Horizon Europe candidate partnership

'A climate neutral, sustainable and productive Blue Economy'

Strategic Research and Innovation Agenda

Draft for Open Consultation

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Contents

1. Background and Context

The partnership for "A climate neutral, sustainable and productive Blue Economy" (herein after referred to as the 'Blue Economy Partnership'), is envisaged as a co-funded partnership under the Horizon Europe Research & Innovation (R&I) framework programme 2021-27. The format will be a public-public initiative with the core group of formal members and signatories comprised of R&I ministries and funding agencies from the participating countries, in addition to organisations such as the Joint Programming Initiative for Healthy and Productive Seas and Oceans (JPI Oceans).

The Strategic Research and Innovation Agenda (SRIA) is an integral and necessary part of the proposal for the Blue Economy Partnership.

This first draft of the high-level SRIA reflects some of the contextual information on the rational, vision and objectives, expected impacts, collaboration and synergies, and implementation modalities of the Blue Economy Partnership. Its central focus is, however, on the structuring and focus of the thematic agenda. The SRIA will be further detailed in Annual Work Plans agreed by the formal parties to the Partnership.

This SRIA builds on the extensive analysis, priority setting, and stakeholder consultation performed while developing the strategic agendas of regional and pan-European initiatives. Many of the already identified research priorities and activities of the European Union (EU) and single nations are similar and therefore offer an opportunity for alignment over all European sea-basins. Accordingly, following a detailed analysis, this partnership SRIA takes into account commonalities across existing SRIAs from the EU Sea Basins, including the Atlantic (Atlantic Action Plan 2.0), the Mediterranean (BlueMed SRIA), the Black Sea SRIA, the future joint North Sea/Baltic SRIA, as well as developments by related Coordination and Support Actions (AORA-CSA, AANChOR-CSA, BlueMed Initiative, Black Sea CONNECT and BANOS CSA). These roadmaps offer demonstrated achievability of policy targets at sea basin scales, allow common issues to be jointly addressed and enable the development of national marine/maritime strategies for a climate neutral, sustainable and productive Blue Economy in a consistent way. The relative consistency in the identification of priority research topics, across different regional agendas and other similar initiatives considerably strengthens the basis for this partnership and its SRIA

Other related strategic agendas within the remit of the Blue Economy Partnership will also be considered. These include, for example, the Blue Bioeconomy Roadmap[1] (2018), the Strategic Research Agenda for Oceans and Human Health (OHH) in Europe[2] (2020) from the Seas Oceans and Public Health in Europe project, the Waterborne Strategic Agenda[3], as well as recommendations by the European Aquaculture Technology and Innovation Platform (EATiP)[4] and the European Fisheries and Aquaculture Research Organisations (EFARO)[5]. Moreover, the soon to be adopted, Blue Economy Roadmap from the European Commission's Directorate-General for Maritime Affairs and Fisheries, the future EU initiative on ocean

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[1] https://webgate.ec.europa.eu/maritimeforum/en/node/4448

[2] https://sophie2020.eu/strategic-research-agenda/

[3] https://www.waterborne.eu/images/pdf/190121-waterborne_sra_web_final.pdf

[4] https://eatip.eu/

[5] A number of these are presented in Annex 2 Overview of existing pan-European and macroregional R&I initiatives and their relevant strategic agendas in the proposal, accessible here.

observations[6] and the Report from the Commission to the European Parliament and the Council on the implementation of the Marine Strategy Framework Directive[7] can also provide relevant inputs. All five Horizon Europe missions are of relevance for this proposed partnership, but the Mission "Ocean, Seas and Waters", in particular.

At the global level, the implementation plan for the United Nations Decade of Ocean Science (2021-2030) articulates a common global framework for ocean science themes that support actions towards the ocean dimensions of sustainable development in the context of the 2030 Agenda. The implementation plan for the United Nations Decade of Ocean Science (2021-2030) will be considered to support the common global framework for ocean science that aims to contribute to sustainable development of the ocean.

From those inputs thematic areas of common European interest are extracted and collectively offer a high potential for this cross-sectorial partnership to align public R&I funding, maximise the coherence and impact of the investments. This SIRA focusses on actions where joint national and EU support can generate momentum and impact well above what could be achieved by a single country or region and thus contributes significantly to a high-performing European Research Area (ERA) in the Blue Economy domain.

2. Rationale for the Blue Economy Partnership

Europe is a maritime continent. In 2018, the EU Blue Economy directly employed close to 5 million people, generating more than €750 billion of turnover. Although many sectors of the blue economy have been devastated by the COVID-19 crises, the blue economy has enormous potential to contribute to a 'greener' economic recovery. The High Level Panel for a Sustainable Ocean Economy recently concluded that sustainable offshore investments can provide at least five times greater returns than costs, demonstrating the importance of investments in this area for recovery and development in the aftermath of the COVID-19[8] pandemic. A study commissioned by the World Ocean Initiative predicts that the ocean can sustainably provide six times more food than it does today through better management and technological innovation[9]. Another study has shown that restoring and protecting the world's large marine ecosystems would not only result in a healthier ocean, with associated positive impacts for coastal communities and livelihoods, but that it would transform a number of maritime sectors and affected sectors resulting in significant opportunities for job creation.[10] A growing body of evidence is also demonstrating the positive public health impacts of direct interactions of humans with the marine environment[11].

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[6] See the Inception Impact Assessment and public consultation on this initiative on ocean observation:
https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12539-Ocean-Observation
[7] REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT The first phase of implementation of the Marine Strategy Framework Directive (2008/56/EC) The European Commission's assessment and guidance COM/2014/097 final
[8] Konar M., Ding H. 2020. A Sustainable Ocean Economy for 2050: Approximating its Costs and Benefits.Washington, DC: World Resources Institute.
[9] https://oceanpanel.org/sites/default/files/2019-11/19_HLP_BP1%20Paper.pdf
[10] Hudson, A. (2017) Restoring and Protecting the world's large marine ecosystems: An engine for job creation and sustainable economic development. Vol 22: 150-155 https://doi.org/10.1016/j.envdev.2016.10.003 Environmental Development
[11] Fleming L.E., Maycock B., Depledge, M.H. and White, M.H. (2019) Fostering human health through ocean sustainability in the 21st century Vol 1:3 p 276-283 https://doi.org/10.1002/pan3.10038

The potential of a climate neutral and sustainable Blue Economy to deliver innovation, value creation and employment is high, and its role in addressing global challenges, as articulated in the 2030 Agenda, such as energy security, healthy productive and biodiverse ecosystems, human health and wellbeing, climate change and sustainable food provision is substantial. Jobs in the offshore wind energy sector have increased nine-fold in less than 10 years, and with EU expected to produce 35% of its electricity from offshore sources by 2050, with this trajectory expected to increase. In 2019 these jobs have already surpassed that of the fishing industry. With growing opportunities in the sustainable and eco-friendly marine tourism industry.

Marine ecosystems provide a wide range of goods and services that directly and indirectly benefit economies and support human health and wellbeing, in ways we are only beginning to understand, meaning that we need to take a wider view on how to foster sustainable and resilient coastal enterprise and communities.

Marine and coastal environments do not stop at national borders and neither do the challenges they face. Challenges and risks from climate change and unsustainable growth in the blue economy will impact Europe's regional sea areas in different ways, with areas such as tropical reefs, mangroves and the Arctic being extremely vulnerable. Europe's ocean, seas and coasts are host to complex systems of globally interlinked commercial activities, often competing for the same dynamic space and resources. About 70% of marine waters are experiencing increasing cumulative anthropogenic impacts. Reducing the environmental impact of ongoing activities and ensuring that improved ocean governance frameworks regulate future economic developments in order to not repeat past mistakes will be central to the vision of this Blue Economy Partnership. A major effort on ocean science, research, technological developments and innovations is needed in consultation with sustainable and evidence-based ocean governance frameworks, both to sustainably use and protect the ocean in order to increase the resilience of its ecosystems and ensure a prosperous sustainable Blue Economy.

3. Vision

The Blue Economy Partnership's vision is to transition from the current, widely non-sustainable ocean economy to a Blue Economy that serves the people by being resilient and productive, not in spite of, but because of being climate neutral and sustainable.

Europe stands at a threshold: The COVID-19 pandemic is expected to significantly impact economic growth, employment, societal priorities and political agendas worldwide for a period of several years potentially leading to less ambitious environmental policies and less sustainable economic regimes. Simultaneously, the ambitious European Green Deal provides an action plan and tremendous opportunity to deliver a climate-neutral EU by 2050 through a just transition to a sustainable and circular economy, with zero net emissions of greenhouse gases, restoring biodiversity and safeguarding a healthy and toxic free environment.

