INNOVAMARE PROJECT

Blue technology - Developing innovative technologies for sustainability of Adriatic Sea

WP4 – Creation and establishment of innovation ecosystem model for underwater robotics and sensors

D4.1.5. Report on development of DIH InnovaMare

Partner responsible: Croatian Chamber of Economy

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InnovaMare

Blue technology -
Developing innovative technologies
for sustainability of Adriatic Sea

DIVE INTO THE DEPTH OF OPPORTUNITIES

Table of Contents

Overview of results of strategic project Innovamare ..... **Error! Bookmark not defined.**

Digital innovation HUB and innovation ecosystem context 4

DIH Innovamare services short/long term 5

DIH Innovamare operational structure 8

DIH Innovamare private entity 10

DIH Innovamare partners financial and operational commitments 26

Financial short term sustainability plan 28

Process of establishment of DIH Innovamare 29

ANNEX 1. - Analysis of similar initiatives and their business models 28

Conclusion 49

Overview of results of strategic project Innovamare

InnovaMare strategic project main aim is to develop and establish cross-border innovation ecosystem model in area of underwater robotics and sensors for purposes of monitoring and prevention of sea pollution with mission oriented on sustainability of Adriatic Sea.

It will improve the conditions at the strategic and operational level of cross-border cooperation between the private and scientific sectors, to encourage the development of new technological solutions and innovations in the field of robotics and sensors. InnovaMare strategic project with 5.6 mil € budget and 14 partners is the part of the Interreg Italy – Croatia CBC Programme. All involved stakeholders from the cross-border level:

1. Scientific-research sector: University of Dubrovnik; University of Trieste; University of Rijeka, Department of Biotechnology; University of Zagreb, Faculty of Electrical Engineering and Computing, National Institute of Oceanography and Applied Geophysics, Italy; Institute Ruđer Bošković, Croatia; The Institute of Marine Science (CNR- ISMAR), Italy.

2. Cluster: Maritime Technology Cluster FVG, Italy.

3. Business supporting organisations: Apulia Regional Agency for Technology and Innovation (ARTI), Italy; Croatian Chamber of Economy; Regional Union of the Chambers of Commerce of Veneto Region, Italy.

4. Local/regional government: Šibenik-Knin County, Croatia

5. Companies: Communication Technology S.R.L., Italy and Geomar d.o.o, Croatia.

The main purpose of InnovaMare project is to bring cross-border collaboration between science and private sector on a higher level and to facilitate the involvement of SMEs in international research networks by adding value to SMEs in internationalization and technology transfer. Through the implementation, InnovaMare will increase the effectiveness of the innovation activities in the blue economy - by enhancing the transfer of knowledge within the cooperation area between the SMSs, R&D centers, higher education and the public sector. The aim is to raise collaboration of innovation players and give them mechanism and tools to boost development of new innovative solutions in area of underwater robotics and sensors.

InnovaMare results as a basis for a DIH Innovamare/Innovamare 2.0 :

- ✓ Created a map of excellence as a key collaboration tool of all stakeholders and part of an interactive web platform. Gathers information from over 1000 stakeholders in the field of marine pollution and blue technologies,
- ✓ Two prototypes of innovative solutions are developing, it will be a presentation of the possibilities and ways of cooperation between the private and scientific research sectors,
- ✓ InnovaMare project has developed Innovamare - interactive web platform (www.innovamare.org) as a central digital place for networking, exchange of experiences and knowledge of stakeholders in innovation ecosystem. In this way its aim is to support collaboration and co-creation in developing innovative solutions for monitoring and prediction of pollution in the Adriatic Sea. As a final point in process of developing innovation ecosystem Innovamare is establishment of cross-border Digital innovation Hub Innovamare.
- ✓ Elaborated methodology, gathered stakeholders and established Living Lab in the Adriatic Sea, which is a key tool in identifying the needs and problems of the blue economy with the aim of finding and developing innovative solutions,
- ✓ Through project Innovamare activities in education, training, and events we have engaged over 300 different new stakeholders on topics such as spin-offs, protection of Intellectual Property Rights, New business models, Technology transfer, Innovation and environmental sustainability, Innovation strategy and innovation management,
- ✓ Through facilitated process of Innovamare stakeholders in 2022. we estimate that we will create 35 project concepts for future financial perspective that are focused on blue economy transformation and environment protection,
- ✓ In 2022. we will achieve partnership consortium consensus on establishing DIH Innovamare cross-border private entity that will represent final showcase of determination and commitment by partners involved,
- ✓ We started process of establishing Innovamare academy as pilot project for future Innovamare study courses in marine technologies,
- ✓ Created Strategic and action plan that can be a model or a roadmap to other initiatives trying to build innovation ecosystem.

Digital innovation HUB and innovation ecosystem context

Technology is becoming more and more developed for human and environmental benefits as a key driver in future economies. In this transition it is all about bringing best knowledge, information, resource from stakeholders who are having it to those who are in need for it and do it in most efficient way. That transition can only be guided by developing models of cooperation and co-creation that will enable all stakeholders to firstly become aware of the transition and then to be in the same course with their knowledge, experience, and resources so this transition is done in that way that no one is left behind.

Digital innovation hubs emerged as real answer that can support these changes so they can be done in more facilitated way. For innovation players it is mandatory to be part of co- creation ecosystems that will allow them to grow, expand and share knowledge and experience. Digital Innovation Hubs are playing an increasingly important role in supporting the digital transformation of companies and industry across Europe. DIHs enable any company to get up-to-date information, expert support, and access to technologies to test and pilot digital innovations with company products, processes, or business models. DIH aims for significant changes in the digitisation of industries, thereby increasing their competitiveness and benefit they develop. The idea is that each DIH acts as the epicentre of a local/regional or even national digital innovation ecosystem able to provide access to services, facilities and expertise of a wide range of partners. The aim is to ensure that the individual customers (SMEs) or the public sector gets the services they need; that the target regional market segments get access to innovative, scalable solutions and that DIHs cooperate with each other at regional, national and/or European level.

The digital and green transformation of the economy is key for Europe to remain competitive internationally. EU companies and public sector organisations needs to integrate digital technologies into their business processes, products, and services to fully benefit from the efficiency gains and innovation they may bring, while remaining environmentally sustainable. DIHs are essential part of sustainable innovative development specially based on digital and green transformation. Such sustainable innovative development is based on 5 critical success factors:

1. the availability of productive capital,

2. the presence of human capital,

3. access to social capital (communication and interaction between people, business networks, trust-based relationships),

4. use of creative capital, and

5. existence of ecological capital.

Responsibility for ensuring regional development is not only in the hands of only one stakeholder, but more of them that come from different organizations, and even with completely different goals and intentions. All these actors are an integral part of a network that is dominant, and through which is distributed the energy, activities, and innovation in the society (Bred Feld, TechStars). Such a network has a key role to provide all stakeholder with easy and clear purpose so all elements that this network are in line with the purpose.

