Horizon Europe candidate partnership

‘A climate neutral, sustainable and productive Blue Economy’

Draft report on the results of the online public consultation

26 January 2020

Contents

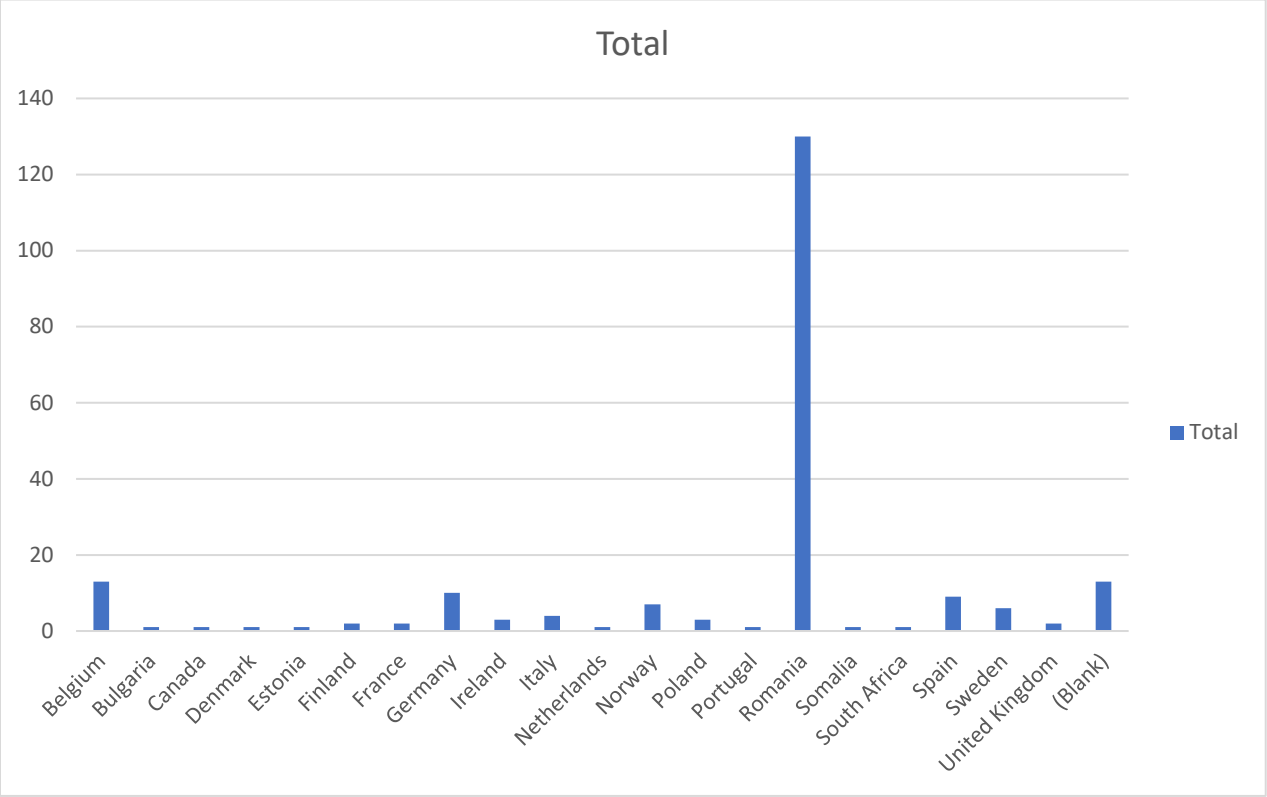
Introduction

In 2019 the European Commission asked potential partners to further elaborate proposals for the candidate European Partnerships identified during the strategic planning of Horizon Europe. The process lead to a portfolio of 49 European Partnerships. Among them is the Partnership for "A climate neutral, sustainable and productive Blue Economy", foreseen for inclusion in the Horizon Europe Work Programme 2021-2022. The Partnership's aim is to reduce fragmentation by linking existing activities and efforts to combine and align pan-European, regional and national investments and the identified socio-political priorities for research and innovation (R&I).

To enrich the partnership co-design process, stakeholders were invited to share their insights and suggestions on the first draft Strategic Research and Innovation Agenda (SRIA) in an open consultation. In total 212 responses were received over the course of the consultation (24 November – 16 December 2020).

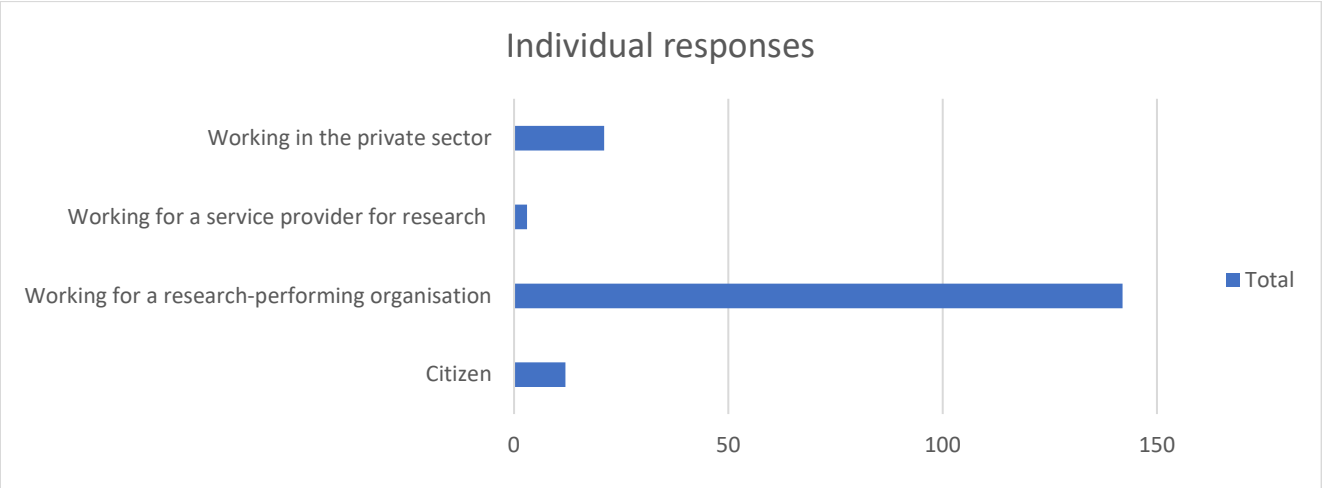
Profile respondents

Geographical breakdown

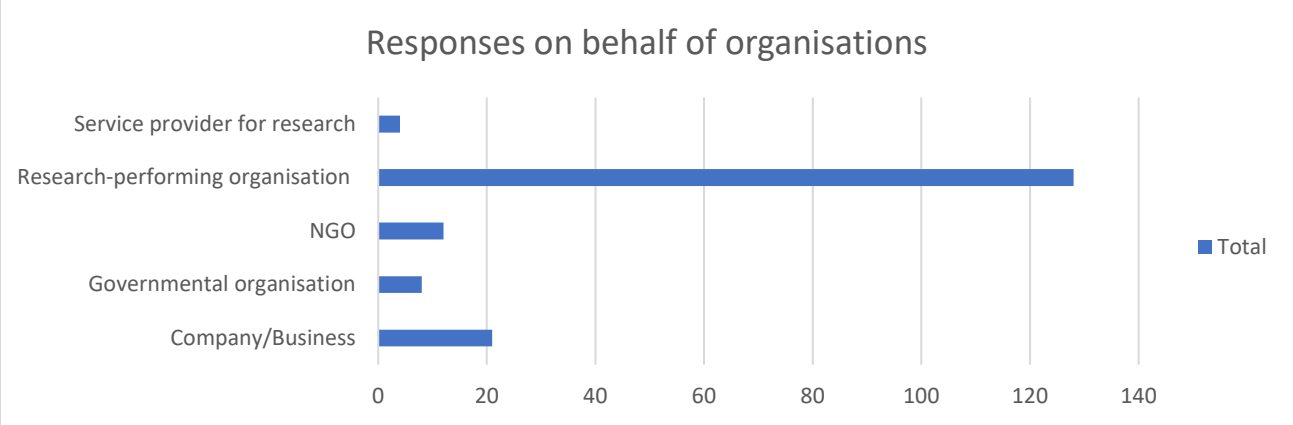


Among EU member countries, the highest number of responses by far came from Romania with a total of 130 responses. To put this in perspective, Romania is followed by Belgium with 13 responses and Germany with 10 responses.

