D.4.2.1 SUMMARY REPORT OF THE POLICY EXPERIMENTS

Deliverable 4.2.1 Summary report of the policy experiments

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Introduction and Executive Summary

As the deliverable 4.2.1 of the Blue Bio Med project, the present document carries out a comparative analysis of the policy experiments, helping unearth common findings from the implementation of the policy experiments methodology. These findings will be specified along a range of dimensions identified inductively and deductively, and will support the development of a governance model to align multi-stakeholder networks, in the transnational and multilevel setting of the Mediterranean (deliverable 4.3.1).

The document is structured in five chapters including the present introduction. Chapter 1 develops the theoretical framework guiding the policy experiment, based on new strands of the innovation policy literature guiding the transition towards directionality-oriented innovation strategies. Based on the guidelines provided by the literature, chapter 2 develops the methodological framework guiding the comparative analysis, which will be unfolded in chapters 3 and 4. Specifically, a comparative analysis of existing governance arrangements addressing sustainable development challenges in the Mediterranean is carried out in chapter 3; the findings from this comparative analysis will in turn guide the design and implementation of the comparative analysis of the policy experiments, in chapter 4. A summary of the chapters' goals and findings is structured below.

Chapter 1: Literature review

The present chapter develops the theoretical framework guiding the policy experiments and their comparative analysis. Indeed, a range of dimensions is extracted from the literature that will guide the empirical analyses developed in the present document (chapter 3: a comparative analysis of governance arrangements; chapter 4: a comparative analysis of the policy experiments). The chapter starts with an initial discussion on the emerging relevance of directionality-oriented innovation policies, emphasising the role played by responsible research and innovation (RRI) as a framework to guide efforts to strengthen the positive impacts of innovation, and decrease its negative impacts (Fitjar et al., 2019; Stilgoe et al., 2013). The chapter then focuses on a case of a directionality-oriented approach to smart specialisation strategy (S3), shared agendas (Ariño and Fernández, 2021; Fernández and Romagosa, 2020; Fernández and Herrera, 2022; Marinelli et al., 2021); this framework offers the advantage of being readily suited to a multi-level and transnational setting like that of the Mediterranean. Being based on the theoretical framework of transformative innovation policies (Molas-Gallart et al., 2020; Schot et al., 2020; Schot and Steinmueller, 2018) -and thereby the multi-level perspective of change in socio-technical regions (Geels, 2002)-, shared agendas are readily suited to work on addressing complex problems taking place at different governance levels and locations, like sustainable development challenges.

Accordingly, the chapter lays out the foundations for a governance model based on the framework of the shared agendas. The rest of the chapter is devoted to consolidating such foundations, firstly by highlighting potential complementarities with mission-oriented innovation policy approaches (e.g. Mazzucato, 2017, 2018), and later by exploring how different understandings of governance extracted from the literature (e.g. Grande, 2012) can be taken into account in the model.

For the former, the bottom-up nature of shared agendas coalitions entails that they might lack the top-down enforcing capabilities of mission-setting governmental agencies or the resources needed to set measurable goals and monitor the extent to which they are accomplished (e.g. Mazzucato, 2017, 2018). However, shared agenda initiatives can draw multi-stakeholder coalitions tapping on the resources available to missions. Specifically, shared agendas facilitate the participatory, bottom-up experimentation required for mission-oriented innovation policy to succeed, by drawing networks involving stakeholders from different territorial scales and countries. Furthermore, as an approach inspired by transformative innovation policy, shared agendas also provide an arena where conflicts between stakeholders are allowed to emerge, and can be addressed (Fernández and Romagosa, 2020). Obstacles limiting the regime de-stabilising potential of transformative innovations might be more easily highlighted, and mission support actions can be redirected to help remove these impediments, supporting shared agendas' efforts to build consensus around scalable transformative innovations.

