DIH INNOVAMARE PROJECT

D 1.3.2 - Recommendations for Boosting Collaboration

Project identification

Project ID: ITHR0200416

Name of the lead partner organisation: Hrvatska gospodarska komora

Name of the lead partner organization in English: Croatian Chamber of Economy

Project title: Cross-border digital innovation Hub for innovative marine technology

Project acronym: DIH InnovaMare

Programme priority: Sustainable growth in the blue economy

Specific objective 1.1: Developing and enhancing research and innovation capacities and the uptake of advanced technologies

Project duration in months: 30

Work package: WP1 Innovation capacity building for implementation of marine technologies

Activity title: A1.3 Focus groups as knowledge sharing activity for upscaling collaboration between tech companies and blue economy sectors to boost digital and green transformation

Expected date: M 18

Activity description: Organisation of focus groups where we will invite marine technologies companies like underwater robotics, sensors, UoT, AI, and other that can contribute to digital and green transformation of blue economy sectors. Define main abilities and use cases of marine technologies in different blue sectors as roadmap. Development of portfolio of case studies of maritime technology applications and related strategy of business development (description, video, podcasts/interviews) to be accessible via DIH website. Focus groups will be held in Zadar and Bari.

Partner responsible: ARTI

Dissemination level: CO - Confidential

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Contents

Introduction

This document presents a set of strategic recommendations aimed at enhancing cross-sector collaboration within the field of blue technologies, with a particular focus on stakeholders operating in the marine and maritime innovation ecosystem. These recommendations emerge as a consolidated outcome from the workshops held on the DIH InnovaMare project: Brainstorming workshops were held with different topics in blue technologies, two focus groups held in Zadar (Croatia) and Lecce (Italy), as well as two mentoring workshops.

The workshops and focus groups explored a range of topics critical to the development of sustainable blue growth, including underwater communication systems, AI/IoT applications, smart sensing technologies, biodiversity monitoring, green energy integration in nautical tourism, and technology transfer for innovation. Participants included representatives from research institutions, technology developers, SMEs, large companies, public authorities, and civil society—reflecting the quadruple helix approach central to the project's vision.

Across all sessions, common challenges were identified: fragmentation in communication protocols, limited interoperability between technologies, regulatory uncertainty, uneven access to funding and infrastructure, and the need for stronger links between research and real-world applications. These barriers hinder the development and deployment of integrated, scalable, and sustainable technological solutions in the blue economy.

In alignment with the project's overarching aim to foster innovation, sustainability, and cross-border cooperation in marine technologies, this report proposes a set of actionable recommendations. They are designed to address the identified challenges and facilitate stronger, more structured, and more effective collaboration among diverse stakeholders. These guidelines are intended to support the design of future joint initiatives, inform policy, and strengthen the innovation ecosystem for the sustainable and inclusive growth of the blue economy in the Adriatic basin and beyond.

Recommendations for Boosting Collaboration

Building on the identification of key challenges currently affecting collaborations among stakeholders and in particular between company and end-users in Marine Technology and Blue Economy—emerging from the analysis conducted in Activity 1.3. This set of recommendations is intended to provide actionable guidance. The objective is to support stakeholders in overcoming the identified barriers and to promote more effective and sustainable cooperation between the different actors involved.

As a result of the brainstorming workshops and focus groups conducted by the DIH InnovaMare project partners, the following key challenges have been identified. For each challenge, possible solutions and targeted recommendations have been proposed.

Challenge 1. Setting spaces for collaboration

To foster real collaboration and meaningful innovation, stakeholders need dedicated spaces where ideas can be tested, validated, and refined through hands-on experimentation. Establishing **regional innovation hubs and living labs** in coastal areas would provide these spaces — physical and digital environments where businesses, and startups can come together to co-develop solutions in real-life conditions. These hubs should not be temporary or project-bound; instead, they should evolve into **permanent platforms for interdisciplinary collaboration**, supporting ongoing experimentation and enabling quicker uptake of marine technologies in different sectors of the blue economy.

Key recommendations:

- **Creation of "Blue Innovation Labs" in coastal areas** where companies and end-users (such as port authorities, fisheries, maritime operators, coastal communities, and public bodies) collaborate to test, validate, and refine innovative solutions in real-life conditions.

- **Establish permanent innovation spaces** that bring together technology providers, end-users, academia, startups, and public stakeholders to co-develop practical, market-relevant technologies and services for the blue economy.

Challenge 2. Achieving Standardization and Interoperability

One of the key technical barriers to effective collaboration in the marine sector is the lack of shared standards. Proprietary systems and fragmented protocols limit the potential for integrated solutions and joint development. To overcome this, it is crucial to promote **open standards, common data**

formats, and interoperable architectures. By aligning communication protocols and metadata models, we can ensure that sensors, platforms, and technologies can "speak the same language." Pilot demonstrators — especially in challenging fields like underwater communication or AI-powered monitoring — can play a strategic role in showing how standardization leads to efficiency, cost reduction, and scalability.