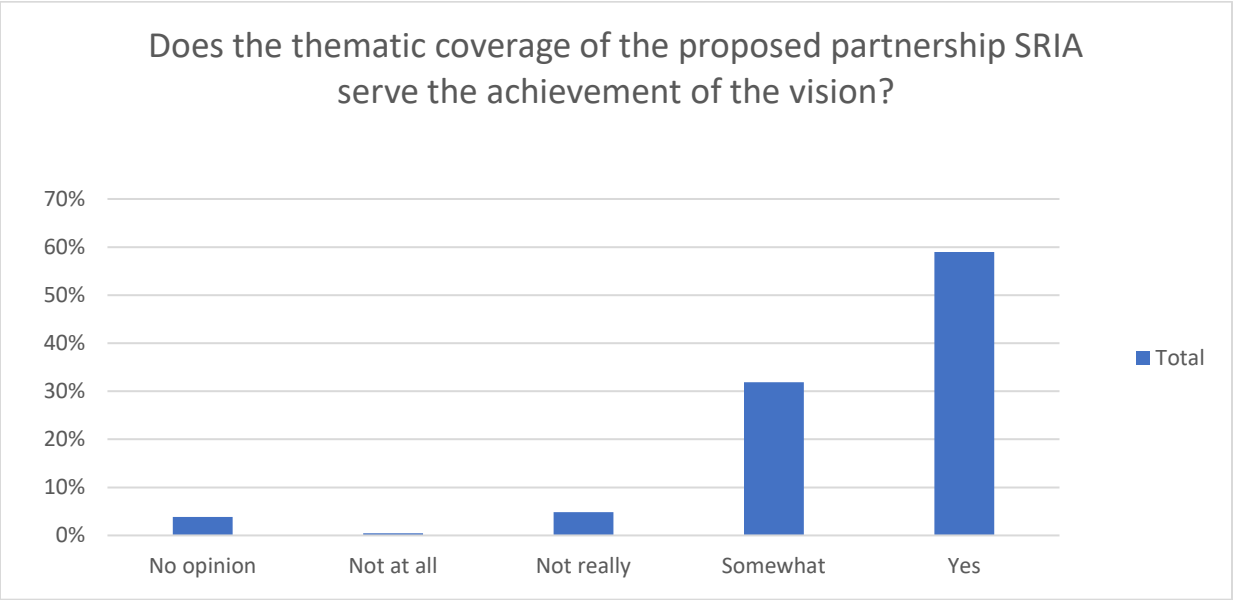
Type of respondents



Overall, we see that the majority of responses originates from respondents coming from research performing organisations followed by respondents coming from the private sector. A similar trend is seen in the response on behalf of organisations.



Thematic coverage



The proposed thematic coverage of the partnership SRIA is endorsed by a majority of respondents. In the free-text replies the overall sentiment is also generally positive or neutral towards the SRIA.

An issue brought up by several respondents is the need for an increased focus on priorities with a strong innovation component in which industry and the private sector can play a larger role. While some respondents suggest to put more focus on the connection specifically to the bioeconomy and emerging value chains based on utilisation of blue biomasses, several others ask to increase the role of technology development more broadly to contribute to the transition to a more sustainable blue economy and marine environment. In that regard several respondents note that the topic of ocean energy (and offshore platforms) is currently missing in the SRIA. It is further specified that there are opportunities from shared research infrastructures and data platforms and through cross-cutting collaboration, aimed at key enabling technologies for in-depth technological innovations and solutions for subsea and ocean activities. Examples given are underwater robotics and automation, underwater sensors and actuators, underwater materials, communication and digitalization. In that regard the respondent noted that cross-disciplinary research could ensure safe, cost-effective and sustainable offshore operations and provide more reliable and accurate data and information on the ocean for better-informed decision-making by policy makers, businesses and investors.

It was further noted that environmental aspects in the text focus more on mitigation (prevention/reduction) of the impact of economic activities on the natural capital, while less attention is given to (research and innovation for) restoring, regenerating and increasing natural capital and ecosystem resilience. Therefore, it is stressed by several respondents that part of the Sustainable Blue Economy Partnership should be focused on the development of concrete, effective measures and tools for restoring the marine environment

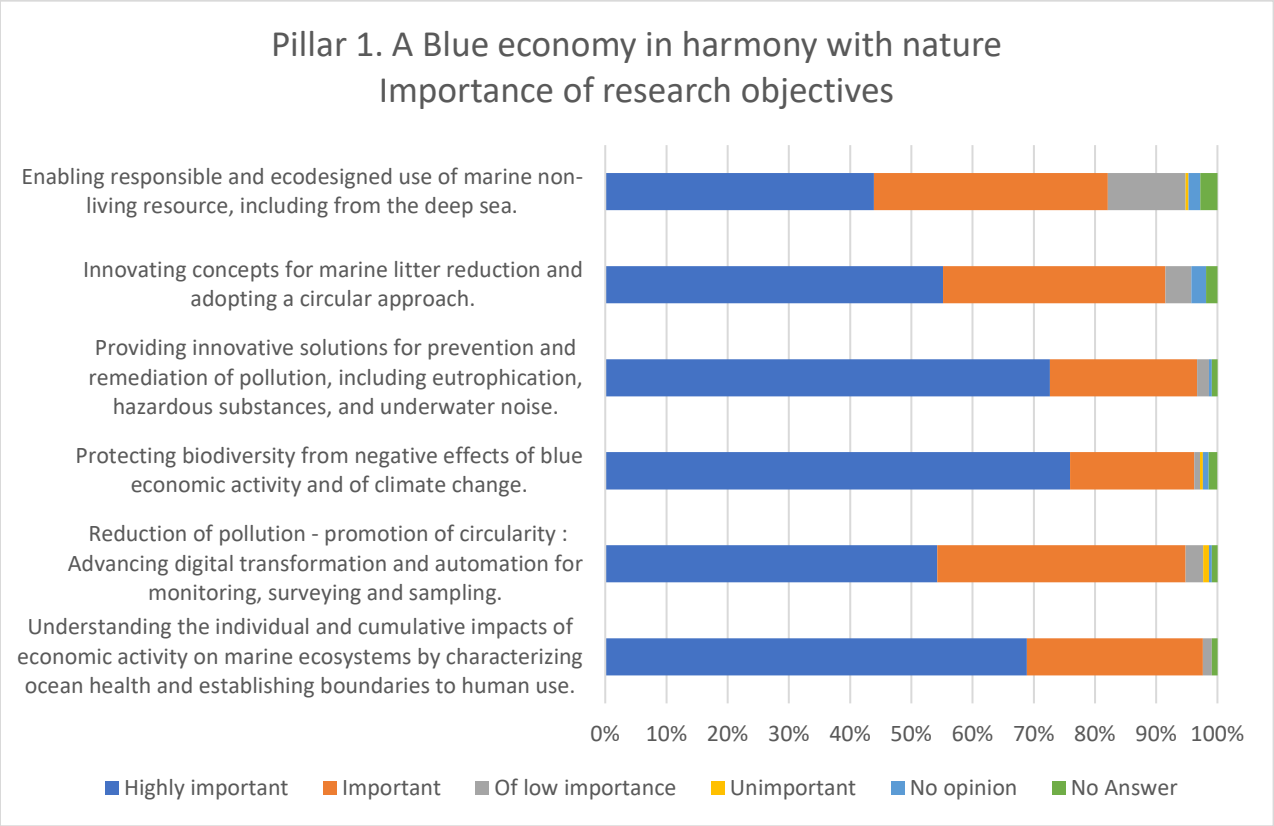
Some respondents also point out that basic knowledge on certain areas is still limited and call thus for greater investments in basic research. With regards to management solutions it is stressed that these

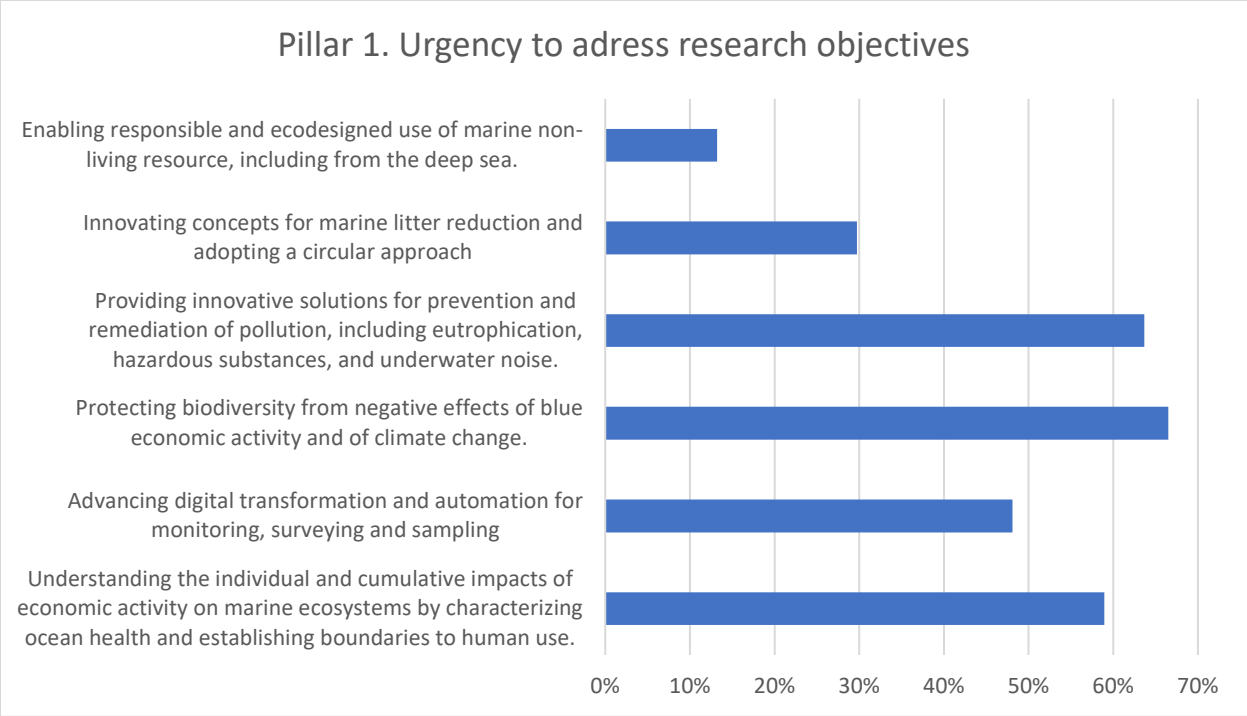
should be developed from a holistic (source to sea) perspective. Related to that, one respondent noted that the agenda needs to provide the structure for addressing complex trade-offs in decision-making and management. Additionally, the partnership is encouraged to address how decisions regarding the management and conservation of the ocean and its uses (through the development of the Blue Economy) can support fair and equitable sharing of benefits that enhance wellbeing, resilience and livelihoods. Another respondent stressed the need for a more bottom up approach with explicit mentioning of local solutions.

