Interreg Atlantic Area
European Regional Development Fund

EUROPEAN UNION

Multiregional collaboration schemes:

Infrastructure

WP3.A5 Report

University College Cork

Proto Atlantic

Innovation in the Marine Environment

Contents

Executive Summary

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 multiregional collaboration schemes with the aim to reinforce cooperation and multisite-based action to support the development of innovative solutions in blue growth-related sectors. For each collaboration scheme a committee of experts and stakeholders belonging to the participating regions joined to discuss common opportunities and challenges. The ProtoAtlantic partner regions include Brest in France, Cork in Ireland, Porto in Portugal, Orkney in Scotland, and the Canaries in Spain.

The aim of this multiregional collaboration scheme was to gain a deeper understanding on **improving Atlantic research and test facilities with new and innovative infrastructure, assets and subsea scenarios**. The event was hosted by MaREI, University College Cork, on **April 26th 2023** and was attended by over thirty-five critical marine and blue growth stakeholders across the Atlantic area. The event was opened with a welcome from Jessica Giannoumis, project manager for the project in University College Cork. This was followed by a presentation by Dario Sosa, from Subsea Mechatronics, who discussed his experience of the ProtoAtlantic project and its valuable impact on their company. The event was facilitated by Dr. Lawrence Dooley, Principal Investigator and Senior Lecturer in Enterprise and Innovation at Cork University Business School.

The findings from the highlighted a need for better alignment across government, industry, and academia to ensure the development of infrastructure meets industry and future sectoral needs, promote and enable access to available infrastructure to support marine development, and enable policy coherence on a regional, national, and international level.

Report written by Jessica Giannoumis and reviewed by Dr. Lawrence Dooley.

Special thanks to Cathal Gannon for administrative support in the organisation of the event.

Introduction

The aim of this session was to gain a deeper understanding the challenges and opportunities that stakeholders across the Atlantic experience in accessing funding opportunities, new international markets, and business strategic partners. 40 attendees registered for the event with 35 attendees from across the Atlantic area actively participating in the event (figure 1). It should be noted that not every registered attendee attended the event and that not every active session participant was registered for the event. Thus, the findings of the online-session and open dialogue are not necessarily representative of the registered attendees.

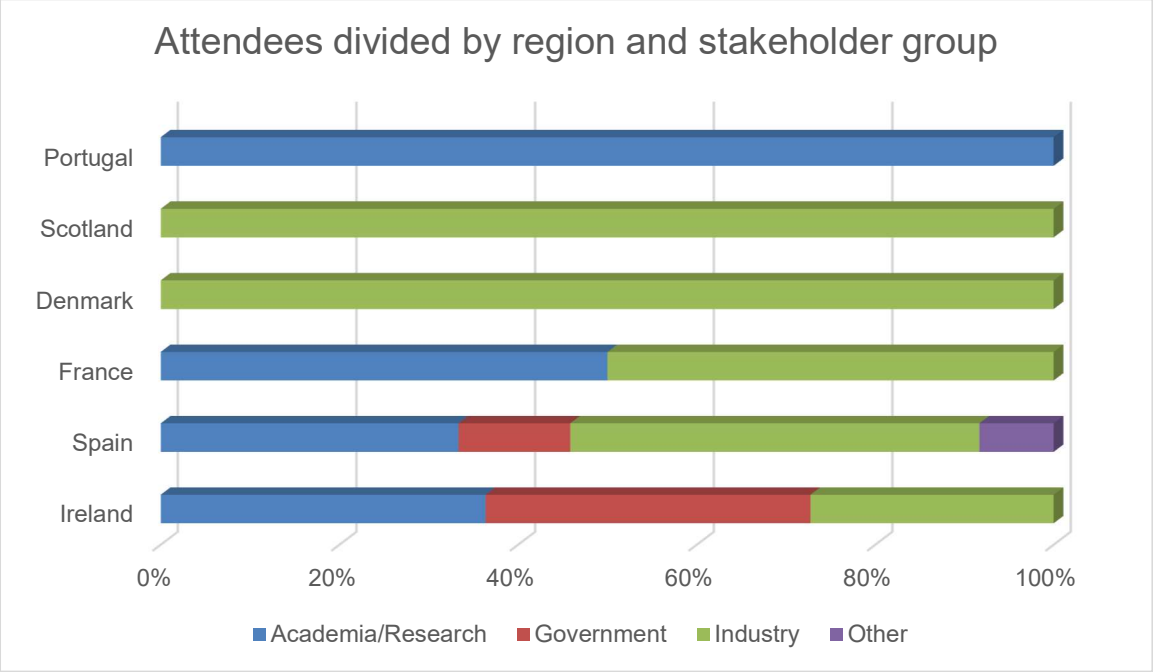

Figure 1 ProtoAtlantic session attendees divided by region (Atlantic area) and stakeholder group