Daniel Isenberg, who teaches about ecosystems at Babson College, has studied the tipping point where entrepreneurial ecosystems can become self-sustainable. The tipping point is where participation of entrepreneurs, mentors, angels, organizations, sponsors, and others in the ecosystem grows to the point where it becomes self-supportive. Based on his analysis, the innovation hub should drive momentum, “buzz” and excitement to inspire ecosystem actors to become part of the ecosystem. Growing an ecosystem is a way to ensure it becomes more sustainable. For this purpose, it is necessary to have clear purpose and targets that will need to be achieved to ensure the growth of the ecosystem at local and regional level. Isenberg proposes a principle that will set goals to enter at least one company with high potential in the ecosystem each year. Another issue that arises when it comes to the regional innovation ecosystem is about the leading organization, an organization that will have responsibility for strengthening and expanding the ecosystem until the moment of achieving self-sustainability as in this case is DIH Innovamare for Innovamare innovation ecosystem. Isenberg lists several possible specifications for such an organization:

- It needs to have a mandate, perspective, training, and resources to influence all stakeholders in the innovation ecosystem,
- Will be independent and not owned by ministries, universities, and organizations,
- Will be responsible for achieving the point at which the ecosystem will become self- sustaining,
- Will know how to experiment, learn, change, and encourage new programs.

Such an organization is not owned by individual organizations and institutions, but it is owned by all involved parties in the ecosystem.

DIH Innovamare is envisioned to be an entity that will manage established innovation ecosystem and Living Lab to reach its vision and mission with sustainable business model. DIH Innovamare aim is to join the Pan-European network of Digital Innovation Hubs (DIHs) and bring opportunities for connection on the European level for all involved stakeholders from the cross-border level.

Regarding the possibilities for creating an entrepreneurial and innovation ecosystem, Isenberg lists recipes for creating it:

1. Stop emulating Silicon Valley, which is unique to that specific region,
2. Shape the ecosystem around local conditions, focusing on local industries with the capacity for rapid growth and build on these bases,
3. Engage the private sector from the start, they should lead the ecosystem,
4. Focus on high-growth companies,
5. Present to the community every success to stimulate and motivates them,
6. Tackle cultural change head-on,
7. No easy money for companies through grants, they must be profitable with good financial management,
8. Enable organic growth of clusters and
9. Reform the legal, bureaucratic, and regulatory framework.

Based on above principles and components it is clear that DIH Innovamare should become separate entity that is responsible for management of innovation ecosystem and has a great advantage because it already had all important stakeholders involved as well-defined focus and purpose that is important for the process of development.

DIH Innovamare services short/long term

Intention of DIH Innovamare is to use expertise, infrastructure, and experience of its wide network of stakeholders and as a facilitator of innovation ecosystem bring them in right time and right place to those who are in need or in search for expertise/solutions. DIH Innovamare should be able to convert data, knowledge, and resources in its ecosystem in products and services that will help in technology and knowledge transfer in process of transformation of blue economy sectors. DIH Innovamare should be able to help transition of expertise and knowledge from scientific-research institutions to private sector but to do it based on demand driven and mission-oriented approach.

Overview of the services

1. TEST BEFORE INVEST

1.1. New concept design and validation

1.2. Adaptation of existing technologies to novel applications

1.3. TRL(S) VALIDATION

2. SKILLS AND TRAINING

2.1. Academy Innovamare

3. SUPPORT TO FIND INVESTMENT

3.1. Providing funding opportunities

4. INNOVATION ECOSYSTEM AND NETWORKING

4.1. Matchmaking / networking

4.2. Innovamare community / Info engagement

4.3. Finding solution for your challenge

5. ADDITIONAL SERVICES

5.1. Project management

5.2. Citizens' science/civil engagement

5.3. Tech foresight and market intelligence

5.4. Business model development for SMEs

5.5. Data service

In the short term - 2-year period our focus is on services that can bring more added value for the stakeholders in reaching their organizational goals but through access of different resources from innovation ecosystem. These services are:

1. Facilitation process in co-creation of project concepts for EU funding by involving stakeholders from innovation ecosystem
2. Providing funding opportunities
3. Project management for institutions that would help them to make a greater impact
4. Tech foresight and market intelligence
5. Data service
6. Matchmaking / networking
7. Innovamare community / Info engagement
8. Finding solution for your challenge

In long run what should be main distinction of DIH Innovamare in comparison to other similar initiatives is to be able to develop model with its shareholders in which he is able to offer packages of services based on infrastructure, equipment, and expertise on larger scale to different kind of initiatives – private or public. This package of services is mostly in context of test before invest services where this kind of coherent approach can help to achieve more cross-border cooperation that is one of main goals in EU guidelines. Our intention should be to help private sector in bringing their products and services to market without added investment in expertise, equipment or infrastructure that already exist in other private entities of scientific-research organizations. To do that it is crucial to have human resources as technology brokerage agents who would be able to recognize the need and find a fit in expertise, technology, or infrastructure from stakeholders in innovation ecosystem. With this approach we are solving crucial competitiveness challenge in EU and that is lack of facilitation and connection of same needs, expertise, resources or technologies but based on solving societal challenges.

1. TEST BEFORE INVEST

1.1. New concept design and validation

1.2. Adaptation of existing technologies to novel applications

1.3. TRL(S) VALIDATION

Based on the analysis of similar initiatives (Annex 1), it can be seen that they are designed as one-stop shops that provide comprehensive support and concrete solutions to their customers in introducing various forms of digitalization in their business processes and help them develop products and services and improve own business processes in accordance with the principles of Industry 4.0. At the same time, they also promote the exchange of knowledge and best practices among users, which is often the best way to learn, given that many companies have similar development paths where they face the same challenges.

A wide range of partners are involved in the work of digital innovation hubs, from local authorities to universities and research institutions, business support institutions and companies of all sizes operating in different sectors. The synergy of the public and private sector is key to the successful and quality operation of digital innovation hubs, given that the different roles, perspectives, and experiences of partners give a complete picture of both the current business climate and the desired future state. At the same time, participation in the work of digital innovation hubs by educational institutions such as public and private universities and research organizations significantly contributes to their educational and innovation role. The range of users who have seen the benefits of using digital innovation hubs is very wide and includes both startups and large companies, but also all those "in between" which shows that companies of all sizes and "ages" can have benefits from such initiatives.

One of the most important functions that is common to all analyzed digital innovation hubs and similar initiatives is to support users in finding sources of funding. The role of digital innovation hubs as incubators and accelerators helps entrepreneurs who need a certain level of support, whether financial, infrastructural, or advisory, to better direct and organize their business. Networking between individual DIHs is also very important, given that they have diverse breadth and depth of experience and are mostly specialized in specific technologies, the greatest synergy is achieved through their cooperation and allows its users access to all necessary solutions that potentially can make business much easier.

DIH Innovamare operational structure

Operational obligations are deriving from stakeholders' roles which are based on three levels: shareholders/founders, strategic partners, and members. Thru agreements with each of the stakeholder it will be defined what in-kind contribution can be achieved for the DIH network in terms of infrastructure, equipment and HR. Crucial point is in partnerships between DIH and its founders, strategic partners, and key members that they should always look in direction of cooperation between the signed parties thru DIH services and projects development. In this way established network is raising each of the institutions inside and at the end DIH itself.

Operational structure

As it is discussed on our meetings main aim regarding operational structure is to be small and agile so it really can be as an entrepreneur.
It goes in max 3 levels where on first level is Supervisory board chosen by the Assembly/Shareholders. Each Supervisory member is a representative of the shareholders/founders. Intention is that Supervisory board does not have more than 7 members. CEO of the organization would be chosen by Supervisory board. Board members would be chosen by the CEO.

Supervisory board besides its roll of supervising operational business process it should have a strategic role as well in a way that thru cooperation with management defines mid-term and long-term strategic goals that are representing goals of the institutions in DIH Innovamare.