For the latter, it is understood that an effective governance model should be able to promote collaboration between a broad range of public and private stakeholders (Ansell and Gash, 2008; Bommert, 2010), alignment between governance levels (Daniel and Kay, 2017), an equilibrium between structure and flexibility to address complex, continuously changing sustainable development challenges (Janssen and Van der Voort, 2016), and an understanding as complete as possible of the sustainable development challenges to be addressed (Rauschmayer et al., 2013).

Chapter 2: Methodology

This chapter explains the steps that have been followed to produce the entire deliverable, describing more in detail the approach and the theoretical foundations that have guided the analysis of existing governance arrangements and the four policy experiments -it should be noted that the same approach will be used to obtain the necessary inputs to build deliverable 4.3.1, on a governance model to address sustainable development challenges through multi-stakeholder collaboration across governance levels and countries in the Mediterranean-.

The chapter starts by explaining the reasons for using a comparative case study approach, mainly due to its capacity to extract common learning from the governance arrangements and the policy experiments by using dimensions coming from the literature review (section 2.1.) as well as new dimensions being inductively identified through cross-case comparison (chapter 3).

It continues by discussing how the literature review contributes to the theoretical foundations guiding the multiple case study; specifically through the definition of the deductive dimensions of analysis that will guide the comparative analysis. Then, it explains how the existing strategic governance frameworks have been selected and categorised into two groups focusing on innovation governance: (i) Governance arrangements promoting multi-stakeholder collaboration on innovation, in topics related to the Blue Bioeconomy; and (ii) governance arrangements not related to Blue Bioeconomy. It concludes by explaining how the methodological approach is similar for the analysis of the policy experiments, using the same dimensions when applicable, but with the difference that the case study methodology on the policy experiments focuses on those outcomes that are common to all the policy experiments compared.

Chapter 3: State of art

This chapter has the scope of analysing currently existing governance arrangements, which can provide valuable insights for the definition of a governance model proposal. The governance arrangements that have been analysed are all promoting multi-stakeholder collaboration on innovation, although some of them are specifically related to the Blue Bioeconomy (B-Blue, Blue Growth Community (BGC) and the Submariner Network), while others are not (European Institute of Innovation and Technology Knowledge and Innovation Communities (EIT KICs), Green Growth Community (GGC), Prima Foundation and the Vanguard Initiative).

The chapter continues by explaining each dimension of analysis being considered and highlights also the four benefits of the multiple case study approach that has been followed: identification of common traits, context awareness, orientation to policy making and flexibility for inductive dimensions. Below are summarised the findings of each dimension, highlighting the main insights.

Inclusive and responsive shared visions

Analysing the different governance arrangements it has been discovered the importance of inclusiveness to have a large representativeness and participation. Such conditions would guarantee that different points of view are taken into account, having an impact in the way decisions are being taken and implemented. In the case of inclusiveness, it promotes the involvement of a wide range of stakeholders, taking into account stakeholders' distribution across the quadruple helix, geographical location and governance levels. These techniques should ensure the inclusion of a broad range of actors in the co-design and implementation of innovations. There are different approaches being followed in the governance arrangements that have been analysed:

- **National or regional living labs**: they have been used to attract stakeholders with relatively limited resources and a stronger need for rapid returns to participation, such as civil society organisations. The stakeholders to be involved in the living labs were identified through a mapping exercise by each of the project partners, being especially relevant to the identification of frontrunners due to their experience and knowledge of the local blue biotechnology value chain (B-Blue and BLUEfasma projects).
- **Working groups structure**, including:
    - **Thematic working groups**: whereby members share specific knowledge on a concrete topic (Submariner network, BGC, GGC).
    - **Policy-oriented working groups**: in this case, the members are more diverse and provide different types of expertise to propose policies. These working groups thus provide stakeholders with an opportunity to influence how problems are framed in policy-making (PRIMA Foundation).
    - **Task-oriented working groups**: this structure is focused on aggregating the stakeholders based on a specific task to be done. It allows a higher specialisation in the outputs being produced and facilitates the distribution of competencies among stakeholders (Vanguard Initiative).