Ireland and Spain had the most attendees with 11 and 24 attendees respectively. Furthermore, there was a large interest from industry and academia – 13 and 22 respectively. This indicates a large interest from industry and academia.

The following section will present the findings from session before presenting an analysis and recommendations based on the findings.

Findings

The findings are divided into two sections:

1. The first section presents the findings from a survey that the attendees of the multiregional collaboration scheme filled out to inform the topics and discussion for the interactive session.
2. The second section presents the findings from the online session which included multiple-choice questions that were asked during the multiregional collaboration scheme and open-ended discussion with the attending stakeholders.

Survey Findings

Prior to the session, attendees responded to a brief online survey to provide insights from a regional perspective on accessing funding for marine-based technologies. The findings from that survey are summarised and presented below followed by a brief analysis of common challenges and opportunities. The survey findings are indicative of registered attendees and are not necessarily capturing the views of the participants that attended the live event.

Accessing Regional Marine-based Research and Testing Infrastructure

The attendees were asked to identify **regional opportunities and challenges in accessing regional marine-based research and testing infrastructure.** The findings are presented per region table 1-4.

Table 1 Irish stakeholder feedback from on opportunities and challenges for accessing relevant marine infrastructure across Europe, results from pre-survey

Stakeholder feedback from Ireland	
Opportunities	**Challenges**
Our work is international, where we provide 'measurement, monitoring and metrics' for at-scale environmental projects in the Blue Sector (usually mangrove, salt marsh and sea grass, but also rain forest and peat lands). There is a significant opportunity to use Ireland as a 'sand-box' to prove out some of our deep-tech solutions and this is being explored from Q3 of this year. Right now it's therefore not possible to identify the challenges.	The key challenge is funding. In Ireland we have excellent wave tank testing facilities at Lir, a scaled test site in Galway and a potential full-scale test site at AMETS, but as it stands there is very little funding available to develop hardware and to test it at these facilities
The Atlantic region contains significant research and testing infrastructures	Coordinating communication and dissemination of good work
Growing networks of diverse projects covering marine science, marine social science, and arts.	Timescales of research vs. policy timescales
MaREI Beaufort lab is in close proximity. Irish team for ProtoAtlantic are based in the local area. This is useful for being able to talk to the ProtoAtlantic team less formally and understand the direction of the ProtoAtlantic project.	Regional specific funding instruments to support research infrastructures can have limitations
	There is no test offshore wind turbine in Ireland.

Table 2 Spanish stakeholder feedback from on opportunities and challenges for accessing relevant marine infrastructure across Europe, results from pre-survey

Stakeholder feedback from Spain	
Opportunities	**Challenges**
Renewable energies	Top knowledge creators migration to other countries
Established marine development teams	Distance to the European knowledge centres
Proximity to the ecosystems	Infrastructure limitations, Regulatory environment, Human resources
Geographical location, Technological expertise, Collaboration and Funding opportunities	
Available infrastructure is good, having PLOCAN in Gran Canaria (more grid connections would be desirable, though)	Permitting (same regulation applies to R&D and commercial projects)
Regional opportunities in the relationship and challenges in accessing regional marine-based research and testing infrastructure allows strategic positioning in the global market.	To access them. This can be particularly challenging for researchers who require specialized equipment or infrastructure.
There are many R&D&i opportunities in the Canary Islands in the field of desalination, with more than 50 years of experience in the exploitation of desalination plants, the existence of a great variety of plant sizes, with a wide diversity of technologies, design conditions and locations, availability of desalination infrastructures and pilot plants for experimentation, excellent availability of natural resources: sun, wind and sea together with relevant high-qualified researchers, engineers and desalination plant operators. A unique in the world desalination-oriented real-life and testbed infrastructure has been defined to research, develop, test and validate water desalination solutions, the use of renewable energy and the water-energy nexus. Collaboration or partnership in projects related to any of the topics associated to our strategic lines of R&D&i in desalination.	Challenges in technology to access deep waters, which as of today, is very limited, and cross-border collaboration to increase the understanding of oceans from a multidisciplinary perspective. This collaboration would bring countless opportunities.