Thus science based information to inform governance decisions towards more sustainability and long term prosperity are more urgent than ever. Those paradigm shifts both necessitate and support the Blue Economy Partnership's vision to provide key knowledge informing the transition to a sustainable and productive Blue Economy, which in turn provides enormous opportunities to boost post-pandemic recovery in our maritime sectors, delivering jobs and value-creation and the "blue" component of the European Green Deal.

Digitalisation, purpose driven technologies, nature-based solutions and automation in parallel with enhancing Ocean Literacy and engagement of the citizens can and must fast-track this transition. Digitization

and equitable data access to support information, knowledge, innovation and Ocean Literacy are described as cornerstones for the success of the UN Ocean Decade. Through the concerted effort of this Partnership, R&I can deliver the environmental and technical knowledge, open knowledge infrastructures and scientific evidence, that are needed to build the substrate and tools for a sustainable blue economic transition driven by cross sectorial collaboration, creative ideas and solutions, information access, and knowledge based policies.

Comprehensive and innovative initiatives and results from the Blue Economy Partnership should support the relaunch and re-establishment of socioeconomic structures in an ecologically and economically more sustainable, equitable and resilient way.

The Blue Economy Partnership will work as an ambitious and expanding cross-sectoral collaboration initiative that aligns European, national and regional research efforts and resources supporting joint activities to co-design, co-develop and co-deliver the research and innovation basis consisting of information, knowledge, infrastructure, literacy and social participation needed for the blue economic transition.

This vision reflects the notion of the Partnership's central global initiative, the UN Decade of Ocean Science, for Sustainable development that "the only possibility to move from the 'ocean we have' to the 'ocean we want' is to convince key stakeholders that the world requires a transformational, large-scale, innovative campaign of ocean science and partnerships to improve delivery[12].

4. Objectives

The four broad general objectives that the Blue Economy Partnership aims to achieve, as highlighted in the Partnership proposal, are:

A. *Alignment of priorities and investments across Europe*

A powerful alignment and structuring among the EU's Member States' and Associated Countries' research and innovation priorities, resource allocations, activities and programmes in Blue Economy domains where research and innovation needs converge across Europe, regional sea basin areas and international partners.

B. *Cooperation* across socioeconomic sectors and scientific disciplines

A pan-European and international research and innovation cooperation at an unprecedented level of integration that includes all relevant socioeconomic sectors and cultures from industry to education and science diplomacy. The community involved is open and growing, inclusive of international partners, in particular those bordering Europe's seas and the ocean.

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https://www.oceandecade.org/assets/uploads/documents/Ocean-Decade-Implementation-Plan-Version-2-0-min_1596634145.pdf

C. Provision of knowledge for a 'green' development of the Blue Economy

A strong evidence-base of knowledge, information and know-how to pursue sound policymaking, regulatory framework, sustainable Blue Economy business opportunities and solution generation. This will contribute to unlock, demonstrate and enable sustainable and responsible use of the full socioeconomic potential, within the boundaries of healthy and resilient ecosystems of seas and ocean.

D. Transformation to a more digital knowledge based climate neutral and sustainable Blue Economy

Rapid progress in key increasingly digital knowledge generation over the next decade towards transitioning to a Blue Economy that by mid-century is climate neutral, ecologically sustainable, competitive, resilient and productive to improve people's wellbeing and reduce risks to nature, thus achieving objectives such as job and value creation and biodiversity conservation, complying with policy requirements under the Integrated Maritime Policy, the Marine Strategy Framework Directive (MSFD), the Water Framework Directive (WFD), and the Maritime Spatial Planning Directive while contributing to strategic priorities of the EC (e.g. European Green Deal, Cohesion Policy, Circular Economy Action Plan, FOOD 2030, Bioeconomy Strategy and Biodiversity Strategy) and the UN 2030 Agenda with its 17 SDGs.

These general objectives are centred around **frameworks, tools, solutions** and **integration**, as elaborated below.

1) "Integration" - To promote interlinked approaches and systemic thinking for integrated information for the Blue Economy transition

This includes agenda co-design and co-production, transfer of knowledge, sharing of resources, infrastructures, expertise and experience across sectors, and collaboration on cross-domain challenges and solutions between land and sea-based sectors, between ocean and climate, and across all water resources.

2) "Solutions" - To stimulate innovation through science-informed solutions

These include solutions for societal demands by stimulating innovation in the Blue Economy and unlocking, demonstrating and enabling sustainable harvesting and circular utilisation of Europe's ocean and seas and related resources in key sectors such as food and nutrition, recreation and health, bio-based products and energy, technology, climate mitigation and adaptation, and others.

3) "Tools" - To offer tools and information to enable climate neutrality and sustainability of Blue Economy activities

These include policy guidance, monitoring, and scientific information for Good Environmental Status, establishment of the Ecosystem Approach to Management (EAM) and Maritime Spatial Planning (MSP), forecasting of climate change effects, information on the marine carbon cycle, early warning for various risk factors, expert knowledge and information and data access on smart water management, aquaculture systems, restoration and other nature-based methods, and several other aspects at the interface of economy and ecology. Information Communication and Technology (ICT) tools such as predictive analytics and big data, cloud and edge computing, data visualization, digital-twins etc. can support the underlying methodology.

4) "Frameworks" - To ensure supportive framework conditions for the Blue Economy to thrive in a climate neutral and sustainable way

These include contributing to the implementation of EU Policies, the EU Mission Areas and Regulatory Frameworks as well as regional and international conventions and global initiatives contributing to a strengthened ocean governance, but also ethics for responsibility in the use of the ocean, as well as societal awareness and ocean literacy on the potential and challenges of the Blue Economy, multi-use of seas, and synergies and trade-offs between interlinked economic and environmental sectors.

The general objectives A-D are depicted as a logical sequence of value creation from priority alignment to transformative impact (Fig. 1). Their sequence is a seamless continuum. This does not, however, imply that they are addressed sequentially, rather, they will be pursued in parallel.
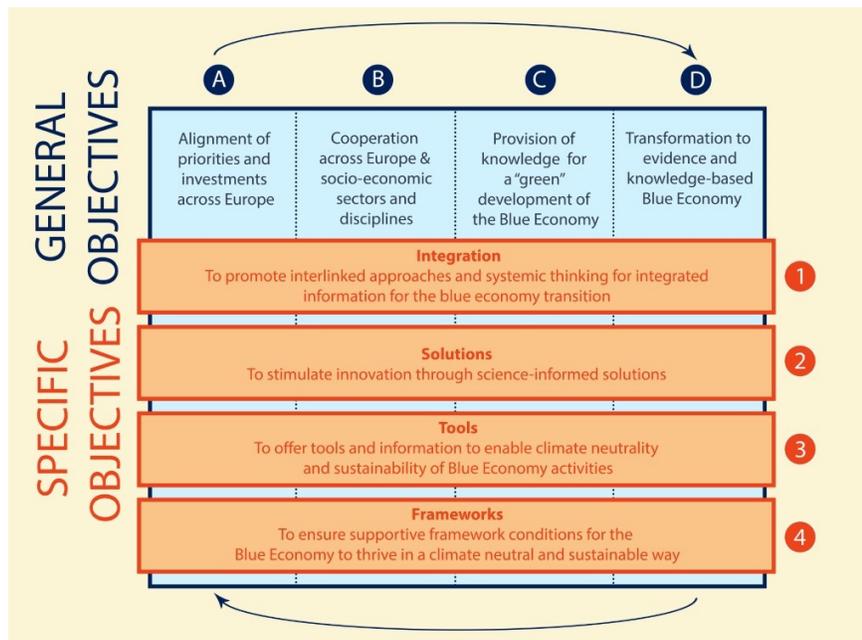

Figure 7: Schematic illustration of the matrix formed by the seamless sequence of strategic general objectives A-D and four specific objectives.

The reality of the evolution of a successful Blue Economy Partnership will evidently also have a feedback loop of continuous learning and adjustment where transformative progress (D) will affect and modulate priorities (A). This evolutionary learning loop will be taken into account explicitly at systematic checks of SRIA timeliness and during the development of the annual work plans.

Intervention logic to achieve the general objectives

Each general objective has been interwoven with four **specific objectives** that form the basis of an **intervention logic** for each general objective. An overview of the aims of the respective general objective (A-D), and an illustrated summary of the intervention logic based on **thematic objectives**, **inputs, activities and outputs is** presented in Annex 1. The full basis of the intervention logic is presented in table format in Annex 2.

5. Expected Impacts

The Blue Economy Partnership will generate positive impact in favour of significant advances in the transformation to a climate neutral, sustainable and productive Blue Economy. Specifically, by 2027 the Partnership will have had concrete impacts on research and innovation, policy, society and economy, with positive environmental impacts (as suggested in the Key Impact Pathways monitoring concept for EU Framework Programmes), as well as structuring impacts on the research and innovation landscape and intervention mode.