Another crucial element for the inclusion and engagement of stakeholders is the **networking services** provided by the governance arrangement secretariat. In the case of the Submariner Network, the activities of the secretariat are heavily devoted to services that might be of interest to stakeholders interested in being part of innovation project consortia, such as matchmaking activities or coaching services to access funding opportunities and set up project consortia.

Usually, a relatively small number of less empowered stakeholders (e.g. SMEs and civil society organisations) tend to be involved, compared to stakeholders with more abundant resources. Such limitations might stem from the foundations of most of the project consortia supporting the governance arrangements. However, some of the participatory structures included here (e.g. BLUEfasma living labs) appear to have been successful in drawing the involvement of less empowered stakeholders due to the applied nature of the innovation projects co-developed in the living labs, whereby stakeholders could foresee rapid returns to their participation.

A **combination of territorialised approaches to stakeholder inclusion** (e.g. living labs strongly grounded on local needs and demands) and non-territorialised approaches might succeed in drawing the participation of stakeholders while also providing opportunities for the upscaling of innovations developed locally and regionally. Additionally, the findings of Rosa et al. (2021) and the BLUEfasma project (2022) suggest that multi-level approaches to stakeholder inclusiveness can benefit from increased resources devoted to communication activities.

A **strong commitment and participation** is the basis of developing a shared vision and agenda. These are frequent among governance arrangements, looking for a shared understanding of three different elements: the current state of affairs in connection with the problems they address; the overall goals to be pursued when addressing the problems, and how these goals should be pursued. It uses these three scenarios to cluster together the governance arrangements and to explain similarities and differences that have been identified.

The **existence of a shared vision and agenda** is being used to concentrate resources towards common goals in the governance arrangements, especially those that are addressing sustainable development challenges. This is the case of the EIT KIC, where a shared agenda is in-built within the application process to become a KIC. Similarly, the Submariner Network's shared vision and agenda are strongly grounded in an assessment of obstacles and opportunities around marine resources as well as a participatory process in the Baltic region (Schultz-Zehden et al, 2021). In the case of the Green Growth Community (GGC) and Blue Growth Community (BGC), operations also respond to a shared vision and agenda logic, however, it is the product of alignment based on the projects that are being promoted towards common challenges. Finally, in the case of PRIMA, the shared agenda brings different challenges being addressed simultaneously by identifying shared benefits that can bring stakeholders together.

Finally, by **promoting a transversal participation though different levels, categories and regions**, the shared agenda should also promote responsiveness to emerging needs and criticisms along the process of design and implementation of innovations. Indeed, certain flexibility is required and it can be easily accepted by having a shared vision. Monitoring procedures should provide governance arrangements with crucial data on the impact of innovations (e.g. Climate-KIC, the Submariner Network and the Green Growth Community), providing information for decision making. Likewise, territorial participatory routines should give voice to a relatively broad range of stakeholders (e.g. B-Blue project and Submariner

Network). Furthermore, many of the governance arrangements (e.g. Submariner Network, Climate-KIC) have developed a shared agenda grounded on multi-stakeholder participation.

The **participation of resource-strained stakeholders** should be supported, in order to include their views in the innovation process; often, these actors might provide inspiration for non-technological forms of innovation. Additionally, exercises assessing the ex-post and ex-ante impact of innovations should be explored, since they would provide valuable data for future projects and promote indirect anticipation and reflexivity.

Roadmaps as a tool for anticipation and reflexivity

The need for ensuring alignment among stakeholders and coordination in the implementation of initiatives requires a structure of **Key Performance Indicators (KPIs)** able to provide enough information to the stakeholders involved in a governance arrangement. A common platform could concentrate data and at the same time make it accessible, supporting the responsiveness and anticipation dimensions of the governance arrangement (e.g. the PRIMA General Analytics developed by PRIMA Foundation).