Key recommendations:

- **Jointly develop and adopt open protocols and metadata standards** to ensure interoperability between different systems, sensors, and platforms. This collaboration should involve both technology providers and end-users to align technical solutions with practical operational needs.

- **Co-design and implement pilot demonstrators** that specifically address interoperability challenges—such as underwater communication systems or AI-enabled sensor platforms—allowing companies and end-users to test solutions together in real-world scenarios and validate their effectiveness.

Challenge 3. Support Co-Creation Through Joint Projects and Challenges

Innovation is most effective when it is grounded in real needs and developed collaboratively. Launching **challenge-based calls for innovation** focused on specific issues — such as biodiversity monitoring, marine debris detection, or dual-use sea-air drones — can stimulate targeted co-creation between technology providers, researchers, and end users. These projects should be supported from ideation to implementation, with joint access to infrastructure, data, and test environments. Such an approach not only encourages **shared ownership of results**, but also strengthens trust and long-term cooperation across sectors.

Key recommendations:

- **Launch Challenge-Driven Innovation Calls**

  Design and fund innovation calls that address concrete industry and community needs (e.g., marine debris detection, integrated sea-air drone systems, biodiversity monitoring). This approach fosters targeted collaboration between solution providers and end users.

- **Promote Joint Development from Concept to Deployment**

  Support co-development processes where businesses and end users collaborate from the ideation phase through to real-world implementation. Facilitate shared access to testbeds, datasets, and infrastructure to accelerate innovation and ensure solutions are user-validated and fit for purpose.

Challenge 4. Strengthen Digital and Knowledge-Sharing Platforms

In a fast-evolving ecosystem, **access to information and knowledge** is a key enabler of collaboration. Digital platforms can help bridge distances — both geographical and institutional — by allowing stakeholders to share technologies, patents, publications, and good practices in an open and structured way. Tools like the **Knowledge Share Platform** offer useful starting points, but should be complemented by a **dedicated marine tech portal** to map use cases, solution providers, and research assets across the region. Such platforms would enhance transparency, support matchmaking, and reduce duplication of effort.

Key recommendations:

- **Leverage Digital Platforms for Cross-Border Collaboration**

  Use digital tools—such as the Knowledge Share Platform—to exchange technologies, patents, and expertise beyond regional and national boundaries. This fosters knowledge transfer and accelerates the adoption of innovative solutions.

- **Create a Centralized Marine Innovation Portal**

  Develop and maintain a shared portal to map marine technology solutions, real-world use cases, and key innovation stakeholders in the Adriatic basin. This resource should serve as a reference point for both companies and end users to identify collaboration opportunities and foster ecosystem connections.

Challenge 5. Bridging the Gap Between Research and Industry

Bringing research and industry closer together requires more than one-off partnerships — it demands **regular, facilitated interaction**. This can take the form of mentoring programs, collaborative labs, and matchmaking events that help researchers understand market needs, and businesses identify emerging scientific knowledge. To support this bridge, **technology transfer offices (TTOs)** and spin-offs should be strengthened, particularly in marine-related disciplines, ensuring that they are visible, well-connected, and able to guide innovations from lab to market with tailored support.

Key recommendations:

- **Expand mentoring programs and matchmaking events** that actively connect researchers, technology developers, and startups with the specific needs of industry and end-users. These initiatives should foster dialogue and accelerate the transfer of innovative solutions into operational contexts.

- **Promote the role of Technology Transfer Offices (TTOs) and support spin-offs** in blue economy sectors, providing them with dedicated resources, visibility, and networking opportunities to bridge the gap between research, technological innovation, and real-world application.

Challenge 6. Investing in Skills, Training, and Capacity Building

Collaboration can only thrive if all actors have the skills and capacities needed to engage fully with emerging technologies. There is a growing demand for professionals trained in **AI, IoT, data science, and sustainable maritime practices** — and this demand spans across sectors. Investment in **cross-sector training**, **digital upskilling**, and **green literacy** is vital to prepare the next generation of the blue economy workforce. Simulation-based learning methods — particularly effective in fields like nautical tourism and maritime surveillance — can help professionals build confidence in complex, tech-enabled environments.

Key recommendations:

- **Design cross-sector training programs** focused on green technologies, digital platforms, AI/IoT, and sustainability in marine and coastal applications. Training should be co-developed by technology providers and end-users to ensure relevance and practical impact.

- **Support simulation-based learning initiatives** for key sectors such as nautical tourism, maritime surveillance, and coastal operations, enabling hands-on experience with new technologies and fostering a skilled, innovation-ready workforce.

Challenge 7. Aligning Policies and Strengthening Regulatory Dialogue

Even the most promising innovation can stall if the regulatory environment is unclear or outdated. Public authorities have a key role to play in ensuring that policies and legal frameworks are aligned with innovation needs. This can be achieved by involving all relevant stakeholders in **policy labs**, where rules, incentives, and constraints can be openly discussed and co-designed. Additionally, **simplifying cross-border cooperation frameworks** — for instance, in joint R&D projects or marine data exchange — would allow technologies to scale more easily and impactfully across regions.