In terms of geographic scope it is noted that the Arctic and Southern Oceans are not mentioned in the current draft.

Finally, one of the respondents concluded that the development of new technologies, digitalisation, automation, Ocean Literacy, etc. should be coupled with human capacity development and constant support, to serve the overall objectives of the agenda. In a similar vein, research synthesis, impact assessment, knowledge transfer and open innovation were suggested as additional elements to enable R&I impact.

Pillar 1. A Blue Economy in harmony with nature





Missing research objectives:

In the free text field respondents outlined their ideas on missing and redundant research objectives. Missing research objectives included:

- Advancing research into diseases and micro-organisms that can have a negative impact on health (of marine species and/or humans).
- Assessing land-sea interaction (including emergencies, biodiversity, invasive species, etc.)
- Informing decision-making on the blue economy in a way that takes into account the inter-dependencies of basic human rights and a healthy ocean, which requires (but is not limited to) inclusion of diverse knowledge and values, as well as processes for equitable and fair partnerships for decision-making
- Managing known impact pathways – i.e. governance, rather than seeking to characterise impacts further.
- Integrating Systems Analysis approaches.
- Developing of measures and tools for restauration and regeneration of damage (including historic damage) and increasing natural capital, beyond the 'mitigating/reducing/preventing'
- Smarter, more effective and biologically relevant monitoring
- Advancing technologies and materials for autonomous operations, such as communication, navigation and information technologies and production technologies for extreme environments. Eg. robotics and vehicles, subsea communications, subsea sensors and actuators or subsea signal processing and data analysis.
- Enabling restorative aquaculture
- Baseline & impact studies and mapping of environmental assessments of new value chains in aquaculture

- Risk analysis on environment and food safety of food from the oceans
- Providing innovative solutions for low impact fisheries.
- Advancing renewable ocean energy
- Education and awareness raising
- Monitoring and observation by making use of new platforms (eg. leisure boats)

Redundant research objectives

While respondents noted quite a number of missing research objectives, notably fewer objectives were identified as being redundant. One respondent pointed out that "Enabling responsible and ecodesigned use of marine non-living resource, including from the deep sea." is a very ambitious objective for the lifetime of the Partnership. It is further specified that it is necessary to improve knowledge of the deep sea and other “untouched” environments and inform the UN-International Seabed Authority before enabling their use as resources. Another respondent noted that if the objective includes deep sea mining, they would strongly oppose the continuation of EC funded research or financial support for technology development for this sector, because of irreversible large-scale biodiversity loss.

Two respondents also referred to the redundancy of the research objective on marine litter which is in principal already subsumed under the objective “Prevention and remediation of pollution".

Table 1 Missing or redundant research objectives in Pillar 1 - A selection of participant responses
Digital transformation may be facilitated by a coordinated approach allowing the planning, management and integration of data. Results coming from the monitoring process may benefit all the relevant economic sectors.
Providing innovative solutions for prevention and remediation of pollution, including eutrophication, hazardous substances, and underwater noise - Under this topic and as we consider the focus on ocean health mentioned above one should open the objective to include also diseases and micro-organisms that can have a negative impact of health (of marine species and/or humans).
The land-sea continuum. This is mentioned only in terms of pollutants, but the problem is broader and includes emergencies, biodiversity, invasive species....
All human activities have an impact on the environment. It is crucial that these are within the carrying capacity levels of the ecosystem. Advances in monitoring capacity through digitisation should contribute to a viable, more evidence-based and predictable governance system and operation conditions for the Blue Economy stakeholders.
The agenda should not only be about understanding cumulative effects but also about addressing these, and it is important not just to include effects of economic activities but to employ a holistic perspective including also indirect stressors such as climate change. The development of measures and tools for restauration and regeneration of damage (including historic damage) to ecosystems is not at all mentioned in the objectives, whereas this should have been central, merely establishing boundaries to future use is too limited in scope Digitalisation is very high on our agenda, but regarding monitoring it is important not just to focus on more monitoring or on using new tools, but on smarter, more effective and biologically relevant monitoring Not everything can be monitored, and that some more complex and important questions (such as on

the cumulative impact of multiple stressors) can only be answered by experimentation in a laboratory. This is not reflected in the text
Chalmers University of Technology interprets that the research objective “Advancing digital transformation and automation for monitoring, surveying and sampling”, is essential to support ”Understanding the individual and cumulative impacts of economic activity on marine ecosystems by characterizing ocean health and establishing boundaries to human use. These two research objectives in turn are essential to ”Protecting biodiversity from negative effects of blue economic activity and climate change”, why we believe that priority should be given to the two first, together with the fourth research objective ”Providing innovative solutions for prevention and remediation of pollution, including eutrophication, hazardous substances, and underwater noise.”, as these three also support the 5th and 6th research objectives in Pillar 2.
It is unclear what is meant with 'responsible and ecodesigned use of marine non-living resource, including from the deep sea.' If this includes deep sea mining, Seas At Risk strongly opposes the continuation of EC funded research or financial support for technology development for this sector, since deep sea mining will lead to irreversible large scale biodiversity loss, and is unsustainable - it would be against the Green Deals 'do no harm' principle to support this sector. Research into the deep-sea ecosystems, its role in supporting marine life and in climate regulation would be welcome, but should not be done with the objective of mining and destroying it. To be added: Providing innovative solutions for low impact fisheries.
Extension proposal under A after ii: “Advanced technologies and materials for autonomous operations, such as communication, navigation and information technologies and production technologies for extreme environments. Such technologies include, for example subsea robotics and vehicles, subsea communications, subsea sensors and actuators or subsea signal processing and data analysis. All these technologies should be able to efficiently and effectively build up marine and subsea structures, operate and maintain them as efficiently as possible, and eventually decommission them sustainably and automatically.”
Digital transformation may be facilitated by a coordinated approach allowing the planning, management and integration of data. Results coming from the monitoring process may benefit all the relevant economic sectors.
Understanding of connections within and between ecosystems, with support of digital tools among others.
Though marine litter is important it is not the most pressing issue in EU waters.
Protecting and restoring habitat and ocean is important, but it should go side by side with possibilities and sustainable management and use of the ocean. Research for a knowledge based ocean and waters policy should be seeking to further sustainable fisheries and aquaculture. Circular economy: The SRIA should include an integrated land-sea-approach. The ocean can contribute to sustainable food production but also relieve land.
Renewable energy technologies are missed in the current SRIA text. As "digital transformation" is well represented in this SRIA, "clean energy transformation" is not. There are many barriers to overcome related to their technological development. Their advance will mitigate the climate change directly from the oceans.