To define the actions to be taken in long-term projects and with a large number of stakeholders, some governance arrangements define roadmaps, specifying the actions to be taken and supporting the delegation of responsibilities. Similar to KPIs, **roadmaps are a powerful alignment tool in complex, multi-level initiatives like governance arrangements**. They need to be supported by continuous monitoring and evaluation procedures ensuring the adaptation of the roadmap along the way. This flexibility is needed to fulfil the dimensions previously reviewed (particularly that of reflexivity), and to ensure that the roadmap is flexible enough to adapt to uncertain innovation processes. Some examples of roadmaps identified among the governance arrangement analysed are:

- Submariner roadmap (launched in 2015 and revisioned in 2021 (Schultz-Zehden et al, 2021): the roadmap comprised a range of strategic actions and for each of these strategic actions, the 2021 revision of the strategy evaluated the degree of completion of the related Submariner projects and proposed a revision of these strategic actions with new strategic actions as part of its vision until 2030.
- The Climate-KIC Strategic Agenda (2021) includes a range of measurable goals connected with the sustainable development challenge of addressing climate change, to be fulfilled by 2027. Furthermore, the Agenda includes a risk assessment exercise where actions are foreseen to address risks that might derail the projects supported by the Climate-KIC.
- The GGC aims to coordinate a range of common indicators for assessing the impact of innovation projects. Importantly, they would enable assessing the degree to which shared goals are being achieved, allowing the reorientation of the governance arrangement against new priorities.

The previous examples are based on an exercise to anticipate needs and reading trends, planning to be prepared and to push towards long-term challenges. To do so, it is important to consider positive and negative outcomes of future innovations. While most governance arrangements have focused on the positive impacts, the negative ones have been largely

neglected, reducing their anticipation capacity. This characteristic stands especially visible in the case of the Climate-KIC: as part of its strategic agenda for 2021-2027, an analysis was produced assessing the potential impacts of the innovations promoted by the KIC, however, little attention was paid to the negative side effects that might stem from innovation.

The **lack of an explicit foresight of the negative impacts of the innovations promoted by the governance arrangements might also correlate with the lack of involvement of some groups of stakeholder**s, especially the ones with limited resources to influence the definition of research and innovation pathways. Therefore, it concludes by stating how foresight exercises with a strong participatory ability can better define a more balanced range of insights on what goals should be pursued.

Finally, **a flexible roadmap and the establishment of anticipation mechanisms might facilitate the capacity of the formers to review and adapt themselves based on changing circumstances**. Considering the uncertainty of innovation and its impact, it is crucial to gather data to facilitate adaptation processes towards the desired outcome that is being pursued. Additionally, reflexivity can also promote a learning process that brings stakeholders to better adapt themselves and their common agenda, adding reaction capacity within the defined roadmaps.

Reflexivity is strongly related to governance arrangements' efforts to anticipate the impacts of the innovations promoted, through the collection of KPIs related to the impact of their innovations. KPIs can be devised in connection to the global goals of the governance arrangement as in, for instance, the Climate-KIC (2021a), the Green Growth Community (CUEIM and UVic, 2021) and the PRIMA analytics platform of the PRIMA Foundation. They can also be linked to specific goals adjusted to the characteristics of the stakeholders involved, as in the Submariner Network (Schultz-Zehden et al, 2021) and the B-Blue community (Charlène et al., 2020).

Experimenting and niche upscaling

Across the observed governance arrangements, it is **common to implement place-based approaches to promote experimentation with emerging innovations**. Through local experimentation, it is expected that user communities will have produced the inputs needed to assess the feasibility of the innovations. The scale of these place-based experiments can vary notably across governance arrangements, from regional pilot sites (B-Blue project and the Submariner network) to an EU-wide network of local innovation hubs (EIT KIC).

Similar to the other dimensions, it is also noteworthy the different emphasis that the governance arrangements assign to experimentation with transformative innovations. Whereas the aforementioned initiatives open the door to experimenting in their living labs and pilot sites with innovations of a relatively low TRL (below or equal to 5), other initiatives are focused on a relatively high TRL (above 5) solutions, on a range of problems more strongly aligned to innovation for growth paradigm such as advanced manufacturing and bioeconomy (the Vanguard Initiative).