As biggest support on strategic level would be Advisory boards that could be established permanent or as think thanks that could help in different areas of DIH Innovamare activities.

DIH Innovamare private entity

SCENARIO A "Entrepreneurial Science"

1. Private entity

In this proposal we as consortium would achieve one important step to really become one of relevant actors on cross-border and EU level in bringing science to business and opposite specially with focus based on blue economy and marine technologies. With entrepreneurial attitude and agility, we are aiming at raising collaboration in one part and in other to boost technology transfer by scientific-research institutions. In this case proposal for the institutions in partnerships consortium is to open a company as an entity with defined founders/shareholders among institutions in partnership consortium and beyond. In this way we are showing the strength of founders and network that exists in company among the founders. One of the crucial elements because company is suitable as entity is possibility to attract different companies and institutions in DIH Innovamare as investors that would add value to initial capital and expand our reach and influence.

By establishing DIH Innovamare as a company it enables institutions to make crucial step in cooperation with private sector and in the same time to become more agile and entrepreneurial in those actions that are limiting them on their institutional level. DIH Innovamare as a company can become a service provider not only for the innovation ecosystem but as well for founders/strategic partner institutions in helping them to overcome managerial, networking and project development obstacles. One of key findings from Norway study trip is their advice that important element for development of innovation ecosystem is agility and business orientation that only can be put in practice thru entrepreneurial organizations. Proposal is to set DIH Innovamare as a non- profit social entrepreneur that is working in direction of its mission sustainability of Adriatic Sea as important social challenge in a way that is leader in bringing together in a network from one side science and private sector as solution providers and on the other hand demand for solutions that is benefiting in social context. For this ecosystem to succeed we should have and organization that is agile and entrepreneurial oriented with employees who as technology agents will be support for founders and members in bringing their solutions to market, be a representative of their in different fields of interest, promote its work and expertise and help them in development of new solutions based on demand.

It is proposal that shareholders/founders share is defined by quadruple-helix groups regarding the percentage of the ownership:

1. Private sector – up to 20% each

2. Scientific-research communities – up to 15% each

3. Local and regional government – up to 10% each

4. Non-governmental organizations – up to 10% each

5. Citizens – up to 10% in total

In this way shareholders/founders are distributed in sense of equal network that has incentive to jointly work on DIH Innovamare development.

In second step important stakeholders' roles are strategic partners and key members. Intention is to immerge them as part of DIH Innovamare thru signed strategic partnership agreements and membership agreements when DIH Innovamare is established.

Main risks in this direction are risk of commitment, long time in deciding on institutional level, financial commitment, and EU funding opportunities where companies are not eligible applicants that could be the case for Innovamare 2.

SCENARIO B "Cooperation in safe mode"

1. Private entity

In this proposal our partnership consortium chooses to establish an association as an entity that will be an NGO as DIH Innovamare.

For establishment of association all partners would be in same position regarding involvement in stakeholders' roles and decision making, as main reference of associations, is based on members that democratically choose representatives and management. Of course, this could be defined in different direction if we decide that we would have 3 members roles in association as well. In that cases structure of association would be like in company that will be defined.

Associations are most used frame for cooperation and collaboration in this term. For the stakeholders to accept members model is easy and with less commitment. It is mostly used in terms of representation, lobbying, bringing together institutions for cooperation.

As DIH Innovamare mission has social purpose then association could be more inclined towards NGO work and in that case can be good partner from government point of view. Considering the partnership number and complexity it would not be easier or faster to establish it in comparison to a company. Association could be small step ahead and can show that there is some commitment for cooperation

among partners. If we are aiming to be more entrepreneurially inclined with the work, then the structure and decision making should be based on the same structure as it is in Scenario A.

In conclusion and based on all collected data on all similar initiatives and through discussion with each of the partners the best suitable option would be to establish and NGO that in the long run can be a founder of a company. In this way we are able to apply our new organization on different calls for business supporting institution as innovation clusters or hubs. NGO as entity takes us to be more oriented on membership model that could be successful because through Innovamare activities we have a lot of interested organizations that would like to join as members. Operational structure should be independent, agile and entrepreneurial oriented so structure we have advised is applicable for NGO. In NGO case through Statue, we would be able to distinguish different types of membership as founders, strategic partners and members that will enable us to set up strategic and operational structure accordingly.

DIH Innovamare partners financial and operational commitments

1. Financial commitment/company

Financial obligations are deriving from stakeholders' roles which are based on three levels - shareholders/founders, strategic partners and members.

Idea is that initial capital for establishment of DIH Innovamare is in the amount that can enable DIH Innovamare to have a 2-year period for operational costs that includes possible co-financing for EU funded projects that DIH will be Lead or a partner specially this implies on Innovamare 2. Financial commitment can be achieved in instalments thru 2-year period that founders agree on.

In financial estimation based on experiences in different institutions, amount gathered for establishment and 2-year financial stability, should be around 300.000-350.000 €.

Based on this estimations proposal for financial commitment is divided between different levels of involvement:

1. Shareholders / Founders – financial obligation of each institution for establishment should be from 40.000 - 45.000 € depending on equity percentage and total number of founders.

2. Strategic partners – financial obligation of each strategic partner should be from 20.000-

25.000 € depending on number of strategic partners

3. Key members – annual key members fee would from 3000 - 4000 €.

Financial commitment can be achieved in instalments thru 2-year period that we agree on and it can have different models.

With financial commitments on this level, we are prepared to fully implement defined services and to become relevant player in regional and EU level.

2. Operational commitment and structure/company

Operational obligations are deriving from stakeholders' roles which are based on three levels: shareholders/founders, strategic partners and members. Thru agreements with each of the stakeholder it will be defined what in-kind contribution can be achieved for the DIH network in terms of infrastructure, equipment and HR. Crucial point is in partnerships between DIH and its founders, strategic partners and key members that they should always look in direction of cooperation between the signed parties thru DIH services and projects development. In this way established network is raising each of the institutions inside and at the end DIH itself.

2.1. Financial commitment/NGO

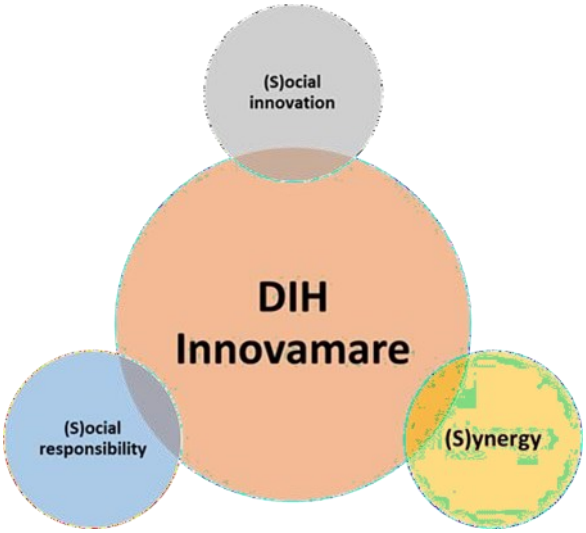
The amount of initial capital needed to start an association does not differ a lot from company as plan is to hire professional management and technology brokerage agents that would in the future be financed thru projects and services. In that case initial capital for starting association is lower for cost of administration and legal services that are higher for company and comes up to 300.000€ in two-year period. If every partner is willing to become founder it should invest in two-year period around 35.000 to 40.000 €. Partners who are not willing to become founder will be part of DIH Innovamare as strategic partners or members and fees in both cases would be defined when DIH Innovamare is established.