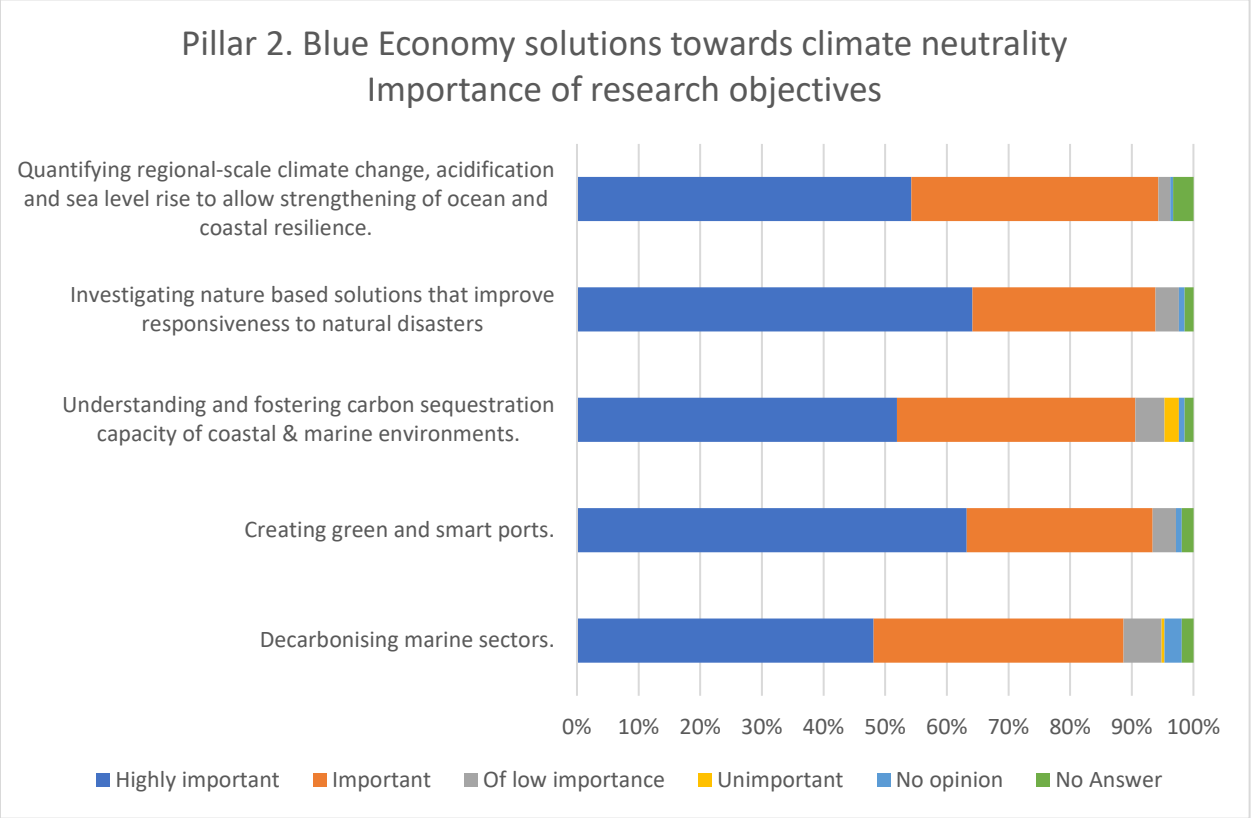
Focus on research and innovation for restoring and increasing natural capital, beyond the 'mitigating/reducing/preventing' Need to balance research objectives (eg understanding cumulative impacts) and innovation objectives (smart sensors and observation to harness sustainable development). The objective 'Protecting biodiversity...' is not selected as priority because it is already enshrined in existing instruments (EIAs, MSFD, Natura2000 etc.) , the R&I in the BE partnership SRIA should go beyond this objective. * check formulation: it should in all case be clear that the SRIA addresses "R&I for...objective x and y."
Advanced technologies and materials for autonomous operations, such as communication, navigation and information technologies and production technologies for extreme environments. Such technologies include, for example subsea robotics and vehicles, subsea communications, subsea sensors and actuators or subsea signal processing and data analysis. All these technologies should be able to efficiently and effectively build up marine and subsea structures, operate and maintain them as efficiently as possible, and eventually decommission them sustainably and automatically
The objective on “Enabling responsible and ecodesigned use of marine non-living resource, including from the deep sea” hints at, but is not explicit about, the potential industrial development of seabed mineral exploration, potential extraction and further processing in the coming decades. Given the increasing demand for minerals in order to implement the green shift, and the fact that licenses for seabed mineral exploration are already granted for several locations, one could expect the Blue Economy Partnership to be more explicit on this point, e.g. to state the importance of a precautionary approach and a holistic investigation into the possibilities and challenges in this area.
Awareness-raising activities introduced from primary to university cycle
Pillar 1 – Blue Economy in harmony with nature. The inclusion of people in the thematic Pillar 1 notion of “knowledge of marine ecosystems” is crucial. Society is part of the ecosystem and therefore, they should be considered as one with the blue economy, not as separated from it. There is a need to acknowledge the lessons learnt as to why “perfect science” has not led to “perfect decisions” in the past: science should be seen as part of the soft governance required to co-develop fair partnerships for a sustainable and inclusive blue economy. In our experience, the ways in which we “do science” are critical to lead to more inclusive and sustainable blue-economy decisions down the line: how early we set research objectives with non-academic partners and rights-holders, and how we develop an iterative approach to research so that it can responds to the evolving understanding of societal needs (and the variety of needs within society) – see the Hub's Code of Practice. Instead, the overarching aim of Pillar 1 is not fully reflected in the corresponding text, so it should be mentioned that further research is needed to understand links with natural capital, and how values are accrued. That said, we welcome acknowledgement of limits. Ultimately, the health of marine ecosystems and the dependence of lives and livelihoods (ie basic human rights) from them are the main research objectives for a sustainable blue economy. So a research objective that is missing here is how to inform decision-making on the blue economy in way that takes into account the inter-dependencies of basic human rights and a healthy ocean, which requires (but is not limited to) inclusion of diverse knowledge and values, as well as processes for equitable and fair partnerships for decision-making: Morgera, 2020). Also important under Pillar 1 (Understanding the individual and cumulative impacts of economic activity on marine ecosystems) is a forward-looking approach: if we shape the use of the marine

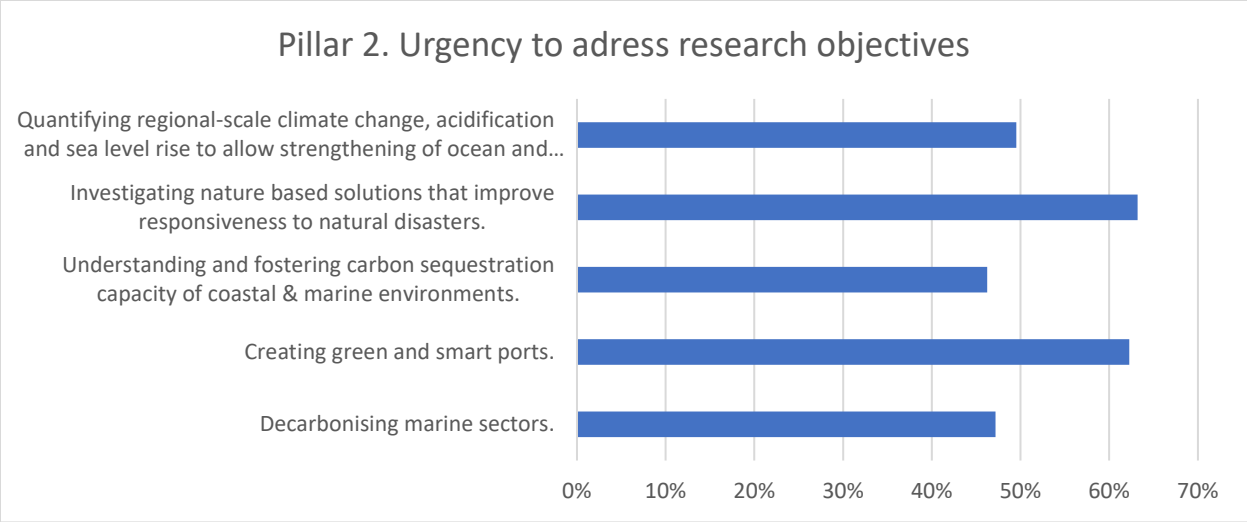
environment, this is going to change as a blue economy progresses. So we need to focus on how we manage known impact pathways – i.e. governance, rather than seek to characterise impacts further.
Using the energy potential of the oceans
All human activities have an impact on the environment. It is crucial that these are within the carrying capacity levels of the ecosystem. Advances in monitoring capacity through digitisation should contribute to a viable, more evidence-based and predictable governance system and operation conditions for the Blue Economy stakeholders.
Enabling digital transformation, innovation, etc. are important, but the main challenge would to enable the implementation of these innovation in a timely manner (and not dedicating a decade to do so), due to the inertia of the current systems. In addition, we currently don't have any solution to access deep sea resources (or any other "pristine" environment) without damaging the deep sea environment. So "Enabling responsible and ecodesigned use of marine non-living resource, including from the deep sea." is a very ambitious objective for the lifetime of the Partnership. It is necessary to improve our knowledge of the deep sea and other "untouched" environments and inform the UN-ISA before enabling their use as resources, specially at the eve of a new International Ocean Governance (BBNJ).
Education is needed from children to adults to protect the environment and climate change, especially in poor areas on all continents. Finding new solutions for a decent living
Text in page 16 of Draft partnership : "Present marine spatial plans are still emerging, with considerable needs for transnational and industry collaboration and these will be supported by smart technology to reduce trade-offs between users, enabling multiuse of areas", would be more appropriate in Pillar 4 - Ocean Governance.
Humanistic research related to the development of the natural terrestrial and maritime ecosystem, which does not exclude artscience projects, urban development integrated in the vision of the strategy and the development of coastal economies, which are based on the cultural ecosystems of the area.
Reduction of freshwater pollution with plastics, organic matter
Development of plants to produce useful energy (electricity and heat) from 3 or 4 existing renewable energy sources in a location / site (including cities) and to limit the classic exploitation of the environment.
Commercialisation and scale up programs for implementation of new technologies Restorative aquaculture Baseline & impact studies and mapping of environmental assessments of new value chains in aquaculture Risk analysis on environment and food safety of food from the oceans
Related to the second research objective, recreational boating can play an important role. Given the estimated 6 million boats in European waters (mainly small boats below 10m), these can play an important role in mapping and gathering relevant data. We therefore suggest to specifically mention "leisure boats" in the SRIA.
"Remediation of pollution" (in general) embraces "Marine litter reduction", so there is some redundancy in the fourth element in the list.
From experience in the terrestrial environment we know that new forms of dialog and Systems Analyses aproaches are imperative to multi-use success. Thus, such methods should be integrated into the research themes. Also modelling of interactions is essential for making good decisions based on scenarios.

There is not enough to reduce cumulative impact and protect biodiversity, there is necessary to enhance key 6 key elements for sustainability by every ecological system such as river catchment which are major providers nutrients pollutants load to oceans. Every strategic plan and every measure to reverse cumulative impact by integration of the Blue economy and Engineering Ecodesign; nature based solutions should improve.