Such experimentation is the first step to promote innovations, which can be further promoted through niche upscaling mechanisms. The coordination among actors at different governance

levels has facilitated access to resources for the promotion of local innovations with transformative potential. Niche upscaling entails that the network of actors involved in the governance arrangements provides the resources to identify, sustain and promote solutions developed at the local level. Such support is necessary to increase the likelihood that the innovations contribute to socio-technical regimes' disruption and reconfiguration. The extent to which transformative innovations can be scaled-up might be strongly related to the governance arrangements' capacity to combine territorialised and non-territorialised approaches to innovation co-creation.

- In the case of the Blue Living Labs promoted by BLUEfasma, through its communication activities, BLUEfasma intends to promote the replication and scalability of niche-level, territorial innovations to higher governance levels.
- The Climate-KIC network of local innovation hubs or deep demonstration sites across the EU is another example, based on demonstration sites are locations where a broad range of innovations are tested and evaluated; those innovations with high potential impact are further promoted to be scaled up.
- BGC and the GGC are mainly focused on communicating the results of its member projects to broader audiences, increasing access to resources and opportunities
- The Submariner Network has engaged in similar practices with its Blue Platform project, which intended to showcase the capabilities of the network and its outputs.

The establishment of such alliances highlights the relevance of multi-level and transnational cooperation in promoting cooperation and knowledge transfer, for example, the interregional cooperation projects between companies and knowledge institutes in a specific technology field or application domain (e.g. Vanguard Initiative). The bridges set by governance arrangements such as the BGC and GGC enable linking the local/regional realities of niche-level experiments with actors operating at the national and transnational governance levels. Particularly relevant appears to be the connection that these governance levels provide to the Mediterranean and EU policy-making arena, potentially influencing the upcoming project funding calls.

Some **drawbacks**, however, have been identified that should be addressed to increase the effectiveness of these approaches: future horizontal project calls could strengthen the alignment of projects around common sustainable development challenges, with common indicators (Borut et al., 2020); the timeframe of these projects might still be excessively limited for the long-term processes mediating between the testing of niche-level innovations in settings such as living labs, and impacts at higher governance levels (e.g. policy influence, scaled up innovation projects).

Focus of mission orientation

This dimension considers three different approaches to mission orientation that will provide valuable insights towards what are the common characteristics of governance arrangements, in connection with their orientation towards missions to address sustainable development challenges. The three dimensions being considered are:

- **Strategic orientation**: it includes governance models that select specific societal challenge(s) and guides collective policy intervention toward clear objectives. It can be

easily linked with decision-making bodies where different stakeholders cooperate in the definition of the strategy to be followed and the validation of initiatives implementing the strategy (e.g. the Vanguard Initiative).

- **Policy coordination**: it is responsible for achieving the mission and its breadth and complexity might increase with the number of policy fields and governance levels covered. This coordination dimension aims at facilitating the alignment between actors implementing initiatives, considering all the potential structures. Among the cases analysed, there are two main situations. In one of them, all the members of a governance arrangement organise themselves in working groups, coordinating actors at a regional or transnational level in a decentralised manner (e.g. BGC); the other one refers to a more centralised approach, where a support body is responsible for coordinating and promoting initiatives (e.g. Submariner Network).
- **Policy implementation**: it is focused on ensuring the consistency and effectiveness of the modes of intervention, as well as the resource allocation and the monitoring of the actions that will lead to the achievement of the policy objectives. It is based on how stakeholders effectively work together to bring forward initiatives working together. Considering the quadruple helix approach and the aim of achieving trans-Mediterranean cooperation, the implementation level will require the proper communication and monitoring tools to guarantee that the work being developed is aligned with the strategy.

Chapter 4: Lessons from the policy experiments

The final chapter describes the approach followed by each policy experiment, taking into account its framing question, methodology, goals and results in connection with the sustainable development challenge addressed by the policy experiment. Later on, the results of the policy experiment are compared with an eye on how they can contribute to the design and implementation of future policy experiments addressing sustainable development challenges, in multi-stakeholder, multi-level and transnational settings like the Mediterranean. Furthermore, the methodological learning gained from comparing the policy experiments will feed into the development of the governance model (see deliverable 4.3.1).

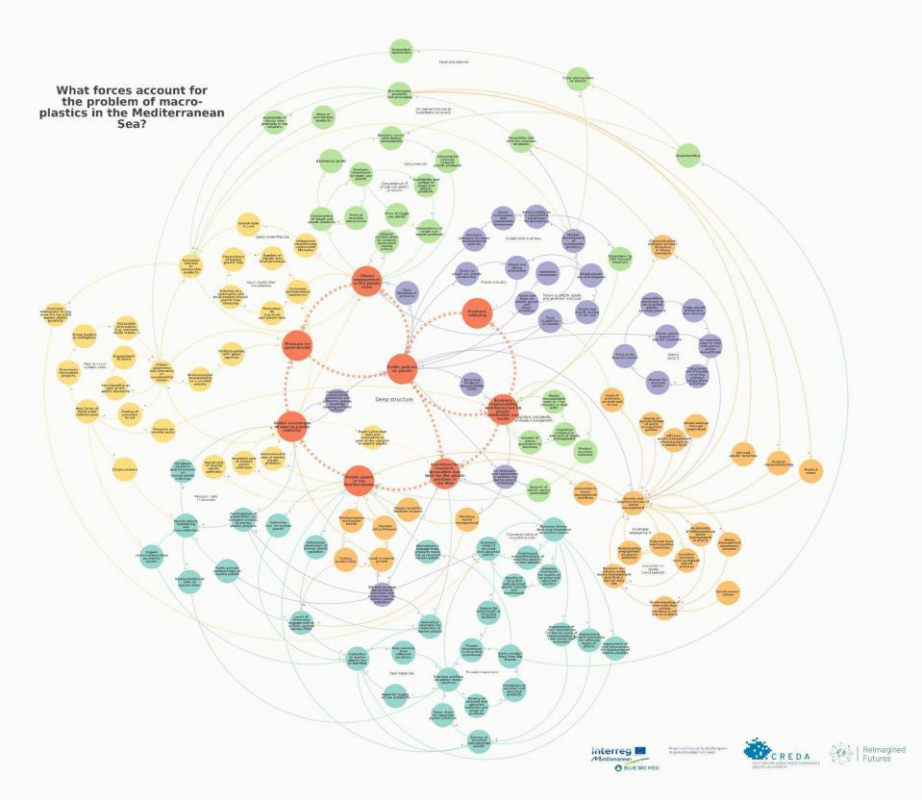
The comparative analysis was structured around four dimensions gathered from the theoretical framework: i) Shared Vision and Agenda, ii) Anticipation, iii) Reflexivity and iv) Experimentation. These dimensions were supported by others that emerged inductively through the comparative analyses between policy experiments. The latter were: v) Multi stakeholder Inclusiveness; vi) Multilevel Inclusiveness; vii) Transnational inclusiveness; viii) Tools to promote multi-stakeholder learning, in multilevel and transnational settings (a transversal category); ix) Balance between Inclusiveness and Implementation Potential. The findings are summarised below. Further information on how the policy experiments were compared across the dimensions is provided in the tables available at the Annex I.

Shared Vision and Agenda

Across the policy experiments, it is possible to see the application of a range of tools promoting a shared understanding of a) the current state of affairs in the challenge, b) what should be the ideal state of affairs in connection with the challenge, and c) what should be the strategic agenda or roadmap leading to that ideal state of affairs. To reach these common goals, the policy experiments tested a diverse toolkit of methodological approaches, on aspects such as:

- **Combining the expression of diverse views with consensus-building**. In here, the experiments on the challenges of Plastic Pollution and Sustainable Aquaculture aimed at combining both aspects through a mixture of group work and plenary discussions, to reach a shared understanding on all three of the previously mentioned goals; in the Plastic Pollution challenge stakeholders were also supported by techniques visualising relationships between factors relevant to the challenge, i.e. System Mapping. The experiment on the challenge of Digitalising the Blue Bioeconomy followed a similar approach, however it focused on the goals a) and b). Finally, the experiment on the Invasive Alien Species (IAS) challenge opted for a different approach, combining a workshop for idea exploration and consensus formation with survey methods to measure the weight of diverse views across types of quadruple helix stakeholders.
- **Extent to which the shared agendas can be realised**. The policy experiments provided different tools to enable the operability of the shared agenda. Particularly noteworthy is the role played by System Mapping leverage points in the Plastic Pollution challenge (figure 1), and the use of survey methods in the IAS challenge.

FIgure 1. Example System Mapping from policy experiment



Source: Reimagined Futures, the economic promotion area of the Catalan Government, the authors. Available in: reimagined-futures.kumu.io/macro-plastic-pollution-in-the-mediterranean-sea

Anticipation and Reflexivity

While anticipation entails predicting future outcomes of innovation before they arrive, reflexivity analyses the positive (and negative) outcomes of the innovations already pursued. This process becomes in turn an input for a learning process and the prediction of the future. Three main approaches can be identified, that combine anticipation and reflexivity:

- **System Mapping**. This approach, implemented in the Plastic Pollution challenge, promotes the identification of positive and negative impacts by analysing the entire complexity of the challenge and defining specific loops, correlations and dimensions. Specifically, the loops are showing how one element has a positive or negative impact on other elements and at the same time, how this first element is connected with the rest of the map.
- **Open dialogue that promotes transfer of experiences across the Mediterranean**. The policy experiment on Sustainable Aquaculture has indirectly obtained anticipation by promoting open dialogue among all the stakeholders. This open and constant dialogue is being used to promote a common understanding of potential threats and opportunities, linked with the previous point of defining a common vision and agenda.
- **Focus on potential positive and negative impacts**. This approach is directly related to the main focus of the policy experiment on the IAS challenge. Current and future innovation strategies might have negative consequences on the environment, and the policy experiment launched a discussion on the negative impacts that might stem from the innovative actions.

Experimentation

Although the relatively short duration of the policy experiments did not allow for testing innovations in real-life settings and exploring how they might be diffused, the policy experiments have provided **temporary spaces for experimenting on**:

- **How to formulate a shared agenda aimed at addressing the focal sustainable development challenge** (see Shared Vision and Agenda).
- **How to start co-developing innovation ideas that could implement the shared agenda roadmap**.

The policy experiments promoted different tools useful to experiment with innovation proposals. In the case of the Plastic Pollution challenge, System Mapping helped stakeholders identify leverage points, whereby they could concentrate their efforts to co-develop innovation proposals. Meanwhile, the Sustainable Aquaculture challenge experiment allowed stakeholders to assess which collaboration routines could help multiple stakeholders work together, in the context of a Mediterranean Innovation Alliance for a Sustainable Blue Bioeconomy. Finally, the quantitative research techniques applied in the IAS challenge allowed to identify which innovation proposals gather support for innovation co-creation, and which ones might be supported only by some types of stakeholders.

Multi stakeholder Inclusiveness

There is a **common imbalance in all the policy experiments,** which might be **caused by the structure itself of the policy experiment.** Indeed, the policy experiments have larger participation by agents from universities and research centres and the public administration. Beyond this limitation in terms of balanced representativeness, there are some valuable contributions from the policy experiments to the understanding of this dimension. These include: a) The sub-categorisation of each group; b) The use of internally balanced working groups; c) Additional efforts to reach a balanced stakeholder distribution.

Multilevel Inclusiveness

To a greater or lesser extent, the **policy experiments have been able to draw a multistakeholder constituency capable of supporting the nurturing and maturation of transformative innovations**, across governance levels. However, the experiments appear to have faced difficulties in engaging stakeholders operating regionally and transnationally. Such difficulties stem from the mismatch between the incentives of these organisations, and the design and implementation of the policy experiments. To involve regional stakeholders, different mitigation approaches might be implemented; these are specified in table 1.

Table 1: Mitigation approaches for multi-level inclusiveness

Applicable to regional governance level	**Applicable specifically to transnational governance level**
- Bidirectional communication efforts to link the framing question to *local and regional* stakeholder needs. - Targeting leading local/regional stakeholders, to attract broader stakeholder constituencies. - Regional/national workshops in local languages, other than English. - Link the policy experiment workshops with living labs; the latter provide stable spaces to test the feasibility of innovation proposals in real-life settings.	- Bidirectional communication efforts to link the framing question to *transnational* stakeholder needs. - Increased desk research efforts to draw transnational stakeholders, particularly intergovernmental organisations.

Transnational Inclusiveness

Southern Mediterranean stakeholders were represented indirectly through transnational stakeholders; this indirect representation could also have acquired a stronger role in the policy experiments, taking into account their role in addressing the sustainable development challenges covered in the policy experiments. In addition, it is also relevant to mention the limitation in the participation of northern shore countries: from one side, there is an over-representation of Italian and Spanish participants in the 4 policy experiments, unbalancing the

participants among the countries that are being represented; on the other side, the participation has not been consistent along the process.

To address these limitations, mitigation strategies like those mentioned in the other inclusiveness dimensions could be implemented. In addition, a mix of workshops and surveys (as in the IAS challenge) could help reach a larger number of participants.

Tools to promote multi-stakeholder learning, in multilevel and transnational settings (a transversal category)

The policy experiments have provided the opportunity not only to think about how to tackle sustainable development challenges but have also provided methodological tools that can be further used in other projects. In general, the tools to promote multi-stakeholder learning could be summarised as:

- **Shared visions and agendas**. Although this process is focused on the definition of the current assessment of a challenge and the future vision to work towards, it is also a negotiation exercise, where the participants learn to bring forward proposals and have to be open to adjustments and concessions.
- **Techniques to visualise complex systemic relationships**. The Systems Mapping technique applied in the Plastic Pollution policy experiment is a prime example, showing how relevant it is to visualise in a map the relationships between factors configuring a sustainable development challenge. Particularly interesting is the role that leverage points play, being areas within the map whereby relationships between factors can be tapped into, to trigger system transformation.
- **Approaches to take into account the positive and negative impacts** of innovation, whether these are direct or indirect.
- **Combining quantitative and qualitative research techniques**. The use of quantitative techniques allowing to identify, and quantify points of agreement and discussion across stakeholders might be a strong complement to the conversations held in workshop settings.

Balance between Inclusiveness and Implementation Potential

As engagements promoting innovations that can transform socio-technical regimes towards sustainable development paths, policy experiments have to deal with the uneasy balance between the opposite goals of ensuring multi-stakeholder inclusiveness, and increasing the implementation potential of the outcomes stemming from the experiments themselves i.e. shared multi-stakeholder agendas and proposals of innovations. To fulfil this goal, the policy experiments have applied a diverse range of approaches, which intend to promote synergies between both goals. These include:

- **The use of System Maps as visual representations of sustainable development challenges**, whereby the complexity inherent to the challenges is condensed enough to ensure their interpretation.

- **The quantification of stakeholder support for the implementation of innovation proposals**, extending the reach of the policy experiment and identifying which stakeholder coalitions might support the innovation proposals.
- **Focusing the policy experiment workshops to build collaboration routines for multi-stakeholder alliances**, rather than on specific actions.

Additional remarks

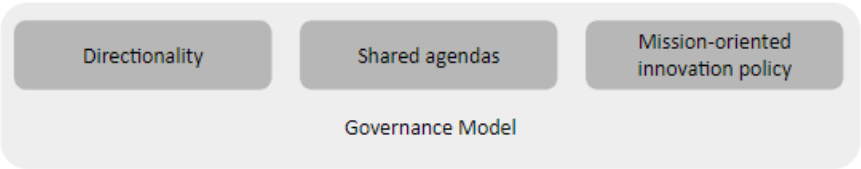
In conclusion, **the present document