Table 3 Continued Spanish stakeholder feedback from on opportunities and challenges for accessing relevant marine infrastructure across Europe, results from pre-survey

Stakeholder feedback from Spain	
Opportunities	**Challenges**
Algae technology, CO2 capture, marine renewable energies testing, aquaculture, tourism	Outermost region: Some of the marine ecosystems in the Canary Islands are located in remote locations, which can make it challenging.
Access to different industries: The Canary Islands are home to a wide range of marine ecosystems, from coral reefs and seagrass beds to deep-sea trenches. This proximity to diverse habitats provides researchers with the opportunity to study a variety of marine organisms and ecosystems. Furthermore, the Canaries offers abundant renewable energy resources, including wind, wave, and tidal energy, which can be harnessed for power generation and its location make them a major shipping and transportation route, providing opportunities for studying and improving shipping and transportation systems.	Regulatory requirements: The regulatory and legal frameworks for marine-based research and testing can be complex and there may be regulatory barriers to accessing marine-based research and testing infrastructure, such as permitting requirements or environmental impact assessments, Same in the Canary Island, where researchers who wish to conduct research must comply with local regulatory requirements, this can include obtaining permits and adhering to specific protocols, creating sometimes challenges for international collaboration and access to resources.
Access to state-of-the-art research facilities: The Canary Islands have several research centres equipped with state-of-the-art research facilities. These include laboratories, research vessels, and underwater robots, which provide researchers with the necessary infrastructure to conduct research and testing. Access to marine-based research and testing infrastructure can enable the development of new technologies and innovations for use in various industries, such as offshore energy, fisheries, and marine biotechnology.	Limited funding opportunities: Although the Canary Islands offer several grants and funding opportunities for marine-based research and testing (including EU grants, regional funding, and regional benefits), competition for these funds can be intense, and researchers may need to have a well-developed research proposal to secure funding.
The Islands offer researchers the opportunity to collaborate with local research institutions and organizations, as well as international research organizations.	

Table 4 Portuguese stakeholder feedback from on opportunities and challenges for accessing relevant marine infrastructure across Europe, results from pre-survey

Stakeholder feedback from Portugal	
Opportunities	**Challenges**
In terms of opportunities, Portugal's strategic location, growing blue economy, and research ecosystem offer opportunities for marine-based research and testing in areas such as biotechnology, renewable energy, and aquaculture.	On the flip side, limited funding, regulatory complexity, competition for access, infrastructure gaps, and coordination among stakeholders may pose challenges in accessing regional marine-based research and testing infrastructure in Portugal.
Accelerator programmes and collaborative projects	Lack of information
	Low funding

Table 5 Danish stakeholder feedback from on opportunities and challenges for accessing relevant marine infrastructure across Europe, results from pre-survey

Stakeholder feedback from Denmark	
Opportunities	**Challenges**
Opportunities are among others, to support the regional development, attracting marine researchers from abroad and thus strengthening the regional economy.	Strict MSP which makes access to testing sites difficult, high costs for SME´s to use test infrastructure, general low interest to make testing infrastructure more attractive

The stakeholders were also asked to identify **other potential challenges and opportunities they have experienced in the marine development**. The findings are presented per region below in tables 5-9.

Table 6 Irish stakeholder feedback from on opportunities and challenges on general marine development across Europe, results from pre-survey

Stakeholder feedback from Ireland	
Opportunities	**Challenges**
Before Covid the world, and very much the EU, was reliant on goods from China. The greatest opportunities lie in the development of EU tech to be manufactured within the EU and distributed from the EU.	In many cases the technologies for a sustainable blue economy exist but their deployment is slowed by policy and governance challenges
	There must be a realisation that developing hardware for the marine environment is inherently capital intensive. It would appear that funding SaaS or even the expensive and slow Medtech development is must more attractive than hardware in the marine space. Perhaps we need to focus on educating and enthusing VCs into our area.
	Complex policy framework, polarised attitudes towards marine development. NIMBYISM. Tragedy of the commons.
	Costs are increasing as a result of the war in Ukraine, restart after Covid, supply chain issues especially from China.