Water, Biodiversity, Services for Society; Resilience to climate change, Culture and Education WBSRCE Concept Zalewski 2017; 2020 (J. Hydrol.)Eng; Ekohydrologia, PWN)

Pillar 2. Blue Economy solutions towards climate neutrality Importance of research objectives





Missing research objectives:

In the free text field respondents outlined their ideas on missing and redundant research objective. Missing research objectives included:

- Investigating nature based solutions as a key input in responsiveness to human-driven impacts with the potential to also increase natural capital and ecosystem services.
- Optimising the resilience of coastal ecosystems and communities and their capacity to mitigate against climate change and natural hazards:
- Cross-sector optimisation of resource use
- Creating unified indicators, assessment tools and auditing requirements to measure the value of ecosystem services
- Advancing carbon capture and storage
- Improving early warning systems to protect citizens, infrastructures and investments
- Optimisation of novel production designs and sensor-based automated monitoring systems
- Accelerating ocean energy development
- Advancing environmental monitoring of wave or tidal energy devices
- Creating green and smart ports and marinas

Redundant research objectives

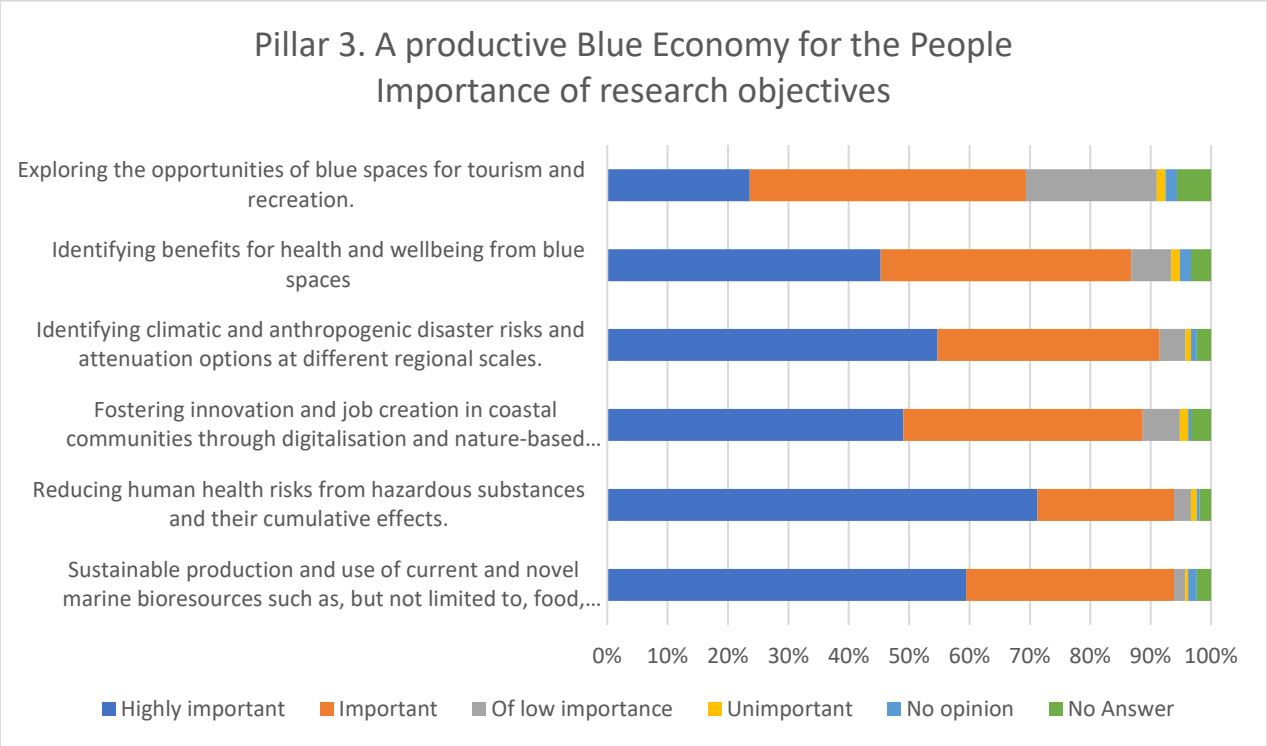
Being asked to identify redundant research objectives, one respondent comments that decarbonising marine sectors and green and smart ports are highly relevant but seem to be better suited to be addressed in Horizon Europe cluster 5: climate, energy and mobility.

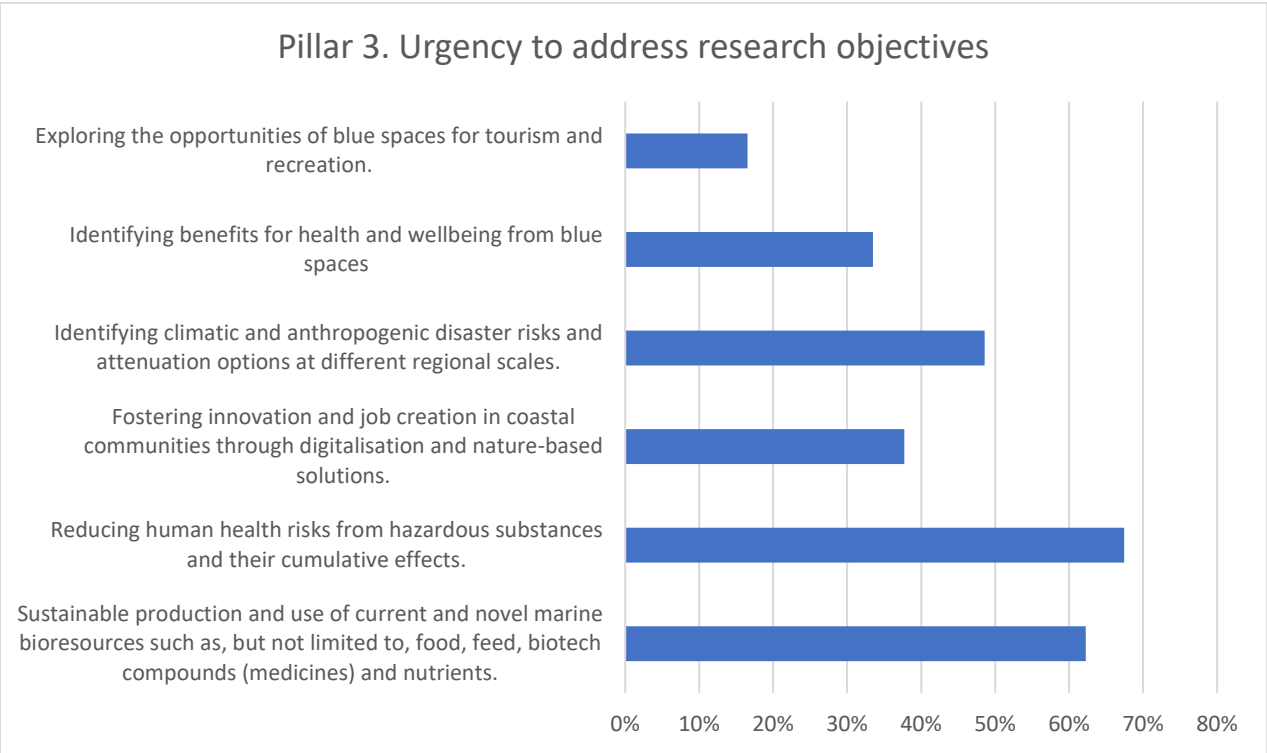
Table 2. Missing or redundant research objectives in Pillar 2 - A selection of participant responses
We welcome the objectives of the Blue economy partnership aiming at achieving the decarbonisation of marine sectors and creating green and smart ports. Cooperation and synergies between European partnerships, especially Zero Emission Waterborne Transport will facilitate the creation of the appropriate port infrastructure - including technologies for bunkering of SAFs and energy supply - that will enable and foster green and smart modes of transport, namely waterborne transport. However, a clear definition of the contribution of the Blue Economy partnership is missing for the above mentioned objectives.
Nature based solutions can also provide a key input in responsiveness to human-driven disasters/impacts as those related to explorarion of marine resouces (biotic and abiotic). This aspect should be included in this item even if it is somewhat covered under Pilar 3
The place of "nature-based solutions" is too reduced and "technic" and "digital" are too preponderant. It will be better to have both approaches at the same level.
Lowering the carbon footprint has already been an on-going process in many sectors, stimulated by the consumer demands / behaviour change. Although climate neutrality may be difficult to achieve by each of the sub-sector in the Blue Economy, more emphasis should be put on a cross-sector optimisation of resource use, i.e. where can a resource be used in a most efficient way, measured by its carbon-footprint. There is also a need for unified indicators, assessment tools and auditing requirements to measure the value of ecosystem services .
Regarding optimizing the resilience of coastal ecosystems and their capacity to mitigate against climate change, it is very important to distinguish between quantifying and undertaking actions – as quantification in itself does not strengthen resilience. Again here, the development of targeted, effective (management, policy) actions are needed.
Chalmers University of Technology interprets the research objective ”Investigating nature based solutions that improve responsiveness to natural disasters” to be a subcategory of ”Quantifying regional-scale climate change, acidification and sea level rise to allow strengthening of ocean and coastal resilience.”.
A blue economies possibility is to capture green house gases and to decarbonize other sectors.
Decarbonising marine (I guess maritime) sectors and green and smart ports are highly relevant - however, not in this partnership. These theme seem well suited to be addressed in cluster 5 climate, energy and mobility. E.g. development of power2X and other technologies are not ocean specific issues
See for example Chapter "Fisheries, Aquaculture, and Shifting Diets - The potential mitigation impact of reducing the carbon footprint of ocean-derived food production (wild capture fisheries and aquaculture) and the potential reductions from shifting diets to include more low-carbon sources of ocean-based protein". https://dev-oceanpanel.pantheonsite.io/sites/default/files/2019-09/19_HLP_Report_Ocean_Solution_Climate_Change_final.pdf. «Ocean foods have the potential to play a significant role in emission reduction efforts if their production is sustainable.». Hoegh-Guldberg. O., et al. 2019. ‘‘The Ocean as a Solution to Climate Change: Five Opportunities for Action.’’ Report. Washington, DC: World Resources Institute. Available online at http://www.oceanpanel.org/climate p. 60. Integrated ocean management as key to action for climate change: https://oceanpanel.org/sites/default/files/2020-09/Integrated%20Ocean%20Management.pdf