Key recommendations:

- **Engage stakeholders in policy labs** to co-design regulatory frameworks that enable and support innovation in the blue economy. Focus areas may include emerging technologies such as drones, marine data sharing, and autonomous systems.

- **Simplify cross-border cooperation frameworks** to facilitate joint R&D activities and accelerate technology adoption across the Adriatic basin, promoting collaborative solutions to shared challenges.

Challenge 8. Capturing and Disseminating Best Practices and Success Stories

To build momentum and trust, it is essential to showcase what works. Documenting and sharing **concrete examples of successful collaboration** — whether that's a cross-border pilot, a multi-stakeholder drone test-bed, or a co-developed environmental monitoring system — can help others learn and replicate. A **living repository of case studies**, maintained in an accessible format (videos, interviews, infographics), would provide both inspiration and practical guidance to new partnerships, helping them avoid common pitfalls and focus on proven approaches.

Key recommendations:

- **Co-create and Share Practical Use Cases**

   Jointly develop and document real-world applications of marine technologies (e.g., coastal monitoring, drone-based rescue solutions). Use these shared experiences to inspire wider adoption and guide future collaboration efforts.

- **Engage in Early-Stage Co-Design**

   Involve end users from the outset of product and service development. Businesses should work with public authorities, local communities, and other users to ensure innovations address real needs and contexts.

Challenge 9. Ensuring Inclusive, Quadruple Helix Engagement

Innovation ecosystems thrive when **diverse voices are heard** — not only from industry and academia, but also from local communities, environmental NGOs, youth organizations, and other parts of civil society. These actors offer critical insights into local needs, social dynamics, and long-term impacts. It is essential to involve them **early in the design process**, through participatory methods like foresight workshops, citizen science initiatives, and inclusive focus groups. Their engagement ensures that marine technologies are developed with **social relevance and environmental responsibility** in mind.

Key recommendations:

- **Engage All Relevant Actors Early**

Involve businesses, academia, government, and civil society from the earliest stages of innovation planning. Early engagement ensures that solutions are aligned with real needs and increases the likelihood of successful adoption.

- **Foster Open Dialogue and Co-Creation**

   Organize joint focus groups, co-creation workshops, and citizen science initiatives to build trust and foster active participation. Empower end users to be co-designers of innovation, not just passive recipients of new technologies.

Challenge 10. Embedding Continuous Evaluation and Learning

Effective collaboration is not a one-time achievement, but a continuous process. To keep improving, partnerships must regularly assess their **progress, outcomes, and impact**. This means defining clear indicators — such as the number of joint pilots launched, knowledge transfers achieved, or technologies deployed — and creating mechanisms for **feedback, reflection, and adaptation**. By embedding learning into the collaboration process itself, stakeholders can remain agile, responsive, and focused on delivering value over time.

Key recommendations:

- **Define Shared Success Metrics**

   Agree on joint Key Performance Indicators (KPIs)—such as the number of co-developed solutions, user-driven pilots, and successful technology transfers—to measure the impact of collaborations and ensure mutual value creation

- **Establish Continuous Feedback Loops**

   Implement structured mechanisms for ongoing dialogue between businesses and end users. Use regular feedback to refine products, services, and funding programs based on practical experience and evolving needs.

Conclusions

The recommendations presented in this report are the result of a collaborative, multi-stakeholder process that engaged a broad spectrum of actors in the blue economy. Through thematic brainstorming workshops, mentoring sessions and focus group sessions, the DIH InnovaMare project has succeeded in surfacing shared challenges and co-developing practical pathways to strengthen cooperation and innovation in marine and maritime technologies.

Addressed to the 4Helix stakeholders — local authorities, universities and research institutions, companies, and civil society — these guidelines are designed to serve as a shared reference

framework for future action. Each stakeholder group has a distinct yet interconnected role to play in shaping an integrated, inclusive, and innovation-driven blue economy:

- Local authorities are encouraged to foster enabling environments by streamlining regulatory frameworks, supporting living labs and innovation hubs, and facilitating cross-border cooperation.

- Universities and research centers are called to deepen their engagement with industry and society, accelerating technology transfer, co-creation, and interdisciplinary research aligned with real-world needs.

- Companies, including SMEs and startups, are invited to embrace open innovation models, engage in co-development processes, and adopt interoperable, scalable solutions that drive sustainable growth.

- Civil society organizations bring essential insights into local contexts, social innovation, and environmental stewardship, and should be actively involved in planning and monitoring collaborative initiatives.

These recommendations are not prescriptive, but rather intended as strategic enablers that can be adapted to different territorial and sectoral contexts. They aim to help stakeholders move beyond fragmented efforts and toward structured, mission-oriented collaboration that delivers measurable impact for blue growth and sustainability.

The implementation of these guidelines will support the consolidation of a resilient innovation ecosystem in the Adriatic basin and contribute to the broader European objectives of ecological transition, digital transformation, and socio-economic cohesion in coastal and marine territories.