Table 7 Spanish stakeholder feedback from on opportunities and challenges on general marine development across Europe, results from pre-survey

Stakeholder feedback from Spain	
Opportunities	**Challenges**
Innovation and entrepreneurship, like renewable energy, aquaculture. Collaboration between academia and industry. Growing demand for sustainable products and services	Some regions with limited infrastructure and resources. Climate change and environmental degradation.
Technical support and consultancy for the development, up-scaling and demonstration under real conditions of innovative solutions using local desalination infrastructure at all scales for R&D purposes.	Gender imbalance: The lack of women in marine development is a well-known issue and there are several factors that contribute to this gender imbalance, including cultural and societal norms, limited access to education and training opportunities, and workplace biases and discrimination.
Opportunities mentioned in previous sections (networks and funding)	Challenges incorporating sustainability and digitization in the sector.
	Other challenges and opportunities are to address future challenges related to climate change
	Data sharing issues
Access to funding	Challenges incorporating sustainability and digitization in the sector.
	Most tech developers are in what is called the valley of death, meaning the technology is high risk while needing funding to survive. This involves that they can't compete against other technologies with a lower risk profile, reason why we need specific calls to develop and test our technologies.

Table 8 Portuguese stakeholder feedback from on opportunities and challenges on general marine development across Europe, results from pre-survey

Stakeholder feedback from Portugal	
Opportunities	**Challenges**
	Difficult for start-ups and SMEs to engage

Table 9 Danish stakeholder feedback from on opportunities and challenges on general marine development across Europe, results from pre-survey

Stakeholder feedback from Denmark	
Opportunities	**Challenges**
	Slow processes, misconceptions of wave energy leading to no motivation to collaborate, lack of regional resources to accomplish their 2030 wave energy strategy, highly protected marine nature combined with fear about harmful wave energy, people need to understand that CO2 is harming their marine environment and wave energy is one out of many solutions to avoid and reduce CO2 to protect the oceans and reduce ocean acidification and deoxygenation

Summary and Brief Analysis

The summary highlights cross-regional common challenges and opportunities in accessing marine testing infrastructure.

Europe has a rich environment in terms of marine testing infrastructure to support research and development technology. However, a lack of awareness of the marine infrastructure and uncertainties on how to access the infrastructures emerged as a common challenge. This lack of awareness also resulted in missed opportunities for collaboration across the regions.

The stakeholders also noted a misalignment between industry needs and government objectives, which slowed down technology development. Regulatory requirements, such as MSP, are complex and difficult to navigate. These requirements make access to testing sites challenging and more costly for SMEs and start-ups. Additionally, the testing sites are often in peripheral regions, making it more challenging and costly to reach the testing site. The stakeholders identified a need for better funding mechanisms to support access to the marine infrastructure.

A low-level general knowledge and awareness of marine activities and opportunities led to low-levels engagement from regional stakeholders in the development of marine activities. This results in polarised attitudes across the community and marine stakeholders, consequently, this misalignment slows down marine development.

Online Session Findings

The first part of the online live session consisted of four multiple-choice questions. The first one was more general, whereas the latter three where bespoke to understanding opportunities and challenges of accessing funding for marine-based technologies.

The first questions concerned the current understanding of blue growth development across the regions. A word-cloud was created that presented all the findings with phrases or words that have been mentioned repeatedly being presented in bigger fonts and bolder colours (figure 2).