Structuring impact

A step change in the collaborative alignment mechanisms for priorities across all relevant scales of Blue Economy research and innovation, including national, macro-regional, EU, pan-European and international levels will be achieved. This is anticipated to result in a tripling of collaboration investments to fuel joint activities, with potential for significant complementary contributions from external private sector collaborators. The Partnership will grow a diverse and vibrant community across research disciplines and socioeconomic sectors. This community is expected to become the innovation engine for the anticipated transition indispensable to develop a sustainable Blue Economy.

Scientific Impact

An irreversible transformation will take place in the approach to research and innovation in the marine and maritime sector, both structurally and culturally. Cross-sectoral and cross-disciplinary research and innovation cooperation will increasingly be an established design. This will be eased by personal and institutional contacts and encouraged by successful collaborations and new opportunities opened by the Partnership. Such opportunities may for example arise from advancement and realisation of digital ocean concepts and from the promotion of Europe-wide systems for integrated monitoring, observation, data, modelling and forecasting capacities.

Societal Impact

Societal benefit from a transformed Blue Economy will be achieved through (i) informing policies that benefit citizens and (ii) supporting fulfilment of existing obligations in the nexus of ocean health, climate change and sustainable economic development. The Blue Economy Partnership will further equip society with advanced methodologies for developing their sustainable future, such as through systematic spatial planning (MSP, MPA) and management tools (EAM) and with direct services such as early-warning systems to support citizens' wellbeing and development potential. Environmental policy impacts will stem from the development of innovative actions and nature-based solutions that help reverse the deterioration of aquatic and marine resources, improve sustainable practices, and increase the resilience of ocean ecosystems in the face of change. The Partnership will mainstream marine biodiversity conservation and contribute to a new deal for nature and people.

Economic Impact

Economic impacts on the Blue Economy domain, but also radiating beyond that, are at the heart of the partnership. While the overall transition of the current Blue Economy to a fully carbon neutral and sustainable mode will continue well beyond a decade, the Blue Economy Partnership will impact the process by laying required foundations and delivering innovation stimulus. Foundation elements for a sustainable Blue Economy will include informed policies and governance architectures, an array of available

infrastructures and information access, also educational elements to ensure Ocean Literacy, capacity and skill among society, enablers and workforce. In addition, the partnership is expected to deliver stimuli for concrete innovative solutions, best practice and pilots in all relevant economic sectors. This will attract creativity, investments and entrepreneurship to develop the climate neutral, sustainable and productive Blue Economy.

A number of suggested key performance indicators on the programme level of the Blue Economy Partnership have been detailed in the associated Proposal. These, including their methodologies will be further elaborated during the SRIA process, also considering the scope of the Blue Economy Partnership and its ultimate composition.

What success looks like by 2030:

[This section will be completed to include the agreed outcomes contained in the topic description for the Blue Economy partnership in the Horizon Europe Work Programme 2021-2022. These are currently being negotiated with Member States.]

6. Thematic pillars and focus areas

The analysis of regional-scale strategic agendas revealed important knowledge gaps and associated research and innovation themes of high relevance and shared commonality across sea basins. It also inspired the architecture of a pan-European agenda for the Blue Economy Partnership, with four high-level thematic pillars under which priority research and innovation objectives were clustered.

The proposed research objectives are those considered most relevant to support the transition to a climate neutral, sustainable and productive Blue Economy, in line with the Partnerships objectives (A-D above) and to avoid duplication with areas that will be undertaken by other partnerships such as, but not limited to, the Waterborne (zero-emission waterborne transport), Biodiversity (protect and restore Biodiversity) and Clean Energy Transition partnerships (detailed further in section 9).

These pillars reflect the transformative change required to achieve a 'green' transition of the blue economy that will benefit **people**, **planet** and **economy** and are all highly interconnected. Pillars 1-3 relate to the three blue economy aspects mentioned in the partnership title, namely **sustainability**, **climate neutrality** and **productivity**. They are connected by the integrative element of **governance** aspects represented by pillar 4. While governance is integral to all pillars, the critical importance of governance in achieving the aims of the Blue Economy Partnership means it was afforded its own pillar.

1. **A Blue Economy in harmony with nature**
2. **Blue Economy solutions towards climate neutrality**
3. **A Blue Economy for the people**
4. **Integrated, responsible ocean governance**

The research and innovation objectives specified within each pillar are impact-driven. They represent critical knowledge gaps which must be addressed to achieve the desired impact. These are diverse in nature, ranging from fundamental understanding of marine and coastal ecosystem functioning and resilience to delivering technical and engineering solutions to specific industry challenges. The Blue Economy Partnership will synthesise and build on the substantial work and knowledge outputs from numerous previous and ongoing projects and will ensure synthesis of these.

The SRIA is deliberately not centred around sector specific agendas and does not explicitly mention all potentially relevant Blue Economy sectors. Aspects of a particular sector could be addressed under all the strategic pillars. For example, ocean literacy, open science, and capacity building efforts will be integrated, promoted, and embedded in activities funded by the Partnership. The SRIA also does not specify regional priorities, instead, the themes are overarching so that they can be interpreted differentially to address sea-basin priorities.

A number of key cross-cutting enablers have been identified, which connect and support all pillars. Achieving the objectives of the pillars will require action across all these cross-cutting enablers. With this in mind, the thematic pillars should not be considered in isolation from each other or from the cross-cutting enablers. The thematic pillars are now described in more detail, along with the overarching research objectives within each pillar (Table1).

THEMATIC PILLARS			
1 **A Blue Economy in harmony with nature**	**2** **Blue Economy solutions towards climate neutrality**	**3** **A Blue Economy for the People**	**4** **Integrated, responsible ocean governance**
How the Blue Economy can sustain its underlying natural capital, contribute to sustainable exploitation of marine goods and restoration and regeneration of their ecosystems through the use of innovative digital, technological and nature-based solutions.	How sectors of the Blue Economy can be smart, digital and competitive to contribute to climate resilience and carbon neutrality by 2050.	How sectors of the Blue Economy contribute to people's well-being, including health, prosperity, nutrition and recreation, building on marine ecosystem goods and services in an equitable way.	How data-driven, knowledge-based, inclusive integrated and responsible ocean governance will enable the Blue Economy transformation.
Research and Innovation Objectives			
A. Enabling economic development within environmental boundaries: preventing negative impacts on the environment: 　i. Understanding the individual and cumulative impacts of economic activity on marine ecosystems by characterizing ocean health and establishing boundaries to human use; 　ii. Advancing digital transformation and automation for monitoring, surveying and sampling;	A. Fast-tracking the blue economy to carbon-neutrality through digitalisation, digital twins, automation, autonomous operations, smart specialisation, and safe and secure purpose driven technology: 　i. Decarbonising marine sectors; 　ii. Creating green and smart ports. B. Optimising the resilience of coastal ecosystems and their capacity to mitigate against climate change:	A. Delivering healthy, affordable, and sustainable food, feed and bioproducts with full transparency throughout the chain: 　i. Sustainable production and use of current and novel marine bioresources such as, but not limited to, food, feed, biotech compounds (medicines) and nutrients; 　ii. Reducing human health risks from hazardous substances and their cumulative effects.	A. Co-creating innovative and knowledge-responsive ocean governance at the appropriate geographic scale: 　i. Fostering an inclusive and multi-stakeholder participatory approach; 　ii. Aligning and advancing scientific, legal, environmental and local knowledge towards opportunities and new operations in emerging sectors.

iii. Protecting biodiversity from negative effects of blue economic activity and of climate change.

B. Reduction of pollution - promotion of circularity:
  i. Providing innovative solutions for prevention and remediation of pollution, including eutrophication, hazardous substances, and underwater noise;
  ii. Innovating concepts for marine litter reduction and adopting a circular approach;
  iii. Enabling responsible and ecodesigned use of marine non-living resource, including from the deep sea.

i. Understanding and fostering carbon sequestration capacity of coastal & marine environments;
ii. Investigating nature based solutions that improve responsiveness to natural disasters;
iii. Quantifying regional-scale climate change, acidification and sea level rise to allow strengthening of ocean and coastal resilience.

B. Creating resilient and sustainable coastal communities through a fair, just and inclusive transition:
  i. Fostering innovation and job creation in coastal communities through digitalisation and nature-based solutions;
  ii. Identifying climatic and anthropogenic disaster risks and attenuation options at different regional scales.

C. Achieving equitable health and well-being from blue spaces:
  i. Identifying benefits for health and wellbeing from blue spaces;
  ii. Exploring the opportunities of blue spaces for tourism and recreation.

B. Enabling operationalisation of the 'Ecosystem Approach to Management' in the Blue Economy:
  i. Contributing knowledge to achieve coherence in policy implementation across sea-basins, between Member States, between terrestrial, coastal and marine/maritime policies, and across sectors;
  ii. Delivering data and knowledge for coherent area-based management including MPAs and multi-use of marine space;
  iii. Promoting operational assessment frameworks to evaluate the status of the marine environment and sustainability of human uses.

C. Behavioural and socio-economic analysis in support of social innovation and social licence to operate for the blue economy:
  i. Supporting a just transition of Sea to Fork systems;
  ii. Valuing Ecosystem services for strategic and economic decision-making.

Key Enablers

- Digital transformation
- Innovative and enhanced ocean observation and monitoring
- Purpose driven technology and new materials
- Open Science and Responsible Research and Innovation
- Support systems and infrastructures
- Ocean Literacy
- Co-creation and participatory stakeholder engagement

Links to EU policy/ regulation

- EU Green Deal - EU Biodiversity Strategy for 2030 - EU Chemicals Strategy for Sustainability - Zero Pollution Action Plan for Air, Water and Soil - The EU Strategy for Plastics - Birds and Habitats Directives - Marine Strategy Framework Directive - Maritime Spatial Planning (MSP) Directive - Recommendation on Integrated Coastal Zone Management, - Common Fisheries Policy - Water Framework Directive and related directives - Single-Use Plastics Directive	- EU Green Deal - Shaping Europe's Digital Future - Strategy for sustainable and smart mobility - Offshore Renewable Energy Strategy - EU Climate Law - EU Adaptation Strategy - Maritime Spatial Planning Directive - Recommendation on Integrated Coastal Zone Management - Farm to Fork Strategy - Common Fisheries	- EU Green Deal - Farm to Fork Strategy - Common Fisheries Policy - Birds and Habitats Directives - EU Bioeconomy Strategy - European Agenda for Tourism 2050 - Marine Strategy Framework Directive - Maritime Spatial Planning Directive - Recommendation on Integrated Coastal Zone Management, - Mapping and Assessment of Ecosystem Services and Natural Capital Accounting	- International Ocean Governance Agenda - EU Green Deal - Shaping Europe's Digital Future - European strategy for data - Space regulation - European Education Area - Maritime Spatial Planning Directive - Recommendation on Integrated Coastal Zone Management, - Marine Strategy Framework Directive - Recommendation on Integrated Coastal Zone Management - Common Fisheries Policy - Water Framework Directive and related directive

Links to other partnerships

- Waterborne partnership - Rescuing Biodiversity partnership - Water4All partnership - European partnership for Chemicals Risk Assessment - EIT Raw materials-KIC	- Zero Emission Waterborne Transport partnership - Clean Energy Transition partnership - EIT Climate-KIC - European Partnership Innovative SMEs	- Animal Health partnership - Safe and Sustainable Food System partnership - European Partnership for a Circular bio-based Europe - EIT Health-KIC - EIT Food-KIC - European Partnership Innovative SMEs	- EIT Digital-KIC - Open Science Cloud partnership - Rescuing Biodiversity partnership - Water4all partnership

Links to the Missions and objectives of Mission "Ocean, Seas and Waters"

Mission "Ocean, Seas and Waters" - Regenerating marine and water ecosystems - Zero pollution Mission Climate Mission Soil	Mission "Ocean, Seas and Waters" - Decarbonising our waters, ocean, and seas and waters Mission Climate Mission Cities	Mission "Ocean, Seas and Waters" - Regenerating marine and water ecosystems - Filling the knowledge and emotional gap Mission Cities Mission Cancer Mission Climate	Mission "Ocean, Seas and Waters" - Revamping governance - Filling the knowledge and emotional gap - Regenerating marine and water ecosystems Mission Cities Mission Soil Mission Climate

Links to funding streams

- Horizon Europe
- European Maritime and Fisheries Fund
- BlueInvest fund
- InvestEU
- LIFE programme
- NextGenerationEU
- European Regional Development Fund
- Cohesion Fund
- National funds

7. Thematic Pillars

7.1 Blue Economy in harmony with nature

How the Blue Economy can sustain its underlying natural capital, contribute to sustainable exploitation of marine goods and restoration and regeneration of their ecosystems.

Preserving and increasing the natural capital of marine ecosystems in a rapidly changing ocean is critical to deliver the sustainable ecosystem services that underpin the Blue Economy and for the EU to achieve the UN Sustainable Development Goals (SDGs) by 2030. The sustainable development of the Blue Economy is not feasible without comprehensive knowledge of our marine ecosystems, how they are changing in response to climate change, and the environmental, socio-economic, and ecological effects of cumulative human activities, both now and in the future. Without an adequate knowledge-base the ecosystem approach to the management of human activities cannot be effectively implemented. Pillar 1 of the Blue Economy Partnership will determine the capacities and limits of Europe's seas, ocean and coastal zones to sustainably support the blue economy and the restoration and regeneration of marine ecosystems. Activities within this pillar will leverage cross-cutting enablers such as digitalisation, social innovation and purpose-driven technology to enable the Blue Economy to become the blue arm of the European Green Deal.

The continued development of autonomous vehicles, low-cost and durable sensors, innovative platforms, tools, and infrastructures for ocean observing will be essential to ensure that the new blue economy is one that can operate within the boundaries of nature. These capacities will contribute to sustained ocean observing and address key knowledge gaps that are fundamental to baseline assessments and forward projections. New information and knowledge will provide both a benchmark and the state of the art for the feasibility of human activities while also maintaining and restoring ecosystem health and resilience. This will incorporate the full integration of the value of the ecosystem, and a better focus on the trade-offs between ecological dynamics and socioeconomics needs, as well as proper considerations of historical and cumulative impacts. 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.

Reduction of marine and coastal pollution in all its forms (e.g., eutrophication, hazardous substances, underwater noise, litter) will be central to facilitate a blue economy in harmony with nature. Actions will identify innovative, nature-based pollution reduction and remediation solutions to prevent and reduce land-derived marine pollution, as well as pollution from all maritime sectors. Adopting a circular approach, will be a focus for the reduction of marine litter. The circular approach will also be central to the development of cost-effective and sustainable products from marine non-living resources, within an ecodesign framework and breaking the 'take-make-use-dispose' cycle to reduce the need for their extraction cycle. Research will evaluate and balance the adverse environmental impacts the extraction of these resources have, against the benefits their utilization could provide. Multidisciplinary research (economics, natural and social science) will play a key role in advancing the governance actions (Pillar4) required to achieve the objectives of this pillar.

7.2 Blue Economy solutions towards climate neutrality

How sectors of the Blue Economy can be smart, digital, competitive and contribute to climate resilience and a *climate-neutral* sustainable and productive blue economy by 2050.

Staying within the global warming limits of the Paris Agreement and meeting the carbon emission targets of the European Green Deal requires solutions to fast-track climate neutrality also in the blue economy. Meanwhile, ongoing climate change and related impacts require forward-looking planning for a climate resilient blue economy and costal settings.

Research and innovation actions will support user-driven solutions across the full value chain for key blue economy sectors including sustainable seafood production and processing, blue biotechnology, extraction of non-living resources and coastal and marine tourism. Working closely with other Horizon Europe partnerships such as Zero Emission Waterborne Transport and The Clean Energy Transition, this partnership can also contribute to transformational progress in maritime traffic, smart ports and marine renewable energy. Pillar 2 will focus on purpose-driven innovation and technologies, which address specific user needs across these maritime sectors.

The Blue Economy Partnership will also support research & innovation actions targeting carbon reduction in maritime sectors. There is immense potential for innovation across the blue bioeconomy and an immediate need to reduce its carbon footprint towards becoming carbon neutral by mid-century. Delivering a viable feed in salmon farming which does not rely on fishmeal is one example where success will not only reduce the climate impact, but reduce costs and support a just transition, as required by the EU Farm to Fork Strategy.

This pillar of the partnership will also address knowledge gaps to enhancing the capacity of coastal and marine ecosystems to sequester and store carbon naturally ('Blue Carbon'), optimizing a key climate mitigation pathway that can help Europe to meet its net emission reduction targets. In addition, understanding and quantifying the scale of climate impacts on coastal and marine environments and regional and local level will be addressed. Advancing climate modelling and predictive tools and capabilities will enable better management of risk, improve our responses to natural disasters and reduce degradation of marine ecosystems.

7.3 A Blue Economy for the People

How sectors of the Blue Economy contribute to people's well-being, including health, prosperity, nutrition and recreation, building on marine ecosystem goods and services in an equitable way.

Human health and well-being and the resilience of coastal communities are closely connected to the quality of marine and coastal ecosystems, their goods, and services. A thriving blue economy, in harmony with nature, can provides jobs, healthy and nutritious food, recreational opportunities and medicinal compounds while also contributing to ecosystem protection and restoration. Actions within this pillar of the partnership will advance multidisciplinary research and innovation at the nexus of marine environmental health and human health and wellbeing, balancing sectoral and sociodemographic interests with environmental sustainability. Social innovation, digitalisation, new technologies, and ocean literacy will be needed to support a just and fair transition of the Blue Economy to deliver more equitable health and well-being

benefits and employment opportunities, both derived from and leading to more resilient marine and coastal ecosystems

Fundamental knowledge gaps at the crossroads of the provision of secure, safe, and nutritious food, biotechnological applications, the sustainable use of bio-resources and socioeconomic impacts will be addressed. These will provide a better understanding of future production and consumption trends for food, feed and bioproducts, as well as how pollution and climate change can impact supply and production. Digitalisation can enable major advancements in the transparency of the entire food chain for consumers, enabling a more resilient, safe food supply with a lower impact on the marine environment and more personalised diets and consumer behaviour. For example, the use of blockchain, in combination with smart phones, will support traceability, benefit citizens and increase trust.

Digitalisation will reduce costs and create new opportunities for a tourism industry struggling to rebuild in the aftermath of the COVID-19 pandemic, to provide consumers with enhanced safety, security, and more personalised tourism offerings, while optimising impacts for local economies, communities, and environments. Purpose-driven technology, circular products, appreciation for the value of an intact marine environment and incentives to support behavioural change will lower the environmental footprint of coastal tourism.

Emphasis will be placed on identifying sustainable and socially-inclusive development opportunities that ensure gender equality and maintain population levels in peripheral coastal areas. Co-creation will ensure the involvement of those who are often most vulnerable to the threats of climate change, such as indigenous communities. Nature-based solutions will be developed to increase the resilience of coastal communities, fast-track their recovery from the COVID 19 pandemic and make them less vulnerable to future threats.

The positive health impacts of interacting with blue spaces will be further explored and quantified to understand how these lead to positive health outcomes and how access to these benefits can be made more equitable. Evidence has shown that these benefits may be greatest among lower socio-economic status groups[13] who often have limited access to these environments.

7.4 Integrated, responsible Ocean Governance

How data-driven, knowledge-based, inclusive integrated and responsible ocean governance will enable the Blue Economy transformation.

Human wellbeing relies on the Biosphere, including resources provided by ocean ecosystems. With a world population reaching 9-10 billion by 2050, pressures on the ocean are expected to increase. Global competition for raw materials, food and clean water will become more intense, while illegal fishing, climate change, and marine pollution are already threatening our ocean's health and contributing to the breaching of planetary boundaries. Ocean governance faces the challenge of reflecting the multi-dimensional and interconnected role that the ocean plays in environmental health, economic prosperity and human well-being including justice and equity. The existing frameworks for ocean governance are not efficient enough

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[13] Wheeler, B. W., White, M., Stahl Timmins, W., & Depledge, M. H. (2012). Does living by the coast improve health and well-being? Health Place, 18(5), 1198–1201. https://doi.org/10.1016/j.healthplace.2012.06.015

to handle these challenges - neither on global, regional or national scales. Innovation, novel technologies and digital tools will help the transition towards a more knowledge-based ocean management, but without a transformative change in ocean governance it will become increasingly difficult to ensure the provision of ecosystem services.

Ocean sustainability transitions are interdependent with those on land. The coastal zone serves as the interface between land-based society and expanded ocean economic activity. Coastal land use planning and integrated ocean governance and management are therefore critical elements of a transition to a sustainable blue economy. Sectoral policies must be fully integrated to achieve this.

Socioeconomic analyses and research into policy instruments are of utmost importance to make sure the right toolbox including social, legal and economic instruments is there to encourage and motivate different actors to initiate change including institutional change and market (re)formation. The identification of science-based safe and sustainable thresholds for economic operations and the social licence to operate, will be prerequisites for new and continuing blue economic activities. Co-creation of knowledge, multi-stakeholder and cross-sector approaches are essentials for an integrated and adaptive knowledge-based ocean management. This can ensure the effective implementation of ecosystem based management and existing policies in a coherent manner: between European MSs and Sea Regions and among different sectors.

A digitally transformed Blue Economy leveraging advanced robotics, autonomous systems and real-time access to a multitude of data, raises security and safety issues that will require new and responsive legal frameworks.

8. Cross-cutting enablers supporting the transition

8.1 Digital transformation

Technological developments in fields such as robotics, artificial intelligence, nanotechnology, quantum computing, biotechnology, the internet of things, 5G wireless technologies, and 3D printing have potential applications in all blue economy sectors. They will provide practical solutions to implement the European Green Deal priorities to tackle the EU's Climate ambition for 2030 and 2050 and the Farm to Fork Strategy for a fair, healthy and environmentally friendly food system. The Blue Economy will play a key role in achieving environmental and climate ambitions in the EU. Digital technologies, using new instruments and sensors, big data cybernetics, artificial intelligence (AI), advanced modelling and simulation (digital twins), autonomous systems and robotics, all offer opportunities to increase the sustainability and performance of the sector. Recent events have accelerated digital transformation: the COVID 19 crisis and the deployment of 5G with image transmission in real time. Digitalisation will be crucial to the transition towards a climate neutral, sustainable and productive Blue Economy through advancing our knowledge of complex ecosystems and improving management practices, reducing the carbon footprint of maritime sectors and adding value.

8.2 Innovative and enhanced ocean observation and monitoring

Access to reliable, quality controlled and harmonized marine data, across a range of disciplines and human activities is fundamental to the sustainable transformation of the Blue Economy, advancing our understanding of marine ecosystems and the (cumulative) impacts of human activities. Digitalizing our ocean through the application of innovative intercalibrated, remote sensing technologies, networking, robotics, autonomous vehicles and systems, together with Big Data analytics, and high throughput computing will revolutionise marine observing systems, data access and applications. Marine infrastructures, vessels (ships,

fishing & leisure) and people (citizen science, tourism) can all be enabled as ocean sensors. A digital ocean can address temporal, spatial and thematic data gaps, complement satellite sensing and provide real-time information to enhance predictive capacities and early warning systems. Free and open access to diverse marine data, according to the FAIR principles, reduces costs and risks for offshore operators, creates new opportunities for innovation in the blue economy and improves ocean literacy. They contribute to integrative models, such as the Digital twin ocean supporting policy development and implementation for the benefit of the environment, citizens, businesses and policy-makers. The potential of the ongoing digital transformation, and its wider impacts, positive and negative, need to be better understood and monitored in view of future policy design and implementation, governance, and solution development.

8.3 Purpose-driven technology and new materials

COVID-19 has transformed industry sectors, requiring them to adapt their products, services and business models, leading to an unprecedented wave of purpose-driven innovations. Europe leads the way in socially responsible entrepreneurship and there is significant opportunity for businesses to support a 'green' recovery of the dynamic blue economy through the development of purpose-driven technology that can benefit society. Many maritime sectors and coastal enterprises face common problems operating in harsh and unpredictable environments, these can include fouling, corrosion, and material fatigue. Innovative low-cost, sustainable and environmentally friendly materials are necessary to reduce costs for and environmental impacts of these sectors. Drones and autonomous vehicles provide another route to monitor and maintain marine infrastructures. Open access to marine data resources, computing platforms, and analytical services provide opportunities for digital entrepreneurs to develop new products or services for offshore operators or the coastal tourism sector.

8.4 Open Science and Responsible Research and Innovation

Open Science[14] makes science more efficient, reliable, and responsive to societal challenges. The current experience of the Covid-19 pandemic has demonstrated the value of opening up science, sharing knowledge and collaborating to respond rapidly to combat the spread and enable mitigation of the effects of the virus. The current incentive structures in academic research often fail to recognize value and reward efforts to open up scientific research. Barriers also exist when collaborating with industrial operators. This partnership commits to Open Science and the FAIR data principles. It will develop explicit policies on Open Science with a clear description of roles and responsibilities for each stakeholder as this is a key aspect in fostering the necessary change in research culture. Furthermore, the evaluation committee for research proposals will be required to adhere to the DORA principles[15], with the aim to support the transfer of scientific knowledge to contribute to policy, practice and innovation. Industry will be a key stakeholder in this partnership and will be facilitated to share non-competitive research and data following to best practice.

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[14] Open Science is an umbrella term that describes sharing via internet any kind of output, resources, methods or tools, at any stage of the research process. Of relevance is in this context is Open Access, Open Data, Open innovation and Citizen Science.
[15] The San Francisco Declaration on Research Assessment https://sfdora.org/

8.5 Increased Ocean Literacy

Creating a collective responsibility for marine environments and making the ocean, seas and coasts a common interest for citizens of Europe and beyond, is critical to achieving the objectives of this Partnership. An ocean literate society contributes to better ocean stewardship and incentivises investments in sustainable blue economy enterprises. Citizen science is an important tool for Ocean Literacy, it increases engagement with marine and coastal environments, heightens awareness of human impacts and fosters a sense of social responsibility. Ocean Literacy will contribute to such awareness, as well as integrating the knowledge and traditional habits of local communities, involving citizens and enabling the synergies between public and private sectors and among different productive sectors. The Partnership will commit to enhanced ocean literacy[1] among European citizens, leading to greater emotional attachment and subsequent benefit to the marine environment. Educating and enhancing citizens' understanding on the importance of the seas and ocean to the health of the planet will encourage responsible consumption and enable behaviour change, which in turn will further reinforce the transformation to sustainable economic practices.

8.6 Support systems and infrastructures

Through alignment of in-kind contributions, the Partnership will also contribute to optimise the use of research infrastructures and of transfer mechanisms for knowledge and technologies. This may include ingestion of data and know-how from companies operating at sea, in the ocean or in inland waters, to complement academic knowledge and public monitoring systems. Openness and access to commercial facilities for education, testing, demonstration or technology transfer purposes will provide science extension services and contribute to an increased public awareness and societal involvement.

8.7 Co-creation and participatory stakeholder engagement

Co-creation among providers of knowledge (local, community, business, academic and policy), research and technology and the users community will be actively sought from planning to implementation. This will foster shared ambitions and the development of innovative, applicable solutions. It will generate a sense of ownership and trust, thereby ensuring uptake by the public and private sector, decision makers and society at large. The ecosystem approach to management (EAM) is fundamental to ensure a sustainable transition of the Blue Economy. It promotes conservation and sustainable use of the whole ecosystem and at the same considers economic and social interests. Gaps between current policies and governance are impeding the systematic implementation of EAM. To make EAM operational, an adaptive and constantly evolving management approach is needed as well as the involvement of stakeholders, industry and other actors.

9. Synergies with other Horizon Europe partnerships

The Blue Economy Partnership is one of 49 candidate partnerships identified in the Strategic planning for Horizon Europe. In order to avoid duplication of efforts and optimise resources and capacities, the Blue Economy Partnership will explore opportunities to identify synergies and potential for collaboration. Figure 1 identifies those partnerships where collaboration could be most beneficial. Opportunities for collaboration could vary from information-sharing to concrete joint activities and may include some of the implementation modalities identified below in Table 2.
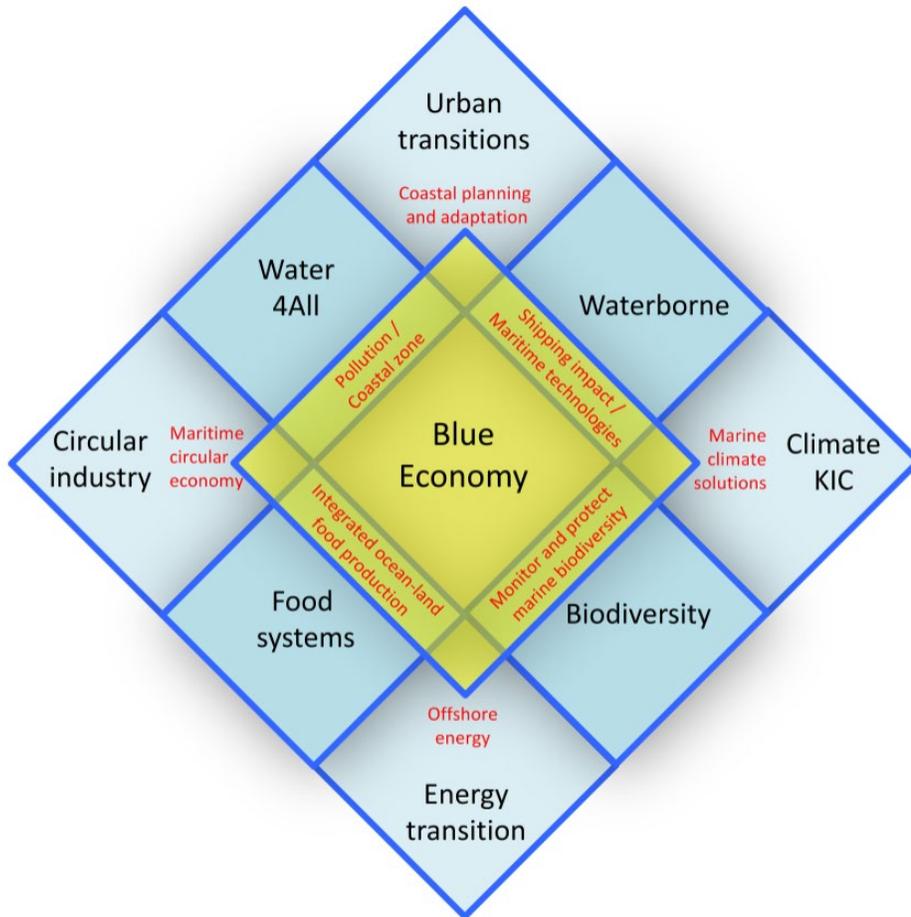

Figure 1: Complementary scopes of Partnerships at the fringes of the Blue Economy Partnership and opportunities for novel collaboration across sectors on topics of shared interest (in red).

Table 1 An overview of other related Partnership candidates, potential interfaces and modes and areas of interaction

Partnership	Possible mode of interaction	Partnership	Possible mode of interaction
Zero-emission waterborne transport	- Waterborne transport and related services are among the core Blue Economy sectors and a relevant stakeholder for EAM. - The development and demonstration of deployable zero-emission solutions - Ocean energy sector	- EIT Climate-KIC[16]	- Funding to innovative start-ups relevant to the Blue Economy.
Protecting and restoring biodiversity to Safeguard life on Earth	- Marine biodiversity - Marine Protected Areas - Nature-based solutions for coastal protection. - Eco-engineering solutions for "blue-green" artificial marine structures. - Ballast Water Management Convention	- Driving urban transitions to a sustainable future	- Implementation of EAM (MPA with focus on the coast, mitigation of emissions of pollutants and litter from land). -
Safe and Sustainable Food Systems for People, Planet & Climate	- Food from the ocean - Role of ocean-based solutions in climate mitigation and adaptation - Implementation of EAM (biodiversity and human wellbeing)	- Clean Energy Transition	- Sustainable Ocean energy technologies.
Water4All	- Hazardous substances, litter (including plastics), eutrophication and bioremediation technologies - Land sea interface - Management of waste products from desalination plants	- Circular and Climate Neutral Industry	- Utilisation of marine resources and ocean energy may contribute particularly to the targets. -

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[16] Several EIT communities may of relevance to the partnership, incl. EIT Food (aquatic food), Digital (digital transformation), Raw materials (deep sea resources).

10. Implementation modalities

The Blue Economy Partnership should be implemented through a joint programme of activities for high impact, relevance and capacity building, ranging from research and innovation to coordination and networking activities. To ensure effective and smooth development, three dedicated pillars of activities within the partnership will be brought forward:

    i. **Implementation of joint calls for proposals with co-funding from the Union**

    ii. **Implementation of joint activities without co-funding from the Union**

        a. Joint Calls (IA/RIAs) for cross-national research and innovation (with or without EU cofunding, different principles e.g., common pot, variable geometry, fair return),

        b. Joint Public Procurement of knowledge demands

        c. Knowledge Hubs, Synthesis Calls, Policy Labs, or Sandpits[24] to address e.g., knowledge gaps and policy challenges building also on knowledge outputs from completed projects and initiatives.

        d. Research Infrastructure sharing and cooperation i.e., cooperation on collection, storage and dissemination of surveillance and monitoring data of the marine environment and ecosystems, for public use for industry, academia and governments

        e. Structured coordination among relevant sea basin Programmes, Strategies and Initiatives

        f. Regional investments through regionally focused entities such as PRIMA;

        g. Instruments aimed at TRL above 6

        h. EU business tools and platforms such as in the Start-up Europe initiative for stimulating innovation at local and SMEs scale

    iii. **A broad set of horizontal activities supporting coordination, international cooperation, engagement and outreach, uptake of results, showcase etc. to significantly increase the impact of the Partnership**

The range of activities envisaged could include, but is not limited to the following:

    a. Capacity development, including mobility and repatriation schemes e.g. for early-career researchers and professionals, science-policy and ocean literacy programmes;

    b. Capacity building in the blue sector through academia-industry interaction (researcher/student/company mobility), continued education schemes, thematic business-research matchmaker events

    c. Knowledge Transfer & exploitation initiatives to fully capitalise on "key exploitable results" from completed projects

    d. Initiatives to overcome non-technological barriers to Blue Economy realisation;

    e. Hackathons and prize competitions to stimulate innovation on specific topics;

11.Annex 1

Overview of the aims of general objective A '*Alignment of priorities and investments across Europe'* and an illustrated summary of the intervention logic based on **thematic objectives**, **inputs, activities and outputs**

We aim for a powerful alignment and structuring among the EU's, MS's and AC's R&I priorities, resource allocations, activities and programmes in Blue Economy domains where research and innovation needs converge across Europe, regional sea basin areas and international partners.
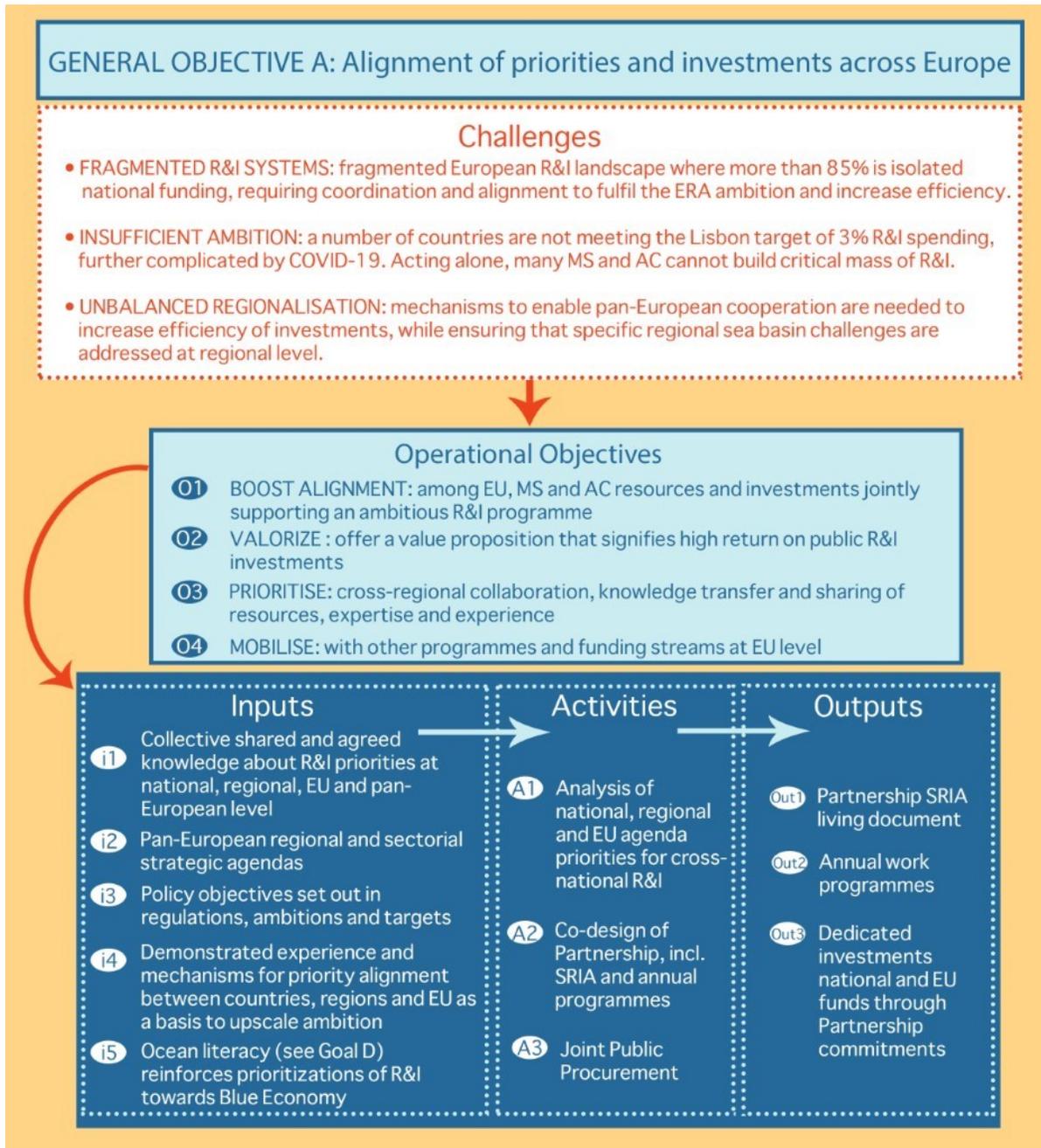

Figure 8: Schematic illustration of intervention logic for general objective A.

Overview of the aims of general objective B '*Cooperation across socioeconomic sectors and disciplines*' and an illustrated summary of the intervention logic based on **thematic objectives**, **inputs, activities and outputs**

We aim for a pan-European and international research and innovation cooperation at an unprecedented level of integration that includes all relevant socioeconomic sectors and cultures from industry to education and science diplomacy. The community involved is open and growing, inclusive of international partners, in particular those bordering Europe's seas and ocean.
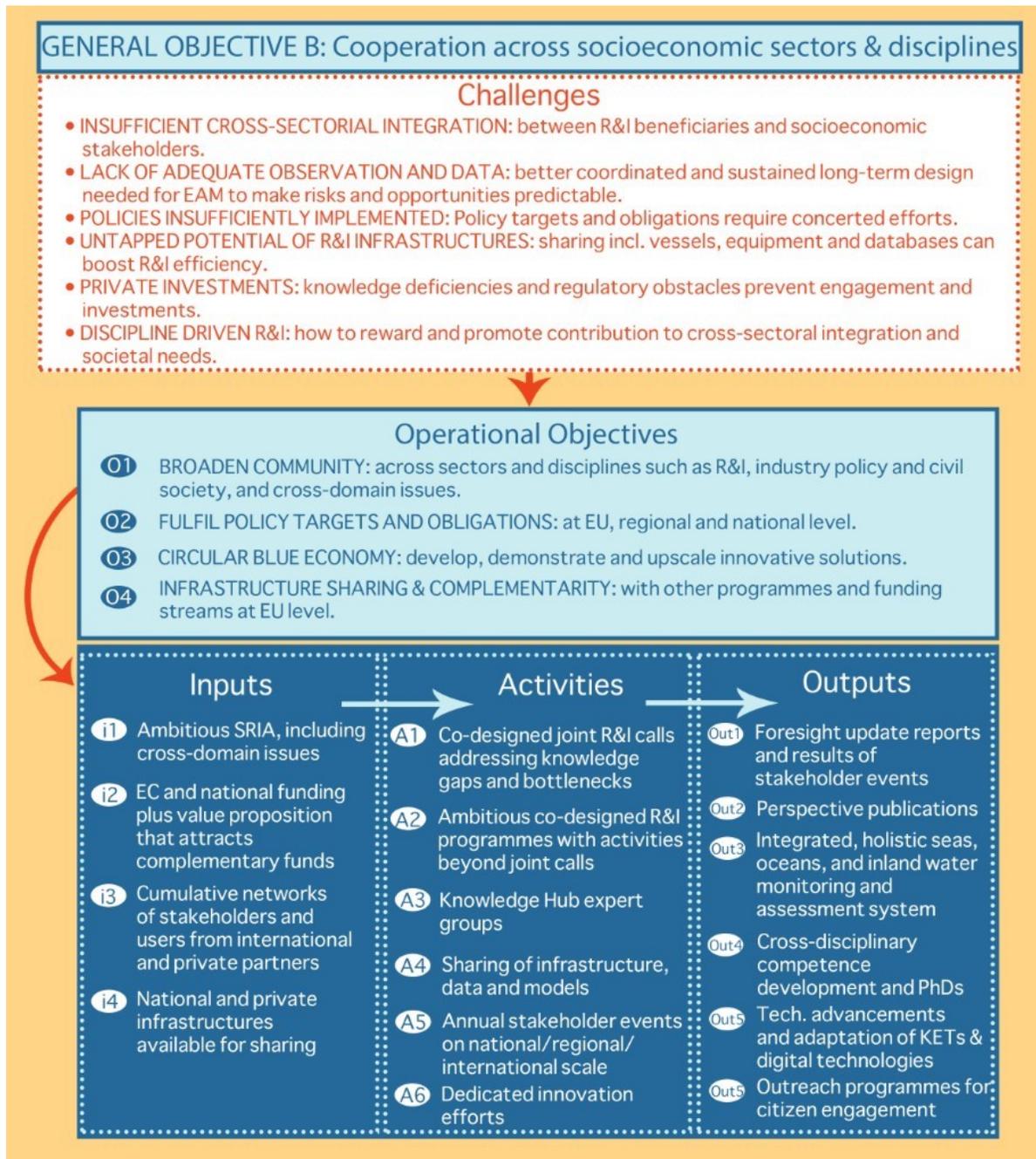

Figure 9: Schematic illustration of intervention logic for general objective B.

Overview of the aims of general objective C '*Provision of knowledge for a "green" development of the Blue Economy*' and an illustrated summary of the intervention logic based on **thematic objectives**, **inputs, activities and outputs**

We aim to generate of a strong evidence-base of knowledge, information and know-how to pursue sound policymaking, regulatory framework, sustainable Blue Economy business opportunities and solution generation. This will contribute to unlock, demonstrate and enable sustainable and responsible use of the full socioeconomic potential, within the boundaries of healthy and resilient ecosystems of seas and ocean.
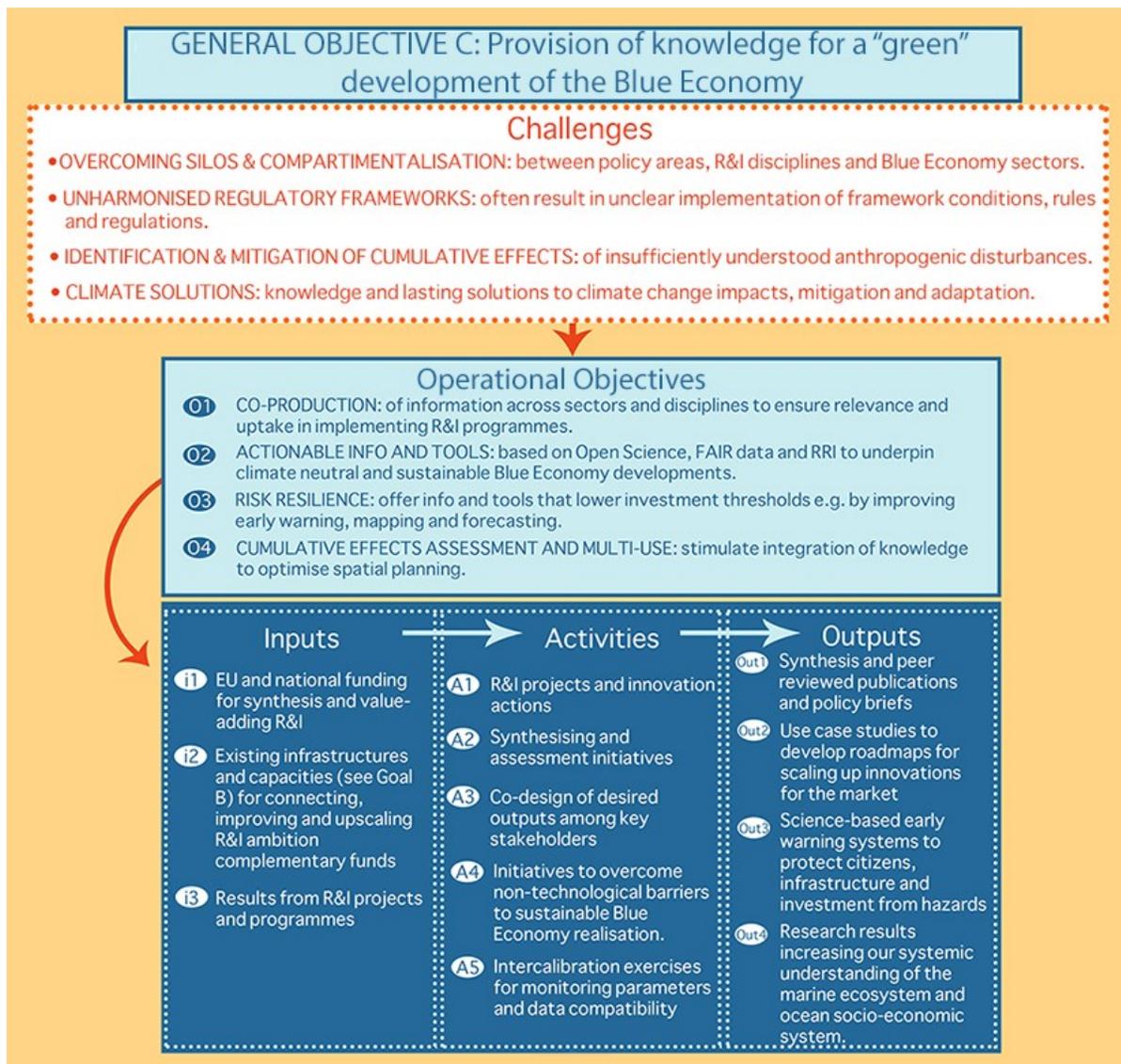

Figure 10: Schematic illustration of intervention logic for general objective C.

Overview of the aims of general objective D, '*Transformation to an evidence and knowledge based Blue Economy*' and an illustrated summary of the intervention logic based on **thematic objectives**, **inputs, activities and outputs.**

We aim to facilitate a rapid progress over the next decade towards transitioning to a Blue Economy that by mid-century is climate neutral, ecologically sustainable, competitive and productive to improve people's wellbeing and reduce risks to nature, resulting in job and value creation and biodiversity conservation, complying with policy requirements under the IMP, MSFD, WFD, MSP while contributing to strategic priorities of the EC (e.g. European Green Deal, Cohesion Policy, Circular Economy Action Plan, FOOD 2030, Bioeconomy Strategy and Biodiversity Strategy) and the UN SDGs.
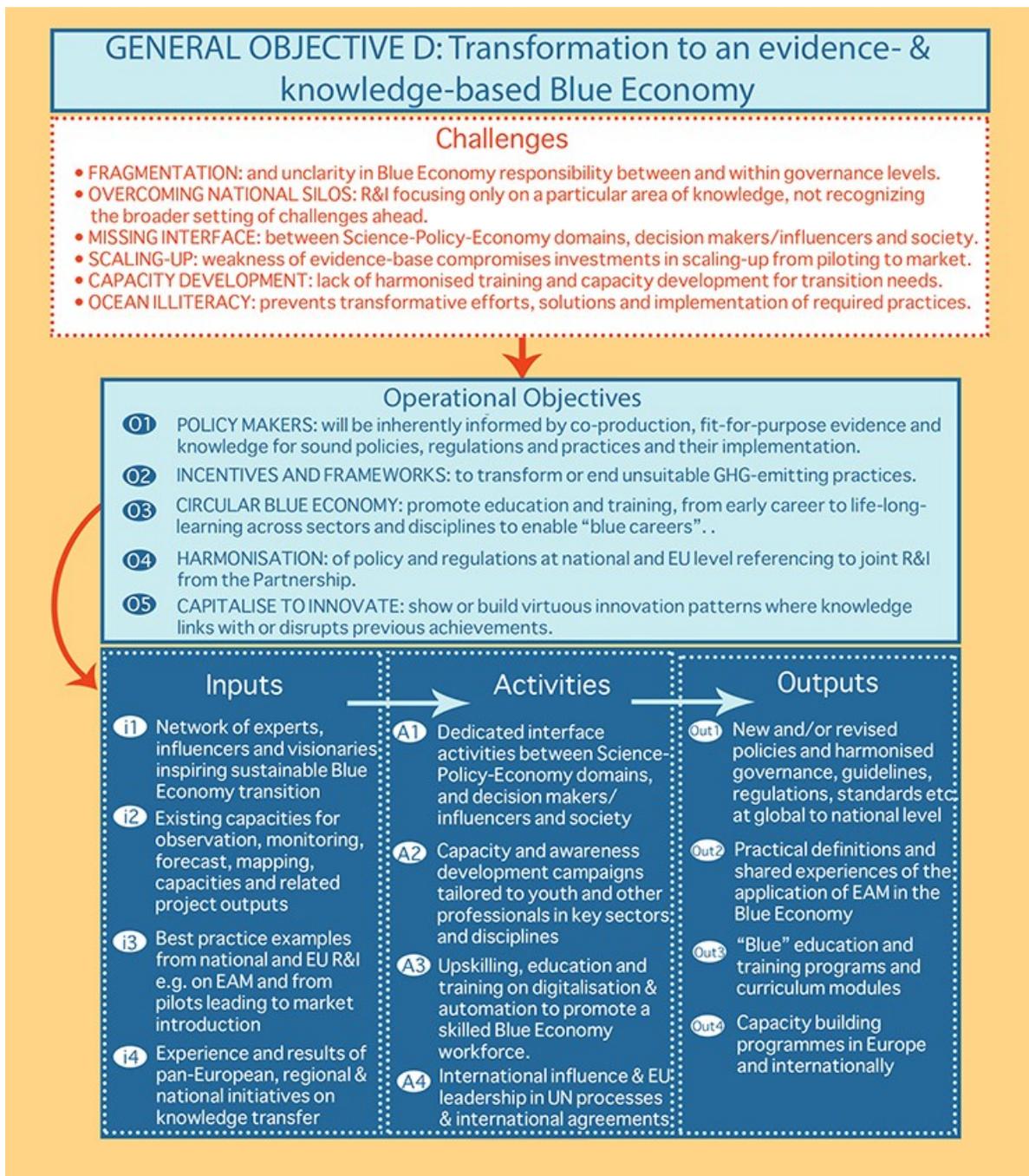

Figure 11: Schematic illustration of intervention logic for general objective D Impacts identified in the topic description for the Blue Economy partnership in the Horizon Europe Work Programme 2021-2022.