How to transform current ports in greener ports must be further explained in terms of needs and solutions. Which technologies must be applied and further advances on these technologies.
*nature based solutions not only to address responsiveness to natural disasters (also increase natural capital, improve resilience, increase ecosystem services,...) * quantifying regional-scale climate change...., decarbonising marine sectors,... are strategic objectives of OTHER partnerships, programmes, initiatives. The BE partnership should develop strong interaction and governance mechanism with these initiatives for the uptake of these results/deliverables, and avoid fragmentation (coordinate and align), but not duplicate efforts
Decarbonising the maritime sector is important, however should be part of cluster 5 efforts and not this partnership
Improve early warning systems to protect citizens, infrastructures and investments Optimising the resilience of coastal ecosystems and communities and their capacity to mitigate against climate change and natural hazards: The materials related questions are included in “Key Enablers” but not as prominent in the Objectives. However, we assume that this is sufficient
The draft SRIA could be more explicit about the need for investing in the development of specific forms of technology for the implementation of the green shift. More specifically, the optimisation of novel production designs, sensor-based automated monitoring systems and control mechanisms have a high potential to improve blue economy efficiency and thus represent an important potential. It is recommended to promote to a larger extent the use of the existing knowledge base to advance the efficiency of aquatic biological production within its environmental boundaries.
Pillar 2 – A Blue Economy solutions towards climate neutrality: as mentioned in a previous comment, it would be important to mention marine renewables, especially considering that the Commission just published its offshore renewable energy strategy, while at the same time acknowledging that this maritime sector comes with considerable environmental impacts (perhaps even compromising other climate-related objectives, such as fostering the carbon sequestration capacity of coastal and marine ecosystems). An additional objective is required here to ensure that the links between land-based and blue economies are joined up to develop solutions towards climate neutrality. This objective will help us to understand “what the ocean we want” is at different scales and for this to be reflected in policy and governance arrangements and to underpin any progression of a blue economy. It will assist us to find out “what is a resilient and sustainable coastal community? How are people connected to blue spaces? What are people’s visions for a blue economy?” Caution is also needed, to avoid taking notions such as ‘vulnerability’, ‘resilience’ and ‘just transition’ for granted. We believe that a participatory process to define their content should be undertaken as a matter of priority, so that there is some understanding of the potentially different ways in which they play out at the EU, regional and sub-regional levels. There is also a need to acknowledge tensions and potential trade-offs between different measures taken to achieve climate neutrality, including trade-offs for biodiversity and inter-dependent human rights (as we indicated above with regard to the example of marine renewables; see also Morgera, 2020).

Creating infrastructure for electricity production based on the potential energy of the oceans
Nature based solutions, natural carbon sequestration and ocean/coastal resilience shouldn't be de-coupled from decarbonising the Blue Economy.
Creation of green and sustainable ports, new solutions in port activities to reduce pollution and the effects of climate change, all of which will determine marine decarbonization.
Text in page 17 of Draft partnership: "Research and innovation actions will support user-driven solutions across the full value chain..." - a mention is missing to include not only user-driven solutions, but user-structured and user-oriented - this means co-designed, as referred to in page 6 of Draft Partnership.
The very important research objectives of pillar 2 are smart specialisation, and safe and secure purpose driven technology. CO2 capture and neutralization represent a major global "challenge", for the reduce carbon emissions and global warming..
Humanistic research, design research and bioart-science projects are mandatory cross-cutting projects for knowledge, awareness and implementation, because everything is done for people with sustainable respect for nature.
It should include aspects and sub-programmes related to educating people in this direction/sense and development of projects for other areas as well such as those belonging to former mining industry.
Development of solutions that consume carbon as a raw material, fertilizer or food
The chemical aspects of marine pollution is important.
Comments: Ocean cleaning should begin with rivers in riparian countries.
We propose to include a specific research objective for accelerating ocean energy development. Wave and tidal stream offer the flexibility to the grid that the wind and solar technologies need in order to ensure a continuous electricity production in a renewables-based electricity system. Ocean energy technologies reduce the need for batteries and have a very low environmental impact. Research actions are needed in order to bring these emerging technologies into commercialisation. In addition to demonstration, a lot remains to be done to progress the sector, e.g. related to PTOs, blades, circularity, array configurations, and system integration. One important call topic could be environmental monitoring of wave or tidal energy devices.
We support the research objectives and would like to emphasise the potential of the recreational boating industry in the decarbonisation of marine sectors. Research and innovation related to maritime transport should be supplemented with that for recreational boating. On the second research objective, we propose to add "marinas" to take into account their potential for green and digital transformation. On the quantification of climate change impact, we support this as crucial to understand impacts for recreational boating infrastructure that is at the intersection of land and sea, as well as for boaters (such as marinas). Forecasting climate change impact and putting in place adaptation measures requires this quantification.
The research themes proposed does not fully meet objective A on solutions. "Understanding", "Investigating" and "Quantifying" is important as fundamental knowledge, but where are the solutions? How will be digitalisation, digital twins, automation, autonomous operations, smart specialisation, purpose driven technology etc be advanced? I am afraid that the research themes as presented are not appealing to industrial and other private sector actor that develop technology, but restricted to the interests of research institutes and academia.

Pillar 3. A productive Blue Economy for the People





Missing research objectives:

In the free text field respondents outlined their ideas on missing and redundant research objective. A summary of missing research objectives below:

- Including a focus on health and welfare in aqua- and mariculture as those parameters at not just essential for the species itself but relate strongly to our capacity to produce higher yields of safe and nutritious food.
- Advancing low impact, sustainable fisheries
- Developing of aquaculture production - in water, on land and through Integrated multi-trophic aquaculture and diversification of species farmed.
- Providing new jobs in coastal communities through non-extractive uses (tourism and recreation) e.g. in combination with MPA type developments.
- Identifying climatic, natural and anthropogenic disaster risks and attenuation options at different regional scales.
- Co-defining 'fair, just and inclusive transition' by all relevant actors.

Redundant research objectives

One respondent noted that identifying disaster risks is less aligned with the scope of this partnership, as this does not directly contribute to a more sustainable blue economy. It is suggested to take this up in another partnership or as an aspect of the Ocean mission.

Table 3. Missing or redundant research objectives in Pillar 3 - A selection of participant responses
Sustainable production and use of current and novel marine bioresources when relating to fish and other species should include a focus on health and welfare as those parameters at not just essential for the species itself but relate strongly to our capacity to produce higher yields of safe and nutritious food. The absence of health under this parameter is detrimental.
Small businesses are a key source of jobs and the attractiveness of coastal communities, and should be acknowledged as such. These should not be limited to nature based solutions, but industrialised blue sectors should rather be encouraged to invest in innovative solutions with a low environment impact that may become profitable in the future. The aspects of industry-driven innovations towards a resilient blue economy deserves more attention.
Concerning the first objective, we believe that the importance of using circular economy principles and alternative and under-exploited sources of raw materials should be reinforced. Concerning the third objective, we would suggest the reinforcement of the idea of creating highly qualified jobs in order to guarantee the proper implementation of the strategies of research and innovation.
Sustainable production of marine bioresources is relevant. Appreciation for the value of an intact marine environment including the positive effect on human health and incentives to support behavioral change to lower the environmental footprint are very important. Otherwise, these objectives are not that central to us.
Reducing risks to ecosystem health from hazardous substances.
Ensuring healthy and nutritious food from the ocean has a huge potential to be further enhanced - both in terms of less impactful, sustainable fisheries and further development of aquaculture

production - in water, on land and through IMTA and diversification of species farmed. As well as providing new jobs in coastal communities through non-extractive uses (tourism and recreation) e.g. in combination with MPA type developments.
The SRIA needs to address objectives on the oceans role in global and European food production? Mobilizing the Marine and Maritime Industries.
Identifying climatic, natural and anthropogenic disaster risks and attenuation options at different regional scales.
Although mentioned, the document could be more specific about the importance of developing increasingly sustainable aquaculture, e.g. through increased production of low-trophic species and seaweed farming (which may also contribute considerably to climate change mitigation). Seen in relation to the reference on p. 4 of the potential to sustainably produce six times more seafood, and given that we have already exceeded the limits for sustainable wild catch, to achieve a sustainable growth within aquaculture should be an explicitly stated goal. One specific aspect is the food loss along the seafood value chain, where long distance transport of easily degradable, non-processed resources prevents utilization of essential marine nutrients.
Pillar 3 – A Blue Economy for the people: Objective B focuses on 'creating resilient and sustainable coastal communities through a fair, just and inclusive transition', placing an emphasis on innovation and job creation, as well as sustainability and resilience. Here the social dimension becomes more prominent, with references to how the blue economy will benefit 'people, planet and the economy' and the recognition of 'a Blue Economy for the people' as one of the four thematic pillars of the overall agenda. We do, however, think that there should be some mention of how the notion of 'fair, just and inclusive transition' needs to be co-defined by all relevant actors as it doesn't necessarily mean the same thing to all people. We would also recommend a more explicit reference to cultural dimensions of human-ocean interactions. There is a reference to tourism and recreation, but cultural dimensions go well beyond that. For instance, ceremonial and religious connections to the ocean for indigenous peoples and local communities are often overlooked. In terms of the key enablers for this pillar (p. 14), we would recommend that references be included to the European Pillar of Social Rights, the EU Charter of Fundamental Rights, the European Convention on Human Rights, and EU legislation and guidance relating to the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters: https://ec.europa.eu/environment/aarhus/legislation.htm. In addition, a broader refernce to the relevance of the UN Framework Principles on Human Rights and the Environment could be also made here (Morgera, 2020). In addition, Pillar 3. A Blue Economy for the People should also reflect on the intangible links between livelihoods and wellbeing . In our analysis of blue economy policies and Sustainable Development Goals (SDGs), we have found weak synergies with gender and gender equality, for instance; this was largely because gender equality and 'empowerment' (as described by the SDGs) require to be understood in a local context (Niner et al., in prep) and are challenging to address at a range of scales. This finding follows through to this document where gender equality is mentioned once. Instead, more specific expectations should be set on role of research in addressing appropriately and systematically gender (and other grounds for) equality. For instance, the funder of the One Ocean Hub (the UK Research and Innovation's Global Challenges Research Fund) has made the submission of a Gender Equality Statement a compulsory requirement for funded research projects. In this statement, applicants must outline how they have taken meaningful yet proportionate consideration as to how the project will contribute to reducing gender inequalities. In addition, gender equality is a key aspect of the Monitoring, Evaluation and Learning framework that

each Hub needs to develop, and a key aspect on which the Hub needs to report on an annual basis.

Non-discrimination, based on gender or other grounds, is also a crucial element to ensure that the blue economy is supportive of the inter-dependence of basic human rights and a healthy ocean (Morgera, 2020).

Missing here is an overarching research question that defines “the ocean we want” and an objective to understand this at different scales, so that this can be reflected in policy and governance arrangements, and underpin any progression of a blue economy.

Further, this Pillar should not neglect the links between land and blue economies, as well as the communities that are linked to the ocean in less tangible ways.

An objective pertaining to renewable energy can also be included under this pillar. Some reference to energy communities, just transition, access to affordable, sustainable and clean energy, that does not negatively impact on biodiversity and biodiversity-dependent human rights (Morgera, 2020).

The identification of benefits for health and well-being should be prioritised as it is the objective from which all others stem. There needs to be some clarity on these linkages and how they translate into livelihoods, food security, energy security, etc. before anything else can happen.

Assessment of ocean pollutants and remedial measures

It should be clear within these aims that we are ultimately seeking a balance where both the ocean and humans can benefit - none of the objectives should be taken from one viewpoint only, as this will result in benefits for one to the detriment of the other.

Disaster risk identification should be made transparent, based on real evidence. Exaggerating disasters can generate a tendency to deny these perspectives and a resistance to promoting truly valuable initiatives.

Reducing and promoting the risks to human health of dangerous substances and their cumulative effects.

Innovation and job creation in coastal communities through digitalisation and nature-based solutions will help tourism, other economic activities, and the wellbeing from blue spaces.

In the context of the Blue economy, the One-health approach in aquaculture production must also be considered. The growth of this sector which in 2050 is expected to supply most of the proteins of aquatic origin must in fact find the right balance between respect for the environment, health and welfare of farmed animals and human health.

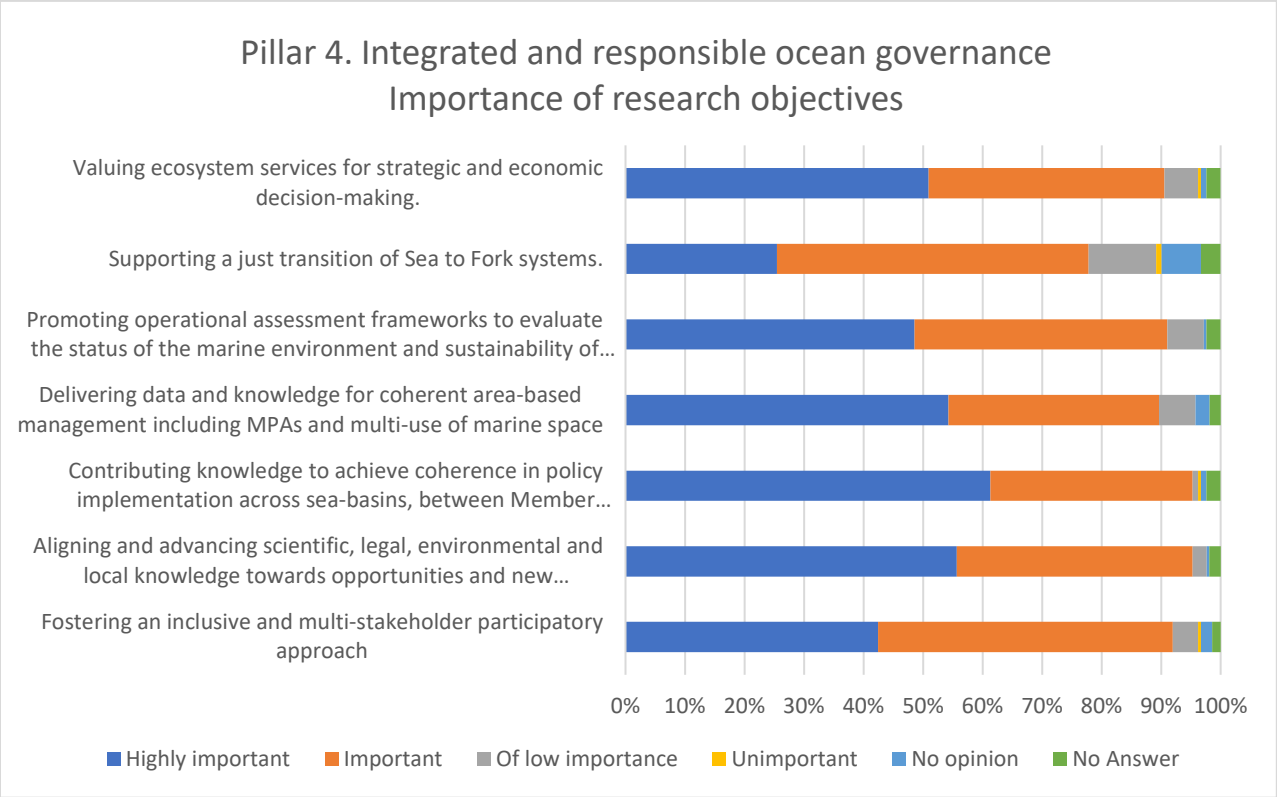
Related to the broader objective A: "A. Delivering healthy, affordable, and sustainable food, feed and bioproducts with full transparency throughout the chain" (Page 12 of Draft partnership), how will these features be monitored/enforced concerning food, feed and bioproducts imported from third countries ?This is also missing in Page 18 of the Draft partnership, when traceability is mentioned. Traceability of seafood originating from third countries is often "blurry" .

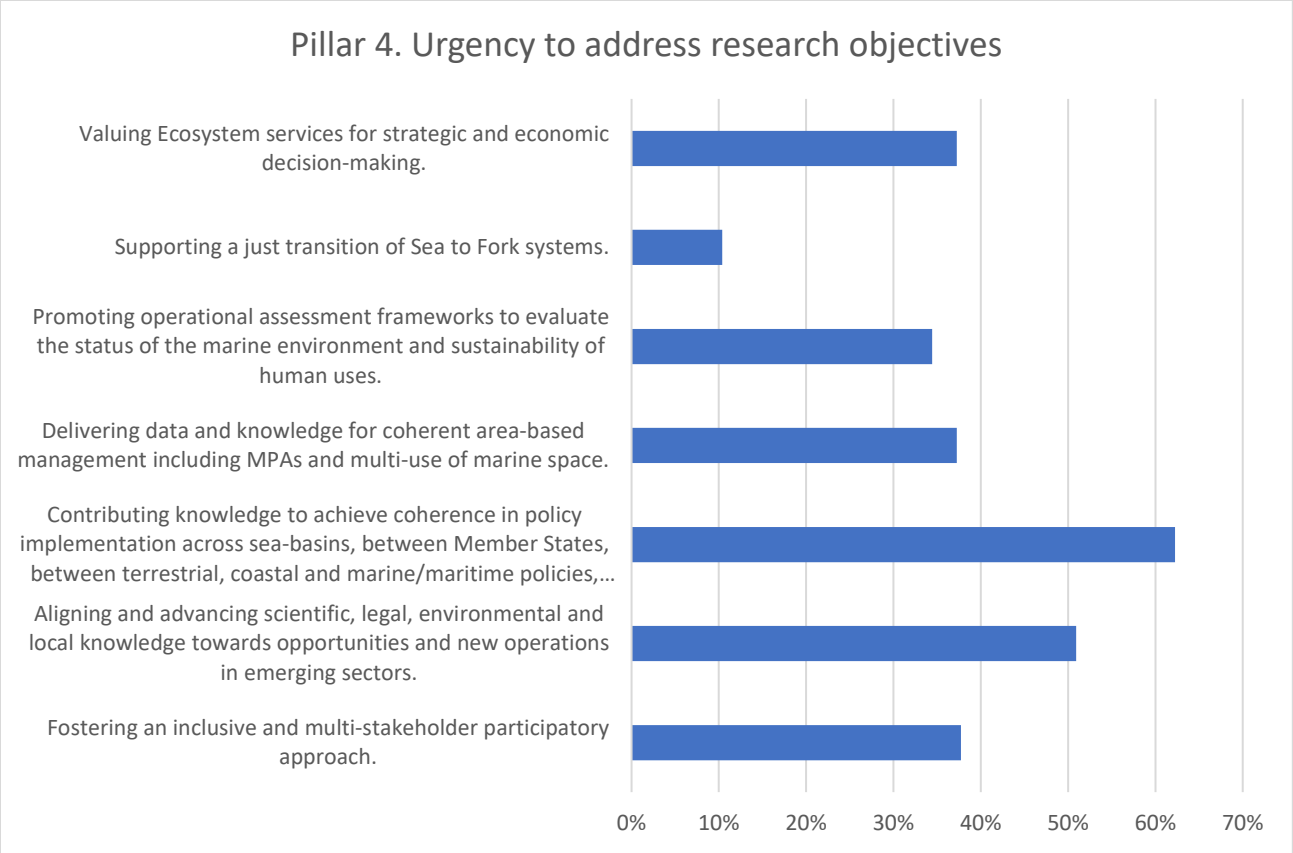
Identifying disaster risks is less aligned with the scope of this partnership, as this does not directly contribute to a more sustainable blue economy. As mentioned before, this seems to be better suited in another partnership or aspect of the Oceans mission.

Furthermore, the potential human health risks from hazardous substances are of course strongly

linked to the potential risks for the environment. By excluding damage by hazardous substances by the environment, in most cases the risk for human health also becomes minimal. Organisms in the marine environment will always be the first to experience negative effects of such pollution. Putting the focus on the ecosystem will therefore result in a positive effect on human health.

Pillar 4. Integrated and responsible ocean governance





Missing research objectives:

In the free text field respondents outlined their ideas on missing and redundant research objective. Missing research objectives include:

- Long term monitoring and observation of marine resources and environment.
- Develop new assessment frameworks, forecasting capabilities, and other analyses of the data obtained through monitoring and observation.
- Recognizing and resolving trade-offs and stakeholder conflicts.
- Develop understanding of natural capital to be integrated into decision making.
- Fully integrate society (including different communities, women and youth) into the understanding of ecosystems, ecosystem services and dependent human rights.
- Recognizing different types and scales of governance and how these can be supported to deliver aims of/for blue economy.

Redundant research objectives

One respondent noted that 'fostering an inclusive & multistakeholder approach' can be regarded as implementation method rather than an R&I objectives.

Table 4. Missing or redundant research objectives in Pillar 4 - A selection of participant responses
Ocean governance. It is not clear about the objective and the modalities of implementation.
It is not entirely clear how the methodology will work in terms of conflicting policy drivers - e.g. what happens where WFD ambitions are in direct conflict to further economic exploitation of a sea basis / increased biomass of fish farms in order to deliver food policy ambitions? It should be made clearer what weighting is being considered on such "impasse" situations. Efforts should be made to achieve the multi-stakeholder approach, engaging each of the target groups to commit to the targets set out in the partnership. Benefits to the industry, i.e. the drivers of the blue economy, should be more emphasised, e.g. through strengthening the social license to operate.
The ecosystem approach to management needs to be expanded from the blue economy focus to cover a flexible, holistic management, aiming at obtaining and sustaining a healthy marine environment. Again, the development and implementation of functional measures and tools (and the evaluation of their effectiveness) is insufficiently elaborated. Innovation, novel technologies and digital tools will not be sufficient.
Transitioning to a post-growth blue economy that puts welfare of planet and people at its core (blue doughnut economy).
Data is important - but new assessment frameworks, forecasting capabilities, and other analysis of these data (e.g. in near-real time) is important to make sense of the data for decision making.
Long term monitoring and observation of marine resources and environment should be explicitly targeted in the SRIA. This is a key enabler and fundamental for sustainable ocean management.
All objectives are relevant, however some are pursued by or focus of other initiatives, partnerships, programmes. E.g. 'fostering an inclusive & multistakeholder approach' can be regarded as implementation rather than R&I objectives; similarly some objectives may be slightly reformulated to underline the R&I aspects of the objective (co-designing the data and knowledge needed for...)
The regional seas play a major role in ensuring relevance and implementation national/subnational(regional).
We strongly support the focus on responsible governance & RRI, open science, ethics, justice, co-creation and cross-disciplinarily/cross-sectoral efforts throughout the framework. However, this emphasis should also be reflected in the explicit mentioning of the need for further research into human values, culture, history, etc. The framework stresses the need for new ocean governance measures, which is of great importance - but to fix something, you need to understand what is wrong with it. It is also important to recognize that real conflicts of interest exist and will not necessarily be dissolved through dialogue. Hence, trade-offs among strategic goals should be anticipated and conceptualized, e.g. on p. 14, research objective 4 C: Here we suggest to add a point iii: “Recognizing and resolving trade-offs and stakeholder conflicts”.
Pillar 4 – Integrated, responsible ocean governance: There should be more conversation between objectives A and B. The ecosystem approach is not only about contributing knowledge, delivering data and carrying out assessments. It is also about participation at different levels, addressing equity (including cultural) concerns, and safeguarding significant relationships between society and the environment, including from a human rights perspective. This is mentioned in the discussion on ‘co-creation and participatory stakeholder engagement’ on p. 21, but should be made more prominent at the outset. In terms of the key enablers for this pillar (p. 14), we would recommend that references

be included to EU legislation and guidance relating to the Aarhus Convention.

Pillar 4 should be the first Pillar, particularly given the poor conceptualisation of how marine resources and space are connected to society.

Objectives should relate to:

1. Develop understanding of natural capital to be integrated into decision making.

2. Fully integrate society (including different communities, women and youth) into the understanding of ecosystems, ecosystem services and dependent human rights (Morgera, 2020).

3. Recognise different types and scales of governance and how these can be supported to deliver aims of/for blue economy (e.g. Raakjaer et al., 2014).

Marine literacy, capacity-building and legal empowerment (notably on the inter-dependencies of human rights and the marine environment) could be included here as a way to ensure that governance is inclusive.

Objective A needs to clarify what co-creation means in the context of the blue economy partnership – there is a need to go beyond the "usual suspects" that routinely participate in public consultations, and include varied and relevant stakeholders, including small-scale fishing communities, indigenous communities, women and children who often are not able to participate in public consultations. The role of social sciences research and methods, as well as arts-based approaches, is crucial in this connection, in our experience. In terms of co-development, the One Ocean Hub's Code of Practice explains how the Hub has engaged in co-development with stakeholders through an initial stage of the research that consists of contextual research-agenda setting by co-identifying matters of concerns and communities/groups that have been left out, as well as ground-truthing researchers' assumptions based on prior research (our "Work Package 0", which is considered an iterative component of the research programme). Work Package 0 also entails ethnographic analysis of power and capacities, the co-identification of those directly or indirectly impacted by ocean uses, as well as the challenges for decision-makers, those responsible for implementation and civil society to support the wellbeing of vulnerable groups. This preliminary, contextual co-development phase has then shaped the Hub's research ethics, data management plan, theory of change, protocols for fair partnerships and mediation, and capacity-support and training activities for Hub researchers and partners.

We don't see objective C (Behavioural and socio-economic analysis in support of social innovation and social license to operate for the blue economy:) incorporated into the research objectives. And would not the sea to fork objective fit better under pillar 3?

Contribute to all marine and related research and information to achieve coherence in the implementation of global sea basin policies, between all Member States, between land, coastal and marine / maritime policies and between all economic sectors, not just those emerging.

Assessment and use of ecosystem services for strategic and economic decision making. They are useful to support social and economic cohesion in all countries and the inclusive participation of research along with the needs of the population.

Text in page 16 of Draft partnership would be more appropriate here in Pillar 4 - Ocean Governance: "Present marine spatial plans are still emerging, with considerable needs for transnational and industry collaboration and these will be supported by smart technology to reduce trade-offs between users, enabling multiuse of areas". In this context, real-time, marine spatial management plans should be considered as this is the objective within B1: Enabling operationalisation of the 'Ecosystem Approach to Management' in the Blue Economy. In Page 18 of the draft partnership, there is a reference to "illegal fishing", which should be complemented with overfishing and IUU fishing. In this respect, what actions will be enforced to ban illegal fishing from EU waters and impair the trade of imported seafood originated from IUU fishing?
When sectors of the blue economy are not able to reach acceptable levels of impact, valuing ecosystem services may provide some ways of assessing the consequences and possible actions for government.

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