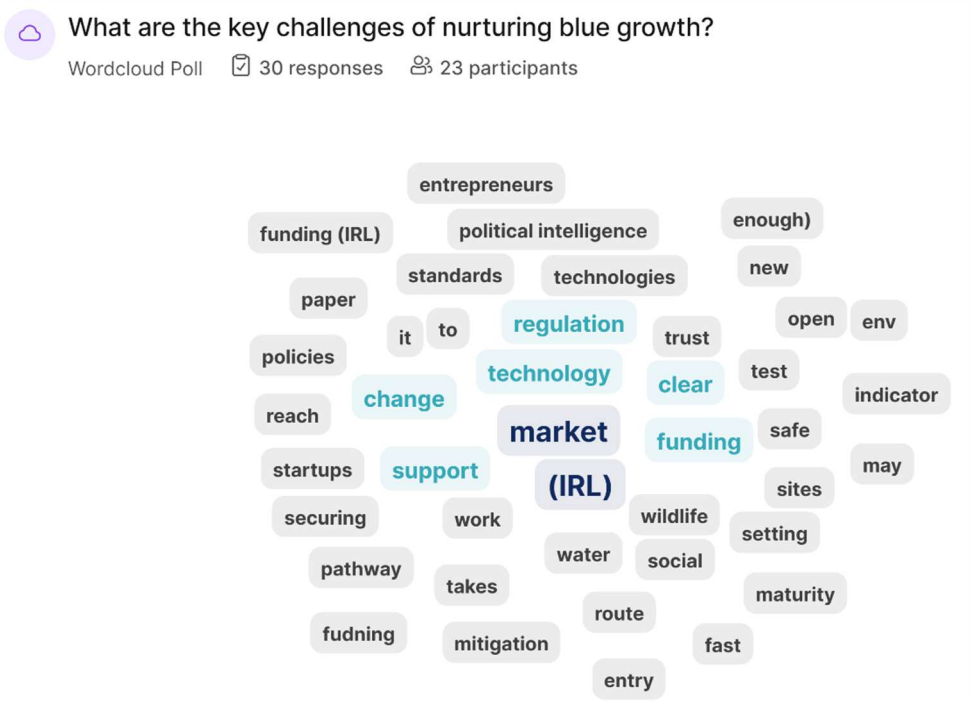

Figure 2 Results from the first session question, findings presented in word cloud where words/phrases that have been mentioned repeatedly are presented in larger font and bolder colours

The above set the precedence for the session. The second question of infrastructure development asked attendees of their awareness of relevant marine testing infrastructures across Europe. A third of the attendees noted that they were very familiar of existing marine testing infrastructure across Europe (figure 3).

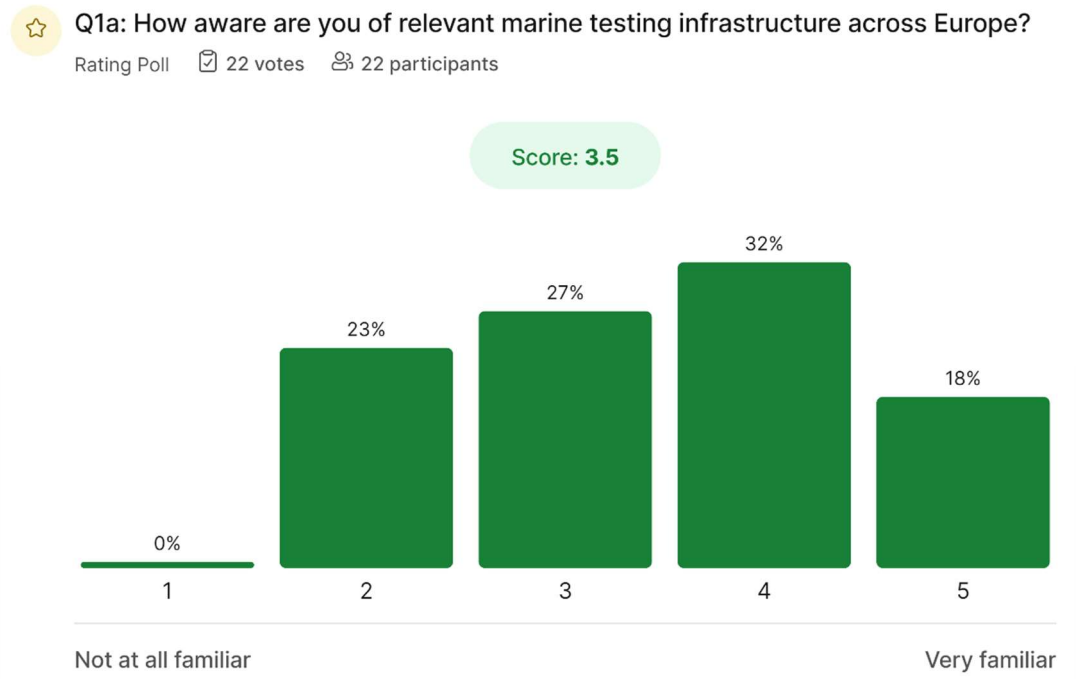

Figure 3 Respondents of awareness of marine testing infrastructure across Europe with 1 = not familiar and 5 = very familiar

The attendees were asked two open-ended questions to gain some more insight into accessing relevant marine testing infrastructure across Europe (table 9 and table 10).