2.2. Operational commitment

If we choose and association as an entity proposal is that we apply same operational structure as in Scenario A. Assembly of the association would consist of founders in case all partners would be founders. If all partners would not like to be founders and we choose that we have 3 members roles then assembly would consist of founders, strategic partners and members that will have voting rights. Assembly would choose members of Supervisory board and Supervisory board would choose CEO. With this structure we can obtain agility in decision making and bring closer association to entrepreneurial way of management.

Financial short term sustainability plan

3S - Digital Innovation HUB Innovamare business model consists of three crucial elements that are essential for reaching its vision and mission. Proposal for Business model for the DIH Innovamare is DIH Innovamare 3S and is based on the three pillars – social innovation, social responsibility, and synergy.



3S – DIH Innovamare

Key activities of each pillar should reach different goals that will allow secure financial sustainability for the work of the DIH Innovamare and its employees. In the pillar social innovation, activities like:

1. empowering co-creation and involvement in EU projects that are aiming to develop new innovative solutions which ultimately aim to improve the welfare and wellbeing of individuals and communities,
2. digital and green transformation counselling based on experience and expertise of partners,
3. mentoring in creation of social innovations,
4. facilitation of innovation ecosystem and bringing innovation players together in direction of sustainability of Adriatic Sea
5. testing sites, equipment and mentoring for development products and services through Adriatic Sea Living Lab
6. support co-creation of projects and innovation concepts with stakeholders from innovation ecosystem that would be attractive for private investments

Next pillar, social responsibility focuses on activities like:

1. awareness raising on different challenges regarding pollution and possible outcomes,
2. enhancing skills and competences in application of blue technologies in blue economy sectors – Innovamare academy,
3. involvement of public and students in open innovation concepts, hackathons, education activities, Living lab activities

Finally, pillar synergy is emphasizing the need for synergy and policy dialogue with decision-makers, but it includes synergy and development of relevant stakeholders' networks.

Starting from a vision on developing Centre of collaboration and networking for enabling social innovation in blue economy that will boost sustainable development we have to understand what possible operational cost are for building this DIH Innovamare and to find potential sources from where it will be financed. On the other hand, we must define a sustainability model that will allow DIH Innovamare to achieve sustainability by providing services to its users. Sustainable growth encompasses a business model that creates value consistent with the long-term preservation and enhancement of financial, environmental, and social capital. According to the Chartered Institute of Personnel and Development

(CIPD, 2012), the essence of sustainability in an organizational context is "the principle of enhancing the societal, environmental and economic systems within which a business operates". This introduces the concept of a three-way focus for organizations striving for sustainability. This is reflected also by Colbert and Kurucz (2007), who state that sustainability "implies a simultaneous focus on economic, social, and environmental performance". From perspective of operations, we see it as a micro company that could be showed as a start-up. Based on that we will go thru main figures and explain potential costs and incomes to find out the point of sustainability. Besides that, we will explain how this DIH Innovamare should look like a private entity and present possible variations on business model.

Operational costs on yearly basis (2023)

OPERATIONAL COSTS	No of Units	Unit cost/€	Total/€
Office space and utilities	12	1.400	16.800
Equipment and supplies	12	500	6000
Communications	12	200	2.400
Lawyer and accountant	12	400	4.800
Inventory	4	1000	4000
Employee salaries			
- Manager	12	3.000	36.000
- Technology brokerage agent	12	2000	24.000
Advertising and marketing	12	1000	12.000
Organisation of events/promotions	5	5000	25.000
Design and printing marketing materials	5	1500	7500
Other costs/ 15% of total			20.775
Total operational costs			159.275

Operational income on yearly basis (2023)

OPERATIONAL COSTS	No of Units	Unit income/€	Total/€
Memberships fees			
Strategic partners	1	10.000	10.000
Premium members	5	3.000	15.000
Donors	2	5.000	10.000
Test before invest	3	9.000	18.000
Skills and training	30	500	15.000
Support to find investment	5	3.000	15.000
Innovation ecosystem and networking	10	2.000	20.000
Additional services	15	1.500	22.500
Total operational costs			125.500 €

Public-private partnership in development of supporting institutions

Based on yearly costs of running DIH Innovamare we can see where a sustainability point is but more important is to know how to set up organizational structure and business model so we can reach that sustainability point from different sources.

Going thru DIH Innovamare model vision and mission we can say that a DIH Innovamare is a supporting organization with a clear goal to achieve. Key driver of this should be a private entity – organization. Almost all CCE experience and sustainability is based on EU and other programs funding and now thru DIH Innovamare intention is to set up it in a way that will bring new sources of sustainability.

To achieve that DIH Innovamare should have a partners that are operationally and financially stable because building sustainability in domain of supporting organizations is a long-term process between 3-5 years and if organization and model is only based on EU and other programs funding it can make liquidity problems. Based on research of similar models we came to conclusion that most natural partner to CCE is local/regional government, scientific research institutions and companies.

DIH Innovamare should be set up as supporting organization on public-private terms by creating partnership and establishing private entity/institution. In this way from DIH Innovamare local government is getting huge experience in developing and implementation projects funded by EU and other funding programs and on the other hand CCE will get a support in financial sustainability for mutual work on development of supporting institution that will serve local community in best possible way.

Process of establishment of DIH Innovamare

First step in process of establishment of DIH Innovamare is based on readiness of each partner in Innovamare consortium to define financial and operational commitment.

Second step will be to sign an agreement between all partners who are ready for establishment of DIH Innovamare, and third step would be formal establishment of legal entity.

Proposal of timeline and activities for each step:

1. Formal decision of each partner institution in strategic project Innovamare to join on establishment of DIH Innovamare and to define its role – deadline 15th of September 2022.

2. Proposal of Statue and Agreement on establishment of DIH Innovamare – 1st of October 2022.

3. Ceremony of signing Agreement on establishment of DIH Innovamare – 26th of October 2022.

4. Legal entity established in December 2022. – payment of financial commitment by partner involved - December 2022 or January 2023.

5. Open call for investors/partners/members to join in DIH Innovamare – February 2023.

In July 2022 partnership consortium held a meeting in Trieste with the purpose to define steps in establishment of the DIHInnovaMare, as well as the partners role in the DIH. Three weeks before the meeting was held, project partners were delivered Executive summary of main determinants in process ofestablishment of Digital Innovation Hub Innovamare. It is a document containing:

1. Overview of results of strategic project Innovamare

2. Digital innovation HUB and innovation ecosystem context

2.1. DIH Innovamare services short/long term

2.2. DIH Innovamare operational structure

3. DIH Innovamare private entity

4. DIH Innovamare partners financial and operational commitments

5. Financial short-term sustainability plan

6. Process of establishment of DIH Innovamare

This document was a starting point for partners to represent their decision makers within the institution process of establishment of the DIH. We discussed about the roles of each partner as well as the services that will be available to the future members.

The establishment of DIH Innovamare is a crucial step in the creation of an innovation ecosystem model.

The meeting in Trieste was the official start of the process of establishment of the Digital Innovation Hub Innovamare on a cross-border level. It will be the first example of the establishment of the private entity as a formal structure on cross-border level dealing with innovative solutions in maritime technologies with the purpose of the sustainability of Adriatic Sea and more it is unique because it will continue the sustainability of outputs on project financed from INTERREG Italy-Croatia.

Project partners signed the Framework Collaboration Agreement Innovamare Innovation ecosystem. It has been signed by all 14 partnership institutions and 3 outside partnership consortium – University of Zadar – Croatia, Development & Innovation Center AluTech – Croatia, and Zadar County development agency Zadra nova – Croatia.

With the Framework Collaboration Agreement, the undersigned Parties express their desire and undertake the obligation of further cooperation to continue working on the implementation of achieved results on Strategic project InnovaMare financed from Interreg Italy-Croatia as well to capitalize them in further collaboration on different projects. For the implementation of the InnovaMare Project the Parties with the Framework Collaboration Agreement fully support the establishment of a Digital Innovation Hub as a model of cooperation and co/creation between the stakeholders, that will enable to achieve sustainability of results and further expand cooperation of project consortium with the broader community for the enhancement of InnovaMare innovation ecosystem. The Framework Collaboration Agreement includes InnovaMare project consortium partners as well as organizations outside of the InnovaMare project consortium who during the project expressed their interest to be involved in the further development of InnovaMare innovation ecosystem and establishment of Digital innovation HUB. The Framework Collaboration Agreement sets out the principal terms and conditions under which the Digital innovation HUB should be established. The mutual relations of the founders and members of Digital innovation HUB, as well as the work organization, will be elaborated in detail and determined by the status documentation on the establishment of the Digital innovation HUB, based on principal terms set out in the Framework Collaboration Agreement. Undersigned Parties fully support the establishment of Digital Innovation HUB and agree that further Coordinators and representatives of activities in the InnovaMare innovation ecosystem will be Digital innovation HUB and its responsible person.

Based on the nature of the Framework Collaboration Agreement undersigned Parties have different roles according to their ability at the time of signing this Framework Collaboration Agreement. All undersigned Parties support the further development of InnovaMare innovation ecosystem and establishment of Digital Innovation HUB. Regarding the establishment of Digital Innovation HUB, some of the undersigned Parties have declared their active involvement in the establishment of the Digital

innovation HUB by defining the role of their involvement and based on that agree on described financial and operation commitment deriving from the role.

The list and roles of the undersigned Parties that will have an active role in the establishment of Digital innovation HUB are as follows:

Croatian partners 1. Croatian Chamber of Economy – decided to be in the role of the Founder/Premium member, 2. Šibenik-Knin County – decided to be in the role of the Founder/Premium member, 3. Institute Ruđer Bošković - decided to be in the role of the Founder/Premium member, 4. University of Zadar - decided to be in the role of the Founder/Premium member, 5. University of Zagreb, Faculty of Electrical Engineering and Computing - decided to be in the role of the Member/Associate (Blue) member, 6. University of Rijeka, Department of Biotechnology - decided to be in the role of the Member/Associate (Blue) member 7. Development & Innovation Center Alutech - decided to be in the role of the Member/Associate (Blue) member. 8. Zadar County development agency Zadra nova - decided to be in the role of the Member/Associate (Blue) member, 9. University of Dubrovnik - decided to be in the role of the Member/Associate (Blue) member

Italian partners 1. ARTI – Apulia region agency for technology and innovation - decided to be in the role of the Member/ Associate (Blue) member, 2. Unioncamere del Veneto - decided to be in the role of the Member/Associate (Blue) member, 3. The National Institute of Oceanography and Applied Geophysics – OGS - decided to be in the role of the Member/Associate (Blue) member 4. Communication Technology S.R.L. – Italy - decided to be in the role of the Member/Associate (Blue) member.

Digital innovation HUB InnovaMare was established on February 15th, 2023, during the Founding Assembly, the association Digital Innovation HUB Innovamare was established with its seat in Šibenik.

ANNEX 1. - Analysis of similar initiatives and their business models

Maritime Digital Hub

1. General information

Maritime Digital Hub Limited (maritime.digital) is a non-profit organization focused on bridging the gap between technology and industry to realize the value of digital transformation. The organization was formed by experts from the technology and maritime sectors, and in partnership with maritime clusters in the UK, Mersey Maritime and local authorities. Hub's focus is to provide thought guidance and simplification of technology to help drive value from digital transformation and enable future workforce training. Think-tank is aligned with the transformation areas detailed in the maritime2050 agenda (a strategic document outlining the UK government's visions and ambitions for the future of the UK maritime sector). It has developed a program for workshops, events, research and development and digital awareness with an emphasis on creating mutually beneficial partnerships that bring value to the maritime industry and related sectors.

2. Membership and partnerships

Maritime Digital Hub is actively working to support partnerships between different stakeholders in the maritime sector. Each technology, business or policy partner is asked for targeted information that facilitates comparison and alignment with the needs of the maritime community, enabling alignment with key values - providing a consensus-based, informed, competitive, fair and defensible source of information.

In the context of regional development partnerships, the most important are:

- The LCR area (Liverpool City Region) which includes a population of 1.5 million people, 43,500 businesses, £ 28.3 billion worth of local economy.
- The EM3 Local Enterprise Partnership supports 1.52 million people, 89,700 businesses, 2 county councils and 14 county governments generating £ 49 billion for the UK economy
- Aerospace Cornwall Programme is run by the Cornwall Development Company, and is implemented in partnership with the West of England Aerospace Forum (WEAF). Cornwall 's technology capabilities are on the rise, with nearly 2,400 jobs in digital technology and traffic in digital technology increased by 32% from 2014 to 2017.

3. Services

- An annual program of events and communication focused on industry priorities will be available to all members
- Monthly networking events (face-to-face)
- Quarterly round tables with a focus on selected technology
- Biennial industrial events
- Thought-leadership groups that will include members, according to competencies and experience
- E-zines and monthly publications
- Editors with major maritime publications including - Raconteur, Lloyds Register
- Online digital forums and networking groups

4. Business model

Maritime Digital Hub was established as a non-profit organization with minimal assets and almost non-existent income. It was launched by Kevin Smith in 2020, in response to the Maritime 2050 Agenda, a strategic document guiding the entire UK sector. Activities are funded by voluntary contributions from members and donations from various sources, while members of the initiative have easier access to various benefits such as participation in events through better prices and discounts available only to members of this cluster. As a non-profit organization, Maritime Digital Hub does not have structured services that can be treated as sources of revenue.

DIH Oceanopolis

1. General information

Digital Innovation Hub Oceanopolis is registered as fully operational by the EU Smart Specialization Platform. It is established in 2018 by name DIH Ocean Technology, as the only European DIH for the ocean industry. In 2021, it will merge with two Norwegian EDIH candidates, thus expanding its focus to the public sector, smart cities and coastal regions. Today, Oceanopolis covers all sectors of the ocean industry, existing and emerging. DIH Oceanopolis is a consortium dedicated to assisting SMEs, coastal societies and the public sector in the sustainable adoption of artificial intelligence (AI), the use of high

performance computers (HPCs), cybersecurity training and other key digital skills and competences. It offers users access to laboratories where they can test their ideas with the help of state-of-the-art equipment. The main goal of Oceanopolis is to provide assistance in finding partners and / or solutions that can contribute to increasing the use of digital tools and solutions to accelerate digital transformation.

2. Membership and partnerships

Due to the strong culture of industrial clusters in Agder, the leading clusters stand out among the partners of Oceanopolis . In addition to clusters, he relies on collaboration with various relevant university and national and regional research institutions. Oceanopolis also has strategic partners for application development, research support, piloting, and strategic business planning and financing.

Private sector partnerships include Norway's most important industrial clusters and business associations, and cover all sectors of the ocean industry, both existing and emerging. This includes sectors related to ocean energy, new materials for ocean applications and 3D printing, underwater mining and ocean infrastructure.

Public sector partnerships include a large network of municipalities and cities both within Norway and in the Nordic region. Close cooperation with smart city networks and other public organizations focused on a smart and more sustainable future of the public sector contributes to the development of better and more efficient services for citizens.

Key partnerships - clusters and regional academic institutions: Norwegian Tunnel Safety Cluster, Eyde Cluster, GCE NODE, Lister Alliance, NORCE, Noroff School of technology and digital media, University of Agder.

Key partnerships - public institutions, investors, incubators and laboratories: Innovation Norway, South Norway European Office, Aust-Agder county council, West Agder county council, Research Mobilization Agder, Innoventus Sor, Mechatronics Innovation Lab, BDLab

3. Services

DIH Oceanopolis provides services in several key areas:

- Artificial Intelligence (AI): workshops and lectures on raising awareness of the importance of AI and encouraging the acquisition of competences in the field of artificial intelligence, advice on how to start applying artificial intelligence, research based on artificial intelligence and sharing experiences of different stakeholders on industrial application of artificial intelligence

- Access to High Performance Computers (HPC): DIH helps Norwegian SMEs gain access to high performance computers and reap the benefits of the innovation capabilities it provides, including HPDA Performance Data Analytics), ML (Machine Learning) and AI (Artificial Intelligence), thus increasing their competitiveness

- Cyber Security: DIH's competent partners offer courses and educational programs that raise awareness of cyber security and help establish a system for conducting cyber security checks

- Digital Competence: Several partners in the consortium offer digital skills courses that include digital maturity tests, interoperability, automation and cyber security. Students are taught how to use different digital technologies and tools and how to prepare a strategic plan for the introduction of digital tools in the organization.

- Test before invest: Oceanopolis enables stakeholders to design and develop new products and solutions through participation in Design thinking workshops. Also, users have access to unique laboratory facilities with state-of-the-art equipment and the possibility of insight into data that can contribute to increasing their competitiveness in the market of digitized ocean-based industry.

- Investment finding support: DIH offers access to a wide range of financial services and investment opportunities for both startups and SMEs. For startups, consortium partners also offer equity-based financing in the form of direct investments or convertible loans.

4. Business model

The development of DIH Oceanopolis was partly financed from the DIHelp program of the European Union in 2019, while part of the funding was provided from the Agdera Regional Plan 2030, and financial and operational contributions were provided by several key partners that enabled the development of Oceanopolis. Today, Oceanopolis' business model is based on the fact that it does not have a member company, but cooperates with clusters and business associations, primarily from the Agdera and Rogaland areas. The reason for choosing this business model was significantly lower administrative costs, but also the possibility of access to many medium and small enterprises through partner networks. The owner of DIH Oceanopolis is NORCE - the second largest research institute in Norway that contributes financially to further development and operationalization, along with other consortium partners that also provide funding and public partners that provide funding from various research and development programs in the European Union and Norway.

OceanACT initiative

1. General information

The OceanACT initiative was launched in July 2021 with the aim of creating the OceanACT Atlantic Laboratory for Technologies of the Future as a center for the development, testing, demonstration and qualification of technologically innovative services and products within the blue economy. As a fundamental task, OceanACT will have the management and international promotion of marine testing infrastructures, of which there are many in Portugal, but currently lacking a clear vision and development strategy on how to maximize their potential. In its work, OceanACT will focus on the management, promotion, operationalization and upgrade of three test infrastructures: Aguçadoura test station, where prototypes of AWS, Pelamis and WindFloat were tested, Viana do Castelo infrastructure, where the Windfloat Atlantic demo farm is located and TEC4SEA marine robotics infrastructure run by INESC TEC. The initiative intends to attract new technology developers, and consequently achieve relevant socio-economic benefits, such as attracting investment, involving national industry in the supply chain of these innovative projects and creating highly skilled jobs. As a result of better management of testing infrastructure and consequently shortening the time to market of sustainable services, the technological development of innovative products and services is expected to improve. By creating the conditions for technologies to enter the market and have a positive impact on society and the environment, OceanACT will become a relevant actor in the transition to sustainability.

2. Membership and partnerships

The OceanACT initiative consists of a consortium of five Portuguese institutions with the common goal of promoting and managing the country's existing offshore testing infrastructure:

- + ATLANTIC: a non-profit R&D + I institution that started its activities in 2019 and has more than 50 employees. It develops projects and services in various areas of marine science, ocean technology, blue economy, marine ecosystem health, climate change, ocean literacy and scientific communication.

- CEIIA: Center for Engineering and Product Development founded in 1999 that designs, develops and manages innovative products in the mobility industry, namely automotive and urban mobility, aeronautics, ocean and space. CEIIA employs over 200 engineers and is currently one of the 10 largest R&D investors in Portugal.

- Fórum Oceano: a private non-profit organization with the status of a public interest entity. It is responsible for launching the Portuguese Maritime Cluster, bringing together over 100 members representing all sectors of the blue economy.

- INESC TEC: a private non-profit research association, with the status of a public interest entity. Dedicated to scientific research and technological development, technology transfer, advanced consulting and training, and pre-incubation of new technology-based companies.

- WavEC: R&D consulting firm founded in 2003, dedicated to promoting the development of marine renewable energy and marine aquaculture as a new sector of economic activity, supported by knowledge and innovation.

3. Services

OceanACT will focus on innovative services and products based on level 5-8 technology according to TRL. In addition to providing access to the technology testing infrastructure, it will support the programming of the technology itself in various phases of implementation, from licensing and installation, operational implementation procedures to the validation and certification of new technologies. In addition to implementing energy-based technologies, OceanACT will participate in other activities related to the blue economy, including aquaculture, maritime/ocean communication and surveillance, ocean cleaning and marine robotics.

Some of the key services that OceanACT will provide to customers include:

- Metocean monitoring
- Environmental impact assessment
- Computer simulations (structural, hydrodynamic , aerodynamic, economic)
- Sensor development, adaptation and evaluation
- Data collection, processing and interpretation
- Support for device monitoring and maintenance (using sensors and robotic systems)
- Access to local and national supply chain
- Certification, licensing and permitting processes (environmental, performance, structural)
- Training on testing infrastructure

4. Business model

OceanACT 's business model is adapted to a strategic path divided into three phases. In the first phase, the Installation Phase (2020-2022), the business model is based on moderate costs and good identification of funding sources. The focus in this phase is on deepening the business model and management model, first projects implementation and defining the investments that will be made in the

next phase. The second phase is the Investment Phase, which is expected to take place between 2023 and 2024, depending on the conclusions of the first phase, market dynamics and requirements, infrastructure costs and the availability of financial and public support. Significant investments will be needed at this stage to ensure the reliability and versatility of testing infrastructures. Due to the above, it will be extremely important to attract new funding and contract new projects while ensuring the continuous functionality of the infrastructure and providing logistical support to customers. The beginning of the third phase, the Consolidation Phase, is scheduled for 2025, when OceanACT will position itself as a reference actor in the development and promotion of relevant major technological transformation projects. It is expected that at this stage, OceanACT will be able to independently generate income that will allow its financial autonomy, through rent, sale of services and development and participation in R&D projects.

Piraeus Blue Growth Digital Innovation Hub (BG-DIH)

1. General information

Piraeus Blue Growth DIH (BG-DIH) was founded in 2014 as part of the Blue Growth initiative of Piraeus, Greece's most important port. The basic goal of BG-DIH is to inspire and help young entrepreneurs to start innovative business concepts, products and services related to marine and freshwater resources. BG-DIH is achieving this primarily through familiarizing local people with new key technologies and their capabilities, and through a range of environmentally, economically and socially responsible initiatives. By promoting new technologies and creative business ideas, BG-DIH contributes to the transformation of traditional processes and activities into more productive and sustainable activities.

Through its work, BG-DIH promotes the development of skills and knowledge of human capital, in order to enable the working age population to acquire new knowledge about the blue economy and the latest technologies. With advanced technological equipment and under the guidance of professional consulting staff, BG-DIH encourages experimentation and the creation of new innovative products and services. The main results from the implementation of BG-DIH include: the creation of networking, the creation of new companies and jobs as well as the BLUACT Transfer Network for the implementation of BlueGrowth from 7 other European cities.

2. Memberships and partnerships

BG-DIH has established partnerships with numerous regional organizations that can be divided into research and technology organizations, universities, industry associations, chambers of commerce, incubators/accelerators and local and regional development agencies.

3. Services

Target users of BG-DIH services are groups or individuals who want to experiment with the use of advanced and high-tech infrastructure and equipment; pupils or students who want to get acquainted with the possibilities of advanced technological equipment; individuals who are already familiar with ICT technologies and want to experiment and develop their skills using BG-DIH equipment and space; groups of potential entrepreneurs or individuals who intend to undertake ventures with a high return on investment in the areas of the Blue Economy and with a desire to mature their own business ideas and develop into entrepreneurial ventures.

Accordingly, BG-DIH provides the following services:

- Training for the use of advanced ICT equipment of the Center
- Technical instructions for the use of ICT equipment from citizens who already have a basic knowledge of the equipment
- Technical instructions for the use of ICT equipment by pupils and students during the planned educational meetings
- Personalized consulting services for customers with innovative ideas and support in developing into specific business ventures

4. Business model

BG-DIH was established as a non-profit organization of the Blue Growth initiative of Piraeus. It is integrated into the Piraeus Blue Growth Strategy, and the establishment and development costs of € 1.8 million are covered by the Region of Attica and the funds provided in the strategy. The activities carried out by BG-DIH are funded by the Blue Growth initiative and its sponsors such as UTECO, ABB and KPMG.

Lighthouse Digital Innovation Hub

1. General information

Lighthouse Digital Innovation Hub (LH DIH) is a non-profit organization founded in 2017 in Lithuania which aims to become a digital innovation platform that supports companies, institutions and organizations in the Klaipėda region in creating added value through the use of digital technologies to improve their business and production processes. The main strategic goals of LH DIH are to initiate and improve cooperation between the public and private sectors and scientific institutions using the most

advanced means of communication; establishment of infrastructure for research and experimental development of products and services; implementation of systems and processes for product prototyping and testing; initiating the development of new products and services; quality assurance and standardization and certification of processes and procedures. Regarding the target sector, LH DIH focuses on the maritime industry, IT, construction, biotechnology and energy, which includes projects of different levels of technological readiness - TRL (Technology Readiness Level) levels 1 to 9. LH DIH's activities are in line with the RIS3 strategy related to strengthening excellence in knowledge creation and development of new high-tech industries (Industry 4.0).

2. Membership and partnerships

Lighthouse DIH connects startup founders, creative industry people, marketing experts, architects, economists and many others, actively collaborating with many partners from the public, private and research sectors such as Klaipeda City, Baltijos Incubator/Accelerator technology parkas, Klaipeda University, Klaipeda Business Association of Industrialists, Klaipeda ID development agency, Digital Innovation Institute research organization and many private companies of all sizes such as Klaipedos oil, Klaipedos energy, Klaipedos bus parkas, etc.

3. Services

Lighthouse DIH's services include expert advice to users on methods of digitization of certain aspects of their daily business and the establishment of innovation systems in companies of different sizes and from different business sectors. In order to transfer practical knowledge as efficiently as possible, regular thematic events and hackathons are organized within the Hub , and users are enabled to use co-working and co-living spaces at affordable prices, which emphasizes the sharing of knowledge and experience between users. Some of the services available to customers as part of the comprehensive support in planning and implementation of digital and innovation processes provided by Hub are:

- Access to finance/investors
- Mentoring in everyday business
- Education and development of business skills of users
- Support in planning the strategic development of the company
- Concept validation and prototyping
- Access to commercial infrastructure
- Assessing the digital maturity of a product/service

- Incubator/accelerator services

Beneficiaries of Lighthouse DIH programs and activities can be divided into several categories according to the type and size of the company:

- Start-up companies
- Small and medium enterprises (up to 250 employees)
- Companies with turnover of 2 to 10 billion euros
- Big companies, multinational companies
- Research organizations

4. Business model

Lighthouse Digital Innovation Hub belongs to the category of DIHs that employ 1-9 people and generate annual income of up to 250 thousand euros. Hub's activities are financed from various sources, the most important of which are:

- Horizon 2020 Program
- European Social Fund
- National funding for research
- National funding for innovation
- Private sources of funds

One Sea - Autonomous Maritime Ecosystem

1. General information

The Finnish One Sea initiative was established in 2015, managed by DIMECC, a jointly owned company of 43 industrial and digital companies and 23 research institutes. The goal that One Sea seeks to achieve in collaboration with partners is to develop a secure and commercially viable highly automated logistics

system. The system will consist of physical infrastructure (ships, ports, freight and communication infrastructure), data infrastructure (cloud services, data interfaces and platforms) and ancillary services that will enable interoperable road and transport chains. The digitalisation of maritime transport will minimize the number of maritime accidents, reduce the environmental impact of maritime transport and improve the possibilities of new commercial projects.

One Sea launches various relevant projects for the maritime network, innovators and IT startups and participates in the global debate on maritime rules and regulations, strategic plans and industry standards. It helps interested companies to raise the level of their competitiveness in the market by using digital tools and technologies and autonomous products and services. It manages test areas where companies can test their innovative service products and acts as a leader in the digitization of the Finnish maritime sector.

With independent operational activities within the One Sea initiative, together with DIMECC and the non-profit organization CaaS Nordic, in 2021 One Sea launched an initiative called 5STAR eCorridors, which was selected as one of Finland's candidates for the official status of the European Digital Innovation Center (EDIH) for the next 3 to 7 years.

2. Membership and partnerships

Sea Partnerships are made up of representatives from both private and public sectors that include academia, regions and cities, maritime networks nationally and internationally. These are mainly leaders in the maritime industry and the information and communication technology sector, who work closely together to develop an autonomous maritime system. The leading partner is DIMECC, the innovation hub for the digitization of the Finnish industry. One Sea is continuously expanding the number of partners, among which the following stand out: ABBA, wake.AI, Cargotec, Ericsson F, Finnpilot Pilotage, Fintraffic (VTS Finland), Haltian, Inmarsat, Kongsberg, Maritime, MTI (Monohakobi Technology Institute), NAPA, TietoEVRY, Wärtsilä, Finnish, Marine Industries, Finnish Port Association, Finnish Shipowners' Association, Shipbrokers Finland , The Royal Institution of Naval Architects (RINA).

3. Services

Open Sea seeks to increase the competitiveness of interested companies through the application of autonomous systems and processes. The focus is on product and service development ranging from TRL 1 to TRL9, among which are:

- Creating a vision and developing a strategy for companies
- Collaborative research
- Testing and validation of innovative products and services

- Market intelligence services
- Education and development of digital and other relevant skills

4. Business model

Open Sea was initiated as part of the following digitization strategies:

- Government Program for Digitization 2025
- Finnish Maritime Strategy 2014-2022 (LVM)
- Finnish government decision on smart robotics and automation (LVM/487/01/2016)
- EU Digital Single Market Strategy

Further development and activities are financed from two sources: 50% of financial needs are covered through membership fees of partners determined according to the size of the organization, and the other 50% is funded by Business Finland, Finnish government organization for financing innovation and promotion of trade, tourism and investments.

Financial resources from Business Finland were provided by the end of 2021, and in cooperation with the mentioned organization, economic goals were defined to finance further activities of the initiative which will achieve profitable business through the commercialization of services.

Ocean Data Factory

1. General information

Ocean Data Factory is Sweden's national marine laboratory. The mission of Ocean Data Factory (ODF) is to enable Sweden to be a global leader in sustainability and innovation in the global digital blue economy. The laboratory specializes in ocean data and has a clear vision of sustainable data-based innovation that will enable Sweden to play a leading role in developing the global blue economy and ensure that the ocean and its resources are managed in the best possible and most sustainable way. ODF collaborates with the Swedish Marine and Water Management Agency on urgent environmental issues.

ODF focuses on the application of digital technologies such as artificial intelligence (AI), machine learning (ML) and neural networks (NN) to various types of ocean data from Swedish as well as international data sources. ODF has access to a number of data sources that contain a large selection of data from a variety of projects and sensors. In short, ODF data sources can be divided into three categories:

- External data - ODF partners SMHI and CIS are experts in open databases, the content of their data and access methods
- ODF Partner Data - Most ODF partners have their own ocean datasets that include metadata and structured data
- Data produced by ODF - ODF produces its own data from the analysis and aggregation of external or own data. Along with other projects and external actors, data can also be collected from different types of new sources such as crowdsourcing sensor data from ships/vessels

ODF was founded in 2019 as a two-year project funded by Vinnova - the Swedish Innovation Agency. After the expiration of the two-year period, financing was obtained for the new two- year period, which ends at the end of 2023.

During 2021, ODF became the leader of the initiative to establish a Swedish national DIH dedicated to the sustainability of marine and ocean ecosystems.

2. Membership and partnerships

The ODF consists of a diverse group of universities, research institutes, public sector organizations and Swedish companies, which together provide access to ocean data in Sweden and globally and the competencies needed for data-based innovation through the application of AI/ML/NN. The University of Gothenburg (GU) as the leading partner is the leading Swedish University for Marine Research. The General Directorate includes the Department of Marine Sciences, the Sven Lovén Center for Maritime Infrastructure and the Center for the Sea and Society. GU is the coordinator of SCOOT - the Swedish Center for Ocean Observation Technology, which is the most advanced Swedish underwater robot for monitoring and measuring the ocean. Furthermore, the Department of Informatics at DG conducts research ranging from abstract mathematics and high-tech applications to the social sciences on the implications of using IT. GU also hosts the Swedish National Data Service, CIS. In addition to GU, other educational and research institutions involved in the project are TU Chalmers, as the initiator of one of the world's most successful venture projects and RISE (Swedish Research Institute) with several areas of applied research with NN/ML/AI.

State administration bodies are also involved in the project. The Swedish National Data Service (CIS) is a national research institution, and the main task of the CIS is to support the availability, storage and

reuse of research data and related materials. The Swedish Meteorological and Hydrological Institute (SMHI) is the national body that conducts the largest monitoring of the marine environment and continuous measurements in Swedish waters. SMHI is responsible for the National Oceanographic Data Center and for sharing data from Sweden with international databases, such as Copernicus.

Several private companies are also involved in the project, mostly from the consulting and software sphere. The project consulting companies specialize in environmental, ICT and shipbuilding issues, while the software companies specialize in maritime, data engineering and analytics

3. Services

The goal of ODF is to accelerate the emergence of sustainable innovations in the blue economy by enabling the new use of ocean data through the establishment of a data factory. A data factory is like any other factory in the sense that there is input that is transformed through an internal process and that then results in output that adds value to users, or helps them make decisions. ODF's data-driven innovation process consists of innovation cycles each lasting approximately six months and implemented through ODF's "Data-Driven Innovation Wheel". Each Innovation Wheel begins with the internal activities of the ODF, followed by open workshops led by the ODF, and then ends with a hackathon or demonstration of the results. The target users of ODF and future DIH services are small and medium-sized enterprises and public sector bodies. The goal of ODF is to provide users with in-depth insight through data into the challenges they face through a structured wheel of activities and to facilitate their decision-making in an innovative approach to solving challenges.

4. Business model

In the first two years of funding by the Agency, one of the ODF's primary activities was to develop a "business model" that would allow it to be financially viable after the first two years. The initial funding by the Agency for the first two years of operation amounted to EUR 390,000. After the end of this period, ODF was granted new funding by the Agency in 2021, also in the amount of EUR 390,000, for the period 2021-2023. During this period, with regular work on projects for the use of data for the development of the blue economy, ODF will continue to work on its own business model to ensure its long-term sustainability. ODF bases its long-term sustainability on the approval of the DIH project, which will enable it a new round of financing and development of market services, of which it seeks to achieve a significant share in revenues in the coming period.

Conclusion

Given that only a small share of companies can be classified as highly digital, digital innovation hubs have an extremely important role in establishing and improving the digital and innovative entrepreneurial climate that will be crucial for the development and future success of their users at the regional level, as well as at the international level, given the range of activities of each DIH. Based on the above examples of digital innovation hubs, it can be seen that they are designed as one-stop shops that provide comprehensive support and concrete solutions to their customers in introducing various forms of digitalization in their business processes and help them develop products and services and improve own business processes in accordance with the principles of Industry 4.0. At the same time, they also promote the exchange of knowledge and best practices among users, which is often the best way to learn, given that many companies have similar development paths where they face the same challenges.

A wide range of partners are involved in the work of digital innovation hubs, from local authorities to universities and research institutions, business support institutions and companies of all sizes operating in different sectors. The synergy of the public and private sector is key to the successful and quality operation of digital innovation hubs, given that the different roles, perspectives and experiences of partners give a complete picture of both the current business climate and the desired future state. At the same time, participation in the work of digital innovation hubs by educational institutions such as public and private universities and research organizations significantly contributes to their educational and innovation role. The range of users who have seen the benefits of using digital innovation hubs is very wide and includes both startups and large companies, but also all those "in between" which shows that companies of all sizes and "ages" can have benefits from such initiatives.

One of the most important functions that is common to all analyzed digital innovation hubs and similar initiatives is to support users in finding sources of funding. The role of digital innovation hubs as incubators and accelerators helps entrepreneurs who need a certain level of support, whether financial, infrastructural or advisory, to better direct and organize their business. Networking between individual DIHs is also very important, given that they have diverse breadth and depth of experience and are mostly specialized in specific technologies, the greatest synergy is achieved through their cooperation and allows its users access to all necessary solutions that potentially can make business much easier.

First cross-border Italy-Croatia Digital innovation HUB InnovaMare was established on February 15th, 2023, during the Founding Assembly, the association Digital Innovation HUB Innovamare was established with its seat in Šibenik.

PROJECT PARTNERS

Lead Applicant

Partners

Associated Partner

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