OCEÁNICA DE CANARIAS	
12	Alberto Dieter Graeff Pez.	FACTORÍA DE COHESIÓN	

No	Present Person	Name of organisation	Region (Country)	Signature
13	JULIO BRITO SANTANA	FGULL	CANARIAS	
14	SANTIAGO YANES DÍAZ	AUTORIDAD PORTUARIA SCTF	CANARIAS	
15	Nicolás Quintana Ramos	T. Quintana (Adiren-CanaValle)	CANARIAS	
16	KEVIN S. NANWANI MEDINA	INNOVALIA ASSOCIATION	CANARIAS	

In addition to the presence of the attendees to the event, we also have the representation of the Government of the Canary Islands through videoconference:

17	Gonzalo Piernavieja Izquierdo	Gobierno de Canarias	Canarias	

Annexe: Pictures of the event




cidihub


Interreg
Atlantic Area
Proto
Atlantic
Innovation in the
Marine Environment
www.protoatlantic.eu

Annexe: Diffusion of the event on TV/social media

This workshop was promoted on the Canary Islands public television (RTVC) within the innovation and technology programme "Canarias 2.0": (click on the image)
It has been been also promoted in the web of Emerge and in the social networks of the partners of the Canary Islands (Innovalia and Emerge).

ProtoAtlantic Blue Growth Policy Round Table Workshop Report

Workpackage 3 – Capitalisation

12 November 2019

Porto, Portugal

Innovation in the Marine Environment

Contents

Executive Summary

ProtoAtlantic, an Interreg project, aims to develop and validate a model for the prototyping and exploitation of innovative ideas in the maritime sector in the Atlantic Area. Work package 3 in ProtoAtlantic will provide a review of the policy support for maritime enterprise nationally and at an Atlantic Area level. Work package 3 further aims to provide sustainability measures with practical guidelines on policy frameworks and as such will hold consultative Blue Growth Policy Round Table Workshops in the ProtoAtlantic partner regions.

The objectives of these workshops was to 1) gain an understanding of the current state of marine areas from the stakeholders' perspective; 2) identify potential strategies for the Blue Growth development.

The policy workshop aimed at regional stakeholders including local and regional policy makers, business and industry stakeholders, academia, and aspiring local entrepreneurs. The policy round table workshop is one of a series of five sessions, which will be taking place across the Atlantic Interreg region over the coming months, with events planned in Las Palmas, Brest, Porto, and Orkney in early 2019.

The coastal city of Porto as well as all the coastal region of the north of Portugal has huge potential as an international hub for marine activities. This workshop allowed the participants to understand the constraints of the sector in the region and to discuss future blue growth strategies. The main conclusions of the workshop were that measures are needed to support start-ups and companies, speed time to market, reduce constraints and "obstacles" to the development of business in the maritime area.

1. Introduction

Blue growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole. Seas and oceans are drivers for the European economy and have great potential for innovation and growth. It is the maritime contribution to achieving the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth. The 'blue' economy represents roughly 5.4 million jobs and generates a gross added value of almost €500 billion a year. However, further growth is possible in a number of areas which are highlighted within the strategy.

The sea has always been an important part of the Portuguese identity—both historically as well as geographically - and the government aims to double the 'blue economy' share of Portugal's economy to reach 5% of GDP. Portugal has the largest Exclusive Economic Zone in the European Union; its marine territory is 18 times larger than the Portuguese mainland territory. As such, and in combination with the Douro River which runs through the city and extends into Spain, Oporto has a competitive advantage compared to other coastal areas. For centuries, Oporto was the leading European hub for maritime trade, exporting regional products such as regionally grown produce and Port wine. While Oporto has experienced a significant decline in entrepreneurial activities and international financial investments, marine related businesses are still concentrating in Oporto. The coastal region of the north of Portugal has huge potential as an international hub for marine activities. The Port of Leixões, which is 10 kilometres from the Porto city centre and approximately five kilometres from the Douro River, between Leça da Palmeira and Matosinhos, is the largest in the Northern Region. This Port is one of the most important ports in the country, it is endowed with quays (a conventional quay for general cargo and solid bulk and a quay for liquid bulk), terminals (terminals for tankers, containers, multi-use and cruise liners), a yachting marina, a fishing harbour and specialised facilities (such as for deposits and warehouses). Every year, it handles around 14 million tonnes of goods (such as textiles, wines, granite, wood and automobiles) and around 65 thousand passengers pass through the Port of Leixões. With the work for building a new Cruise Terminal in Matosinhos, this port will make an increasing contribution towards the growth in tourism in the North, with more and more cruise ships and more passengers passing through.

Portugal's Blue Growth strategy seeks to develop marine activities along the coastal areas by enabling faster and easier processes to promote growth, investment, and research. There is a lack

of available networks for SMEs and start-ups on a regional level, consequently there is an opportunity for Oporto to develop an infrastructure enabling innovation to increase regional competitiveness in marine sectors. Oporto hosts Portugal's one of the most influential research institute, INESC TEC which provides R&D in power and energy, and industry and innovation, among others. Oporto's geographic characteristics and their R&D expertise provide a unique opportunity for the
sustainable development of regional marine sectors, such as maritime trade, tourism, innovative boat designs, and marine robotics.

ProtoAtlantic, an Interreg project, aims to develop and validate a model for the prototyping and exploitation of innovative ideas in the maritime sector in the Atlantic Area. The ProtoAtlantic consortium consists of international partners INNOVALIA and EMERGE based in Las Palmas (ES), Technopôle Brest Iroise and Brest Metropole in Brest (FR), INESC TEC in Porto (PT), the European Marine Energy Centre (EMEC) in the Orkney Islands (UK), Cork County Council and University College Cork (IE), each of which providing a unique approach to the Blue Growth sector development. ProtoAtlantic will provide a review of the policy support for maritime enterprise nationally and at an Atlantic Area level. ProtoAtlantic aims to provide sustainability measures with practical guidelines on policy frameworks and as such will hold consultative Blue Growth Policy Round Table Workshops in the ProtoAtlantic partner regions.

On November 12th, 2019, INESC TEC in collaboration with Fórum Oceano and CETMAR hosted workshop 3, Blue Economy Financing, of this year's edition of Business2Sea. The format was slightly different from the other ProtoAtlantic Blue Growth Policy Round Table Workshops but the objectives and results were similar. The workshop targeted at Blue Growth stakeholders including local and regional policymakers, business and industry stakeholders, academia, and aspiring local entrepreneurs. The workshop was attended by 99 participants (see Appendix I for list of attendees). The workshop was one of a series of five sessions, which took place across the Atlantic Interreg region during the last year.

The workshop aimed to bring together different players, namely representatives of Startups and SME financing systems, business incubator, business accelerators, companies, institutional organizations and investment fund representatives (seed and venture capital) as well as policy

makers, political agencies, associations and clusters, namely the Portuguese sea clusters (Forum Oceano). The objective was to identify the available funding instruments, to discuss the main difficulties and to identify measures to facilitate access to finance.

The workshop kicked off with a short introduction by the moderator, Miguel Marques, partner at PricewaterhouseCoopers (PwC); Followed by the talk by Ruben Eiras, Director General for Maritime Policy from the General Directorate of Maritime Policy (DGPM), entitled Portugal's Blue Ecosystem of Innovation: the key for achieving a blue finance solution. an introduction to the ProtoAtlantic project and Blue Growth. The second talk was by Rui Ferreira from Portugal Ventures. Founded in June 2012, Portugal Ventures is the result of a merger between three of the major Venture Capital Firms in Portugal – AICEP Capital, InovCapital and Turismo Capital, thus playing a key role in the financing and growth of the Portuguese entrepreneurship ecosystem. Sónia Ribeiro presented the support program MARE STARTUP. Susana Pinheiro from UPTEC MAR presented some available tools for financing the Blue Economy such as idea competitions, Accelerator programs, public funds, incentive schemes and venture capitals. Following this introduction to available funding tools, Carlos Pinho, business developer at INESC TEC, presented the ProtoAtlantic project, this presentation raised some interest by DGPM, Capital Ventures and PWC. In addition to the presentation of the project: objectives, partners, market gaps that will respond, sequence of support for the validation of ideas and technologies, network of collaboration and articulation, an analysis of the advantages and opportunities of the project model for the different stakeholders (with a focus on entrepreneurs) in the most diverse sectors of activity of the sea economy. The last talk was done by Silvia Moreno, representing the Spanish member of KPMG International Cooperative, she introduced the PORTS 4.0, the largest open-innovation fund for the port-logistics ecosystem.

The presentations were followed up by a round table to examine Porto's and north of Portugal's current state of Blue Growth potential from a short-term and long-term perspective.

2. Results

2.1 Stakeholder engagement in the Workshop

The consultative policy workshop in Porto, hosted at the Alfândega do Porto Congress Centre, on November 12th, 2019 was attended by 99 stakeholders with a diverse background and invested interest in the regional blue growth development (Fig 1).

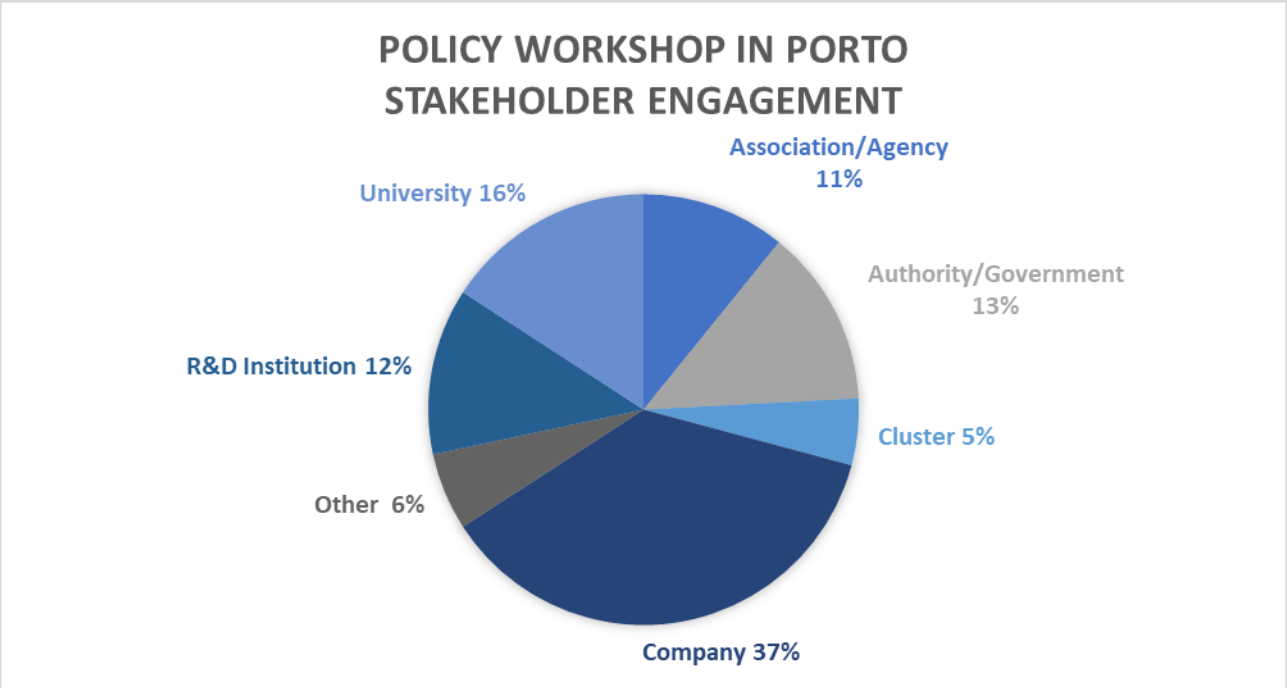


Figure 1 - Blue Economy Financing Workshop Audience

The workshop started with a set of presentations followed by a round table discussing regarding blue economy financing. These creative brainstorming activities allowed the stakeholders to reflect on their own experiences and ideas of what blue growth means to them individually, before discussing the current regional state and identifying potential blue growth strategies (fig 2).

Figure 2 - Blue Economy Financing Workshop

The workshop was held under the international event, Business2Sea, dedicated to the development of projects and business in the different sectors of the Sea economy, open to the participation of all organizations. This association allowed us to reach a wider/broader audience and to ensure the presence of stakeholders and policy makers. ProtoAtlantic project was also showcased on the exhibition area at INESC TEC's booth, where we had the opportunity to disseminate the project with more detail, including to possible entrepreneurs with whom we exchanged business cards and even had the chance to explain the project to the Portuguese Minister of the Sea, Ricardo Serrão Santos (Fig 3).

Figure 3 - Blue Economy Financing Workshop. Visit of the Portuguese Minister of the Sea, Ricardo Serrão Santos and Rui Azevedo, secretary-general of Forúm Oceano.

2.2 PESTLE analysis

The PESTLE framework was used to analyse the current state of Porto's marine sectors highlighting the **P**olitical, **E**conomic and **B**usiness, **S**ocial, **T**echnological, **L**egal, and **E**nvironmental enablers and barriers as experienced by the stakeholders.

Political: How do legal issues and government regulations affect the probability of a business being successful and profitable in Blue Growth sectors in Porto?

(+) Moderate Political Risks

(+) Strategic importance of the Oceans

(+) Support for investment and innovation in various sectors of the Sea Economy

(+) Existence of a strategic vision for several sectors (Ports, Knowledge, Science and Innovation,…)

(-) Lack of long-term consensus on investment priorities between major parties (difficulty in achieving), including renewal of the economic fabric

Economic and Business: What role do economy and business play to support business in Blue Growth sectors in Porto?

(+) Interest rates at historically low levels

(+) Growth of some specific activities (and resilience of some sectors during crises)

(-) Fragile and in some cases fragmented sectors, without critical mass

(-) Increased international competition in various sectors

(-) Failures in accessing venture capital to launch new businesses

Social: How do social and cultural factors influence markets, consumer demands, and drivers of social perception?

(+) Skilled labour in ICTs

(+) Reduction of qualified emigration and (some) attraction of qualified immigration

(+) New strategies / policies for society's involvement with the Sea (e.g., school sports)

(-) Lack of qualified personnel in specific areas

Technological: How do technological factors influence Blue Growth in Porto?

(+) Attraction of new technologies and respective tests for PT

(+) Competences of the internationally competitive Scientific and Technological system capable of supporting innovation

(+) A growing entrepreneurial culture, with events such as the Web Summit taking center stage

(+) Establishment of competence centers for multinational companies in the country (eg Google, Amazon, etc.)

(-) Uncompetitive / modernized and / or digitized sectors

(-) Technical, infrastructural gaps and means for testing technologies (i.e., zones for testing in a real environment)

Legal: How do legal factors (health and safety, product safety, standardization) influence Blue Growth in Porto?

(+) Company on the spot and digital counters

(-) Bureaucracy and slowness of the judicial system that does not favor a business environment

(-) Slow, “complex” and bureaucratic incentive / support granting processes

(-) Non-publication of the ornament of the maritime territory

Environmental: How do environmental issues/changes influence the Blue Growth potential in Porto?

(+) Strategic positioning of the country with easy access to Sea and Deep Sea

(+) Increasing consumption of renewable energy (e.g., investments in marine energy)

(+) Growing Environmental awareness (plastic campaigns, clean beaches,…)

(+) Effects of climate change driven by new developments and solutions

(-) Blocking investments due to the lack of broad and healthy discussion on the topics

2.3 SWOT analysis

Stakeholders identified several potential regional blue growth strategies and then outlined and discussed the opportunities and challenges that exist in Portugal for blue growth, and future blue growth strategies, and performing a SWOT (strengths, weaknesses, opportunities and threats) analysis.

SWOT analysis of strategies to support the growth of the Sea economy (“Blue Growth”)

• Public R&D institutes with a long history of projects linked to the sea • Existence of public support for sea economy projects • Incubators in the Sea area and access • Port of Leixões - one of the most active and innovative STRENGTHS	• Difficulties in accessing financing / investment (early stages) • Failure by public authorities to meet deadlines • Difficulties in licensing processes (ex: aquaculture, collection of algae, use of wave energy and offshore wind) WEAKNESSES
OPPORTUNITIES • Existence of Human Resources with high technical competence • Several universities covering different areas • Lower structural costs than the EU average	THREATS • “Small” domestic market • Lack of “tradition” of technology development for the sea • Risk aversion - entrepreneurship

3. Conclusions

The principle take home message was that although there are some available initiatives to support start-ups - such as ProtoAtlantic - with entrepreneurs, R&D, test sites, incubators, venture capital, they are not well known by the general public.

However, several other crucial constraints and “obstacles” to the development of business in the maritime area were pointed out. Aspects that need attention are listed below:

1. Ensure top-down and bottom-up approach organising stakeholder meetings to assess and re-assess Blue Growth strategy
2. Raise public awareness regarding marine issues/marine opportunities/economic and environmental opportunities from early childhood education to instil accountability and fuel interest in marine related areas
3. Nurturing a safety net for marine start-ups and entrepreneurs with Financial incentives/tax breaks comparable to other European regions
4. Creating strong bonds between the general public and the marine resources through easy access of ‘open’ ocean activities
5. Territory planning as a practical step towards implementation of the strategy for the Atlantic region and particularly focused on proper management of the marine resources. The concept of location of existing and future marine activities along with regulatory framework should be available and facilitate the licensing.
6. The National strategy for the sea keeps changing with governments and there is a need for a long-term consensus that should be robust, properly explained and shared with the sector’s professionals.
7. There should be a political support from the government to encourage venture capitals to invest in Sea Economy.
8. Measures should be implemented aiming to speed “time to market”.
9. In order to achieve blue growth, highly qualified and skilled professionals are needed. Yet the maritime sector is experiencing difficulties in finding the right employees, therefore there is a need for improving human resource training policy.

Appendix I: Attendance List

First Name	Last Name	Job description	Organization
Abílio	Martins	Coordenador do grupo de Trabalho do Mar da Câmara Municipal de Lisboa	Camara Municipal de Lisboa
Adriana	Boto		DREAMS
Adriano	Lima	Researcher	INEGI
Afonso	Teixeira	Executive Director	Portuguese Association of Surf Schools
Agnes	Marhadour		CIIMAR
Alexandra	Duborjal Cabral	Técnica Superior	Comissão de Coordenação e Desenvolvimento Regional do Norte
Alexandra	Correia	Projects Cordinator of Alentejo Regional Development Agency	Alentejo Regional Develpoment Agency
Alexandre	Martins	Real Estate Investment Advisor	Euro Brokers
Allen	Silva	CEO	A.L.L.E.N. Global Solutions
Amaury	Behaghel	Founder	SailMyCargo
Ana	Cavadas	Science and Innovation Officer	CIIMAR
Ana	Carla	Science and Technology Manager	MAREFOZ - University of Coimbra
Ana	Rodrigues	Executive Director at Nova SBE Environmental Economics Knowledge Center	Nova SBE
Ana	Azevedo	Researcher PhD Program	Universidade Católica Portuguesa - Centro de Investigação de Estudos Políticos
Ana	Poças	CEO	SWL
Ana Luisa	Almeida		CoLAB +Atlantic
Ana Luísa	Ribeiro	Agência Nacional de Inovação	ANI - Agência Nacional de Inovação
Ana	Lopes		ANI
Ana Paula	Lima	Project Manager	INESC TEC
Antonio	Jorge da Silva	Head of Projects Office	Instituto Hidrográfico
António	Castro Moreira	Diretor executivo	FORUM BLUE SCHOOL
António	Sarmento	President of the Board	WavEC
António	Meireles	Chapter Coordinator	Surfrider Foundation Europe
Antonio Pedro	Maia Brasil	Manager	PIXAIR
Arshia	Gratiot	CEO	Third Space Automation Oy
Augustin	Olivier	Executive Advisor	INESC TEC
Belén	Martín Míguez	Project management/coordination at University of Vigo, Centre of Marine Research	University of Vigo/CIM/ECIMAT
Bibiana	Neves Dantas	Project Manager	ANI - Agência Nacional de Inovação, S.A.
Bruna	Fonseca	Team Leader	F.Iniciativas
Carla	Santos	Project Manager	Local Heroes
Carlos	Baia	Vereador Municipio Faro	Municipio de Faro
Carlos	Faria	Researcher	Universidade do Minho
Carlos	Oliveira	Consultor	ADSA
Carlos	Maio	Executive Manager	QSR
caroline	vodrazka	senior consultant	Marlo
Cátia	Afonso	Técnica superior	Direção-Geral de Política do Mar
Céu	Carvalho	Partner	KPMG & Associados, SROC, SA
Clément	Boulier		National Hub France
Daniel	Fernandez	R&D&I Funding Consultant	Freelance

Daniel	Rey	Head of Campus do Mar	Campus do Mar - Universidade de Vigo
David	Vasques da Silva	Director	Estação Náutica do Baixo Guadiana
Dília	Nunes	Master Student	UALG - Universidade do Algarve
Diogo	Oliveira	Sales Director	Foodintech
Elena	Maneiro Franco		Innovation and BD in fuel saving and electronics
Emanuel	Mendonça	Project Manager	Fundo Regional para a Ciência e Tecnologia
Eva	Flores	Financial Manager	SUBMON
Filipa	Monteiro	Researcher / PhD Student - NextSea	University of Minho
Filipa	Manaia	Innovation Center Manager	QSR
Filipe	Pedro		Docapesca - Portos e Lotas, S.A.
Francisco	Campuzano	Project Manager & Researcher	MARETEC - Instituto Superior Técnico - Universidade de Lisboa
Francisco	Beirão	Coordenador da delegação de Lisboa	Fórum Oceano
Francisco	Castro	Client Engineering	NAVIA
Frederico	Ferreira	Project Officer	Fórum Oceano - Associação da Economia do Mar
Gonçalo	Sousa	Master student in Aquaculture	Universidade Do Algarve
Guilhermina	Rego	PRESIDENT OF THE BOARD OF DIRECTORS	APDL - ADMINISTRAÇÃO DOS PORTOS DO DOURO, LEIXÕES E VIANA DO CASTELO, SA
Helder	Nogueira	Executive Member of the Board	APA - Administração do Porto de Aveiro, S.A.
Helena	Fernandes	Diretora Comercial e Marketing da APDL	APDL
Hugo	Choupina		FI Group
Iria	Santamaria	International Manager	ASIME
Isabel	Valente	Professor / Research	Centro de Estudos Interdisciplinares do Século XX da Universidade de Coimbra
Joana	Fonseca	Manager	KPMG & Associados, SROC, SA
Joana	Moreira-Silva	Science and Innovation Officer	CIIMAR
João	Ferreira	Co-Founder - Head of Business Development	Abyssal
João	Lacão	CEO	Multisector Innovation Consulting
João	Graça	Project Manager	Marlo Consult
João	Baptista	Researcher	Universidade do Minho
Joao Rui	Baptista	Knowledge & Research manager	PwC
João Vaz	Silva	Director	Triede TI
Joaquim P.	Marques	Diretor	YUNIT
Jorge	Silva	CEO	Martec
Jorge	Narciso	CEO	SWL
Jorge	Vieira	CEO	UNDERSEE
Jorge	Santos	Software Engineer	TRIEDE TI
Jorge	Tavares	CEO	A2O / NAVIA
José	Pinheiro-Torres	CEO	N9VE - Nature, Ocean and Value, Lda
José Carlos	Lopes	Executive Advisor	POSITIVE SINAPSE CONSULTING, LDA.
JOSE LUIS	GARZA SILVELA	GENERAL COORDINATOR	VIDA LACTEA, SLU
Juan Antonio	Oliveira	Business Unit Manager Structures & Marine Applied Engineering	CT Ingenieros
Juliana	Monteiro	Coordinator and Funding Adviser	FCT NOVA
Leonel	Dias	Software Engineer	TriedeTI
Liliana	Gonçalves	Financial Officer	Fórum Oceano
Lourenço	Ramos Pinto	PhD student	CIIMAR, SPAROS Lda., ICBAS-UP
Lucia	Fraga	Head of Training Department, CETMAR	CETMAR_Centro Tecnológico del Mar

Luiz	Vieira		DIS Desenvolvimento Inovação e Sustentabilidade, crl
Manuel	carrasqueira	chairman	qualiseg
Manuel	Vaz da Silva	Director	Triede TI
Márcia	Pinheiro		DGPM
Maria	Ferreira	Consultora Sénior	IST - Instituto Superior Técnico
Maria da Luz	Fernandes	phD Student	CESAM/University of Aveiro
Marijn	Rabaut	International Marine Policy Manager, MSP Expert	Blue Cluster Flanders
Marisa	Fernández	Head of department	Centro Tecnológico del Mar - Fundación CETMAR
Marisa	Lousada	Senior Manager	KPMG & Associados, SROC, SA
Martins de	Almeida	Managing Director	Sevways
Miguel	Bacelar	Technology and knowledge Transfer	Universidade de Trás-os-Montes e Alto Douro
Miguel	Marques	Partner	PwC
Mónica	de Brito	CEO	Sines Tecnopolo
Nader	Hassavari	CEO	Ocean power parks
Naiara	Hernández	Associate Researcher	iBET - Instituto de Biologia Experimental e Tecnológica
Noelia	Estévez Calvar	Project manager at National Hub Spain & Campus do Mar - Universidade de Vigo	Spanish National Hub & Campus do Mar - Universidade de Vigo
Nolwenn	BEAUME	European project officer	Pôle Mer Bretagne Atlantique
NUNO	GOMES	Innovation Advisor	INNOSCIENCE
Nuno	Leitão	Co-Founder and CFO	Sea4Us, Lda.
Nuno	Machado	TI support and Customer manager	A2O / NAVIA
Nuno	Ribeiro	Senior Technician	DGPM
Pablo	Fidalgo	Project Manager	The Galician Association of Metal Industries - ASIME
Patrick	Freire	Executive Director	BioMimetx
Paula	Madeira	Head of Programming and Monitoring Department	Direção-Geral de Política do Mar
Paulo	Reis	Diretor Geral	F. Iniciativas
Pedro	Reis	Manager	PwC
Pedro	Valle Teixeira	Consultant	MDS - Global Insurance & Risk Consultants
Pedro	Vidal		xunta de galicia
Rafaella	G. Corrêa	PHD Student	Universidade Federal de Santa Catarina/UMinho
Raquel Gaião	Silva	Communication Officer	Bluebio Alliance
Ricardo	Pinho		PwC
Rita	Silva	Senior Project Manager	ANI (Portuguese National Innovation Agency)
Ruben	Eiras	Director General for Maritime Policy	DGPM - Diretorate General for Maritime Policy
Rui	Reis		ETE
Rui	Costa		Ubiwhere
Ruy	Esteves	IT Administrator	Área Metropolitana do Porto
Silvia	Moreno Lombardo	Senior Consultant - Strategy and Digital Customer	KPMG Spain
Silvia	Torres López	Head of the Marine Technologies Unit	CETMAR
Susana	Moreira	Science and Innovation Officer	CIIMAR
Teresa	Amaro	Investigadora	CIIMAR
Tomas	Galamba	Trainee	ANI
Vanessa	Huertas Mosquera		ASIME
Vitor	Vasconcelos	Director	CIIMAR

Vítor	Verdelho	Board Member	A4F
Vitória	Lindo	Business Development Executive	TRIEDE TI
Vitorium	S L	CEO	VITORIUM,SL
YURI	COSTA	Oceanographer - Ecologist	CIIMAR
Zacharoula	Kyriazi	Postdoctoral Researcher	CIIMAR

Interreg Atlantic Area
European Regional Development Fund

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

emerge

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES

marine southeast

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu

ProtoAtlantic Blue Growth Accelerator Programme:

Investment Opportunities and Roadmap

University College Cork
October 2020

Innovation in the Marine Environment

Content Table

Introduction

Blue Growth, a term first coined by the European Commission as "an initiative to harness the untapped potential of Europe's oceans, seas and coasts", identified rich marine resources as an unique asset for economic development in coastal regions and on islands. The European Commission has through the Blue Growth objectives for the first time highlighted marine sectors as high growth market opportunities which carry socio-economic importance to the development of coastal regions. Particularly marine sectors such as aquaculture, marine robotics, and marine renewable energy which fulfil global needs in food safety and security, enable monitoring and exploration in harsh and remote conditions, and globally growing energy needs are of importance. Marine startups and small and medium-sized enterprises (SME) in these emerging marine sectors require support mechanisms tailored to their needs as they are competing for the same business and financial support as land-based SMEs, yet the research and development infrastructure is more difficult to access.

ProtoAtlantic, an Interreg Atlantic Area funded project, provides marine-specific support mechanisms to marine startups and SMEs in these emerging sectors, including business support through the accelerator and mentorship programmes, enabling companies to fast track their product development through access to prototyping and testing facilities in all partner regions. The Interreg Atlantic Area encompasses partner regions in France, Ireland, Portugal, Scotland and Spain. The consortium partners consist of Technopôle Brest Iroise in Brest, University College Cork, County Council Cork, INESC TEC, the European Marine Energy Centre (EMEC), EMERGE, and the lead partner, Innovalia Association. The strategic collaboration between the partners also enabled marine startups to access testing facilities in the Atlantic ocean. The extreme living laboratories provided by EMEC, the LiR NOTF testing facilities, and INESC TEC promise harsh real-life conditions which test the suitability of marine technologies to the limit which provide startups and SMEs with an extra layer of confidence in their technologies. This cross-regional collaboration puts the ProtoAltantic programme in a unique position, as it is the first of its kind to dedicate marine-specific support to marine startups and SMEs which have benefited from the opportunities that ProtoAtlantic has provided. Given the success of the ProtoAtlantic project, the objective of this document is to present a roadmap to take forward, such that it can be sustainable and impactful into the future.

There is an opportunity to build on the initial investment in ProtoAtlantic as proof of concept and take the initiative forward in building an accelerator programme that fast tracks progress of marine startups. The vision is to develop the European Atlantic Margin as a global hub for Blue Growth facilitated by state of the art accelerator programmes. The potential to realise this vision is explored in the following sections. First, we review the current state of the art in commercially-led enterprise development initiatives in the marine space. Second, we review approaches to investment in Blue Growth in the private sector. Third, we outline a roadmap for a Blue Growth accelerator programme for the region.

Startup Investment Opportunities

Startups are high-risk enterprises – to survive the 'valley of death' access to financial capital is critical (figure 1). While high risk is involved particularly in startups involved in marine sectors, if successful investing in startups could also yield high growth potential especially when their Proof of Concept (PoC) shows that the startup idea is profitable and scalable. During the early stages, startups typically rely on bootstrapping, i.e. founders, family, and friends (FFF) to support the company. Access to private investment, i.e. seed capital in the form of accelerator programmes or business angels, and early stage financing through venture capitalists and investment funds, could make the difference for startup survival.

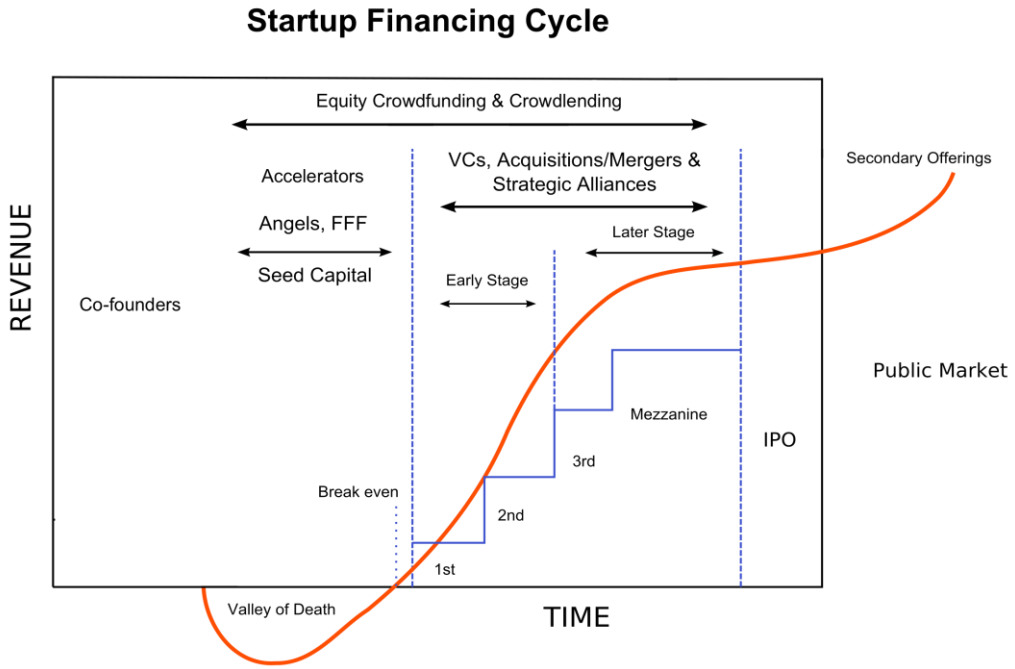


Figure: typical financing cycle for startup company (Commons Wikimedia)

Business angels, also known as angel investors or private investors, are individuals investing their own funds thereby providing much needed capital to startups. Venture capitalists (VCs) are private equity investors providing capital to startups and SMEs that have demonstrated and are promising high growth potential. In exchange for their high-risk investments, business angels and venture capitalists receive company equity or a stake in the company. Other possibilities of accessing private funding include acquisitions and/or mergers and strategic alliances where startups are consolidated with other entities. Initial Public Offering (or IPO) takes place when the startup is in the process of offering shares to the public. Typically, only a fraction of all startups make it to the public market.

There are many pitfalls in the 'valley of death' especially for marine-based ventures, accelerator programmes are of high importance as their support goes beyond the necessary seed capital.

Accelerators as Enterprise Development Initiatives

Accelerators are commercially-led enterprise development programmes which have become vital to a vibrant startup and entrepreneur community. Accelerators are business development programmes which have proven to be important mechanisms for fast-tracking the development of startups and SMEs in emerging sectors thereby nurturing innovation and technology development. Through accelerator programmes successful startups are able to secure funding, receive business advice from highly regarded mentors, and subsequently startups and SMEs will be better prepared to scale their business idea into viable self-sufficient businesses. Prospective startups and SMEs will essentially be put into a supportive and pressurised environment where they will work closely with their mentors and peers to develop their business to the next stage. Each of the accelerator programmes will provide different support mechanisms tailored to the industry needs and requirements. The accelerator programmes also work as soundboards for private investors and venture capitalists as they can follow the development of startups through the accelerator programme and provide funding and scaling opportunities at an early stage.

Accelerators such as *Techstars*, *500 startups*, and *Y Combinator* are designed in a way where every supported startup will receive a toolbox of necessary skills that should be able to support the growth of the enterprise. Most accelerators are open to all types of startups and SMEs across regions and sectors. Variations in accelerator programmes exist, where industry-specific innovation and technology development is encouraged. Startups and SMEs can apply to these industry-specific accelerators which in return will facilitate an introduction to the existing sector-specific infrastructure, this is of particular interest in marine-based sectors.

Marine Accelerators

Marine startups and SMEs largely competing with land-based startups for a coveted spot in accelerators, which is particularly difficult as the support needed for marine-based enterprises differs greatly from land-based enterprises. Typically, marine-based infrastructures are geographically constrained and rare, hence expensive to access. Marine clusters may be able to facilitate some access to these infrastructures. Yet, accelerators dedicated specifically to marine-based startups and SMEs have emerged and have shown to be a tremendous asset to the development of marine startups and the innovation ecosystem in which these startups are embedded in. The following section will give a brief overview over some of the existing marine accelerator programmes and some of the benefits that these provide to their startup members.

Marine Accelerator Programmes

HATCH is the world's first aquaculture accelerator designed to support seed and/or pre-seed startups with innovative ideas and scalable solutions for relevant aquaculture problems and alternative seafood/protein. HATCH is currently present in 3 locations which are located in thriving aquaculture communities such as the National Energy Laboratory of Hawaii in the Hawaii Ocean Science and Technology park, offices in Bergen, Norway and in Singapore. The 15-week long accelerator programme provides access to approximately 50 on-site mentors and close collaboration with the HATCH team. The HATCH accelerator programme organises 3 demo days where startups can pitch to relevant and large audiences, providing a platform for private investment.

More information available at: https://www.hatch.blue/

PortXL is the world's first Port and Maritime Accelerator with accelerator programmes in Antwerp which acts as a local business acceleration focused on lead generation; in Rotterdam focusing on maritime tech startups and scale-ups all over the world; and in Singapore, the maritime hub of Asia where PortXL's extensive network and expertise will help strategize to enable market penetration. The PortXL programme provides a 3-month accelerator programme assisting with market validation, finding clients, providing masterclasses, etc. Beyond the 3-month programme, PortXL continues mentorship and network opportunities, and continues providing access to resources within the PortXL infrastructure.

More information available at: https://portxl.org/

Based in Israel, **theDOCK** is a vertical Venture Capital firm providing an accelerator programme dedicated to reshaping ports, shipping and maritime logistics sectors. The accelerator programme is a 4-month long programme providing access to worldwide leading global maritime corporations for validation, pilot programmes, data sharing, domain knowledge, co-creation, and design partnership. theDOCK also provides active support by a large network of industry and technology mentors along with coaching and guidance on business and financial models, government grants, preparation for investment rounds, pitching and more. Beyond that, theDOCK has a vast network of investors, venture capitalists, and corporate venture arms.

More information available at: https://www.thedockinnovation.com/

Key Performance Indicators of Marine Accelerator Programmes

Key Performance Indicators (KPIs) allow for the quantitative measurement and the qualitative monitoring and evaluation of accelerator programmes and hence are important indicators for the success of any accelerator. The continuous assessment of accelerator KPIs may be of interest to regional development agencies as the KPIs provide insight in the economic potential of emerging sectors, such as Blue Growth sectors.

Quantitative KPIs may include:

- Number of companies operating after they left the accelerator
- Number of jobs created by the supported startups and SMEs after they left the accelerator
- Increase in valuation
- Investment secured by the supported startups and SMEs/amount of money raised
- Number of new patents
- Number of new innovations
- Survival rate of companies

Qualitative KPIs may include:

- Satisfaction of the accelerator programme
- Satisfaction and engagement with mentors
- Support mechanism through the startup cohort

Accelerator programme KPIs also signal investment opportunities in the private sector, ensuring that the startups that have successfully completed an accelerator programme can continue their growth and progress.

Blue Growth Investment in the Private Sector

Investment funds are a way of securing capital for economic development where a group of investors will invest collectively while also benefiting from the advantages that may arise from collaborating within a group. Investment funds are particularly interesting in the economic development of emerging sectors as these provide high growth potential. Examples of investment funds in marine spaces include the BlueInvest Fund and the Blue Angels Investment Group from SeaAhead Bluetech Innovation.

The European Investment Fund (EIF) in cooperation with the European Commission has launched the BlueInvest Fund which allocates €75m in equity funds dedicated to the development of the EU's Blue Economy. The initiatives supported through this fund should aim to contribute to one or more of the EU's political objectives which includes lowering the carbon footprint, creating employment opportunities, and the protection and sustainable use of natural and/or cultural marine capital. The BlueInvest programme funds a broad range of activities in the marine space such as co-investment with equity funds in companies operating in marine sectors. BlueInvest attempts to foster a Blue Economy Venture Capital ecosystem with the aim to attract successful private investment necessary to nurture emerging sectors.

More information available at: https://www.msp-platform.eu/fundings/blueinvest-fund

Applying for BlueInvest Fund at: https://webgate.ec.europa.eu/maritimeforum/en/node/4500

Blue Angels Investment Group, founded in Boston, facilitates investment opportunities and are catalysing a bluetech cluster in the Northeast of the United States. Bluetech stretches across all marine and maritime sectors and as such provides investment opportunities for technology development. SeaAhead focuses on bluetech in maritime and marine industries including shipping, offshore renewable energy, aquaculture, and creating a sustainable and urban waterfront. Blue Angels prioritise bluetech opportunities expecting that the business models of the supported startup companies are profit-driven and have positive environmental impacts such as climate change mitigation or water quality improvement thereby also creating and supporting smart and resilient cities. While the Blue Angels are an investment group which is open to accredited investors and investors taking an interest in the bluetech sectors, SeaAhead is also a hub for startups and SMEs running an incubator, and building up companies in the marine sectors.

More information available at: https://sea-ahead.com/blue-angels

ProtoAtlantic Roadmap

ProtoAtlantic has successfully delivered the first blue growth accelerator programme geared specifically towards marine startups in the Atlantic Area. To continue the success of the accelerator programme the ProtoAtlantic consortium has collectively decided to support marine entrepreneurs and startups and the development of the marine space in the following areas:

Marine Product and Technology Development and Prototype Testing Infrastructure

The ProtoAtlantic consortium continues to support marine product and technology development and provided access to prototype testing infrastructure across the Atlantic area. In particular, the consortium has agreed to continue to provide and share call for applications for startups that want to test at world-renown testing facilities such as the European Marine Energy Centre (EMEC), Lir-NOTF – Ireland's National Ocean Test Facility, and INESC TEC – Institute for Systems and Computer Engineering, Technology and Science and PLOCAN Oceanic Platform of the Canary Islands.

Startup Acceleration and Mentoring

ProtoAtlantic has provided expertise to startups across the Atlantic area in business development and startup mentoring both in-person and online via one-on-one mentoring and via the ProtoAtlantic Stakeholder platform, which is free to enter and provides startups with a unique opportunity to engage with other startups, marine stakeholders, and investors.

Investor and Funding Attraction

The ProtoAtlantic consortium has engaged with investors interested in marine startups in and outside the Atlantic Area. ProtoAtlantic will continue to facilitate collaborative events whereby marine startups and entrepreneurs will be able to engage and connect.

Marine Policy Recommendation and Ecosystem and Community Support

ProtoAtlantic has also provided marine policy recommendations for the partner regions with blue growth and the sustainable development of coastal regions in mind. The ProtoAtlantic consortium will continue to engage with stakeholders within across the Atlantic Area to ensure that the development of coastal regions and marine sectors continues along a sustainable trajectory. ProtoAtlantic will continue to nurture a cross-national ecosystem and community across the partner regions and will continue to strengthen the cross-sectoral collaboration among the partners through online and in-person meetings.

Interreg Atlantic Area
European Regional Development Fund

EUROPEAN UNION

Lead Partner

innovalia ASSOCIATION

Main Partners

INESCTEC

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

EMERGE
STARTUPS · INNOVATION

Cork County Council
Comhairle Contae Chorcaí

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

TECHNOPÔLE
BREST-IROISE

Associated Partners

Ayuntamiento de Las Palmas de Gran Canaria

HAPPY VENTURES
A world of possibilities

marine south east

Brest Métropole

@protoatlanticEU

www.protoatlantic.eu