Table 10 First question of accessing relevant marine testing infrastructure across Europe

Country	What barriers are limiting your use of testing infrastructure?
IRL	New infrastructures versus civil service resistance to change
IRL	Timeframe and scheduling
IRL	Uncoordinated national infrastructure strategies
IRL	Transnational access programmes
SP	Time required to get access, paper work
SP	Mainly an easy and quick access to good sites and infrastructures
SP	Grid infrastructure availability
SP	Regulations and permits
SP	Difficult access to infrastructure
SP	Funding to do the experiment
SP	Budget, limited access to the infrastructure, difficulties to send hardware to infrastructures in other regions
SP	Outermost locations
SP	Long-term funding and regulation
SP	Bureaucracy and regulation
SP	Access to the infrastructure
SP	Possibilities of partnering with companies, funding
FR	Cost and risk for demo project
DK	Open door principles
N/A	Use of standards, e.g., IEA, OES, or IEC

Table 11 Second question of accessing relevant marine testing infrastructure across Europe

Country	What are the key regulatory challenges in relation to testing/infrastructure in your region?
IRL	National roadmap/policy for infrastructure development
IRL	Speed of formulating and implementing policy that considers each phase in the lifecycle of the project and has clear understanding from each governmental department
IRL	Lack of a clear policy and direction
IRL	Length of time to get consenting along with uncertainty of timeline
IRL	Grid access
IRL	Lack of openings for other technology sectors in marine policy
SP	Permits and grid being available at the same time
SP	Timelines
SP	The time for obtaining permits
SP	Coordination among stakeholders
SP	Permitting requirements or environmental impact assessments
SP	Marine policy issues
SP	IP challenges
SP	For open waters, a more simplified regulatory process is sought
SP	The long time it takes to get some permits for installing a prototype
SP	R&D projects having the same regulations and permitting timing as commercial projects
FR	Permitted testing infrastructures exist to simplify developers life
N/A	Bureaucracy of public organisations
N/A	Consenting is fast-tracked when using existing infrastructures
N/A	Investor view of regulatory uncertainty

Summary and Brief Analysis

The attendees were asked to discuss **how access and development of testing infrastructure to support business can be enhanced.**

The attendees highlighted that academia and industry were not treated equally in terms of accessing funding infrastructure. Thus far, the stakeholders noted, testing infrastructure largely relies on government and public funding to support the testing of marine technology. Private industry, it was said, has not invested equally in the marine development and access to testing infrastructure. Subsequently, industry experiences barriers in accessing testing infrastructure which has slowed down marine development.

Regional differences exist in terms of how industry and academia engage, according to the attendees. It was noted that there were more testing infrastructure resources available in France than in other regions. Additionally, it was noted that industry stakeholders in France had easier access to testing infrastructure than experienced elsewhere across the regions.

Furthermore, collaboration across the triple helix was discussed in terms of accessing marine infrastructure. The attendees identified that regional differences in terms of industry-academia engagement can be noted. In Portugal, stakeholders noted that academia has changed their approach to align closer with the end-user of the technology. This suggests a need for a comprehensive understanding of the needs of regional industry stakeholders to ensure that research projects align with regional needs and opportunities.

The consensus was that research projects between industry and academia are not well-aligned with the needs on a regional level. The attendees also raised the issue of lack of awareness among industry stakeholders of available testing opportunities. The attendees identified a need to align industry needs and expectations with potential opportunities at testing infrastructures. This illustrates a need for networking opportunities between industry and academia to promote technology development opportunities. In line with this, a need for cross-regional alignment to support marine development has emerged, i.e., a need and opportunity to better integrate the existing marine testing infrastructures to support cross-regional development.

Recommendations

The aim of this multiregional collaboration scheme was to gain a deeper understanding on improving Atlantic research and test facilities with new and innovative infrastructure, assets, and subsea scenarios. The research findings highlighted that there is a correlation between technology development, funding mechanisms, and knowledge transfer and as such, each of these themes should be looked at in conjunction with each other rather than in isolation.

The multiregional collaboration scheme emphasised a 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 nurture the development of marine sectors. Based on the results, some high-level recommendations at EU-level and cross-regional level can be made, these are presented below.

- **Need for European data base of marine test resources to raise awareness and promote available testing infrastructures across Europe.**

A diverse testing infrastructure for marine technologies exists across Europe. However, the results from the multiregional collaboration scheme revealed that awareness of these marine infrastructure is low and that industry and academia struggle in accessing these infrastructures. In France, marine infrastructure providers have already started the process of gathering information and resources about existing marine infrastructures and how to gain access to them. This, it was highlighted in the multiregional collaboration scheme, should be done on a cross-regional scale to promote and raise awareness of available marine technology infrastructures. Subsequently, this also enables marine testing infrastructure to identify potential avenues for further development, as they understand which infrastructures are available and which potential infrastructures may be necessary for further technology development.

- **Need for harmonisation and streamlining of access procedures to support industry development and technology development.**

Currently, each marine testing infrastructure provides their own procedures for industry and marine technology providers to gain access to the testing infrastructure. This includes testing opportunities enabled through public and private funding mechanisms. Public funding mechanisms include EU-funded projects, such as ProtoAtlantic, which have developed their own procedures and assessment criteria to provide testing opportunities to marine-based industries. This also includes regional-specific public funding mechanisms such as enterprise development programmes that provide funding for marine-based industries to invest into technology development. Some marine testing infrastructures also enable privately funded access to the testing infrastructure, with their own procedures in place to ensure that the testing infrastructure can deliver what is needed to mature marine technology.

However, the stakeholders of the multiregional collaboration scheme revealed that gaining access to these infrastructures can be confusing as each infrastructure will follow their own protocols and procedures. Consequently, this makes it challenging for industry to work efficiently cross-regionally as they have to invest resources to familiarise themselves with each testing infrastructure and to ensure that they can gain access to them. Harmonising and streamlining this process would thus allow for a more targeted approach for industry. At the same time, streamlining this process would also allow for capacity building across the infrastructures as they increase their knowledge about currently available infrastructures. Marine infrastructure providers could identify their development potential thereby increasing their unique competitive advantages, rather than competing with other marine testing infrastructures. Thus, building a data base and streamlining the process of gaining access to the infrastructures could become a major competitive advantage for Europe.

- **Need for specific contact for companies to enable networking opportunities.**

One of the core challenges in accessing marine infrastructure is identifying the person that could enable access. This is particularly a challenge when enterprises would like to avail of infrastructure access cross-regionally and may not be aware of regional stakeholders. The stakeholders of the multiregional collaboration scheme proposed for marine infrastructures to provide key information about the available marine testing infrastructure and to identify regional specific contacts for accessing regional infrastructures.

- **Need for policy coherence on European, national, and regional level to ensure that marine development is aligned and that funding streams are aligned.**

In addition to providing practical information about marine testing infrastructure, the multiregional collaboration scheme also revealed a need for policy coherence across all levels. This should be aligned with current and future funding streams. A mismatch between the European, national, and regional level as well as cross-regionally was identified, which presents as a key challenge for marine industries to access testing infrastructures. Misalignment of policies could increase inefficiencies on a national and regional level as funding opportunities may not be appropriately matched with potential development opportunities. This misalignment could also lead to policies hindering rather than supporting marine development as they may not address industry needs.

- **Need to align government and industry needs to support marine development, i.e., in the needs for infrastructure development to meet current and future industry needs.**

The multiregional collaboration scheme findings also revealed a need to align industry and government to increase efficiency and effectiveness of marine infrastructures. This alignment ensures that industry and government identify a common vision and work together towards achieving this. In the absence of this alignment, industry and government will operate in silos which could make access to marine testing infrastructures challenging. This also increases the risk of industry and government potentially identifying different development opportunities. As a result, industry and government would invest into different mechanisms to enable technology development and consequently, development potential is not being realised.

Two overarching themes emerged, firstly there is a need to increase awareness and promote available marine testing infrastructure within and across Europe. A database to highlight all potential marine testing infrastructures, streamlining processes to access these infrastructures, and providing information about key stakeholders that could help in gaining access to the testing infrastructure could be a first step in highlighting the unique opportunities of testing marine infrastructure across Europe. Secondly, marine infrastructure, access to it, and enabling its development to ensure marine development, requires both knowledge sharing across and within regions, and alignment of funding mechanisms on an international, national, and regional level. Thus, marine infrastructure should be understood and utilised against the backdrop of available funding opportunities and regionally available knowledge, to enabling regions to identify and realise their potential marine development opportunities.

Figure 4 presents a screenshot of the opening session of the multiregional collaboration scheme.

Figure 4 Screenshot of the opening session of the multiregional collaboration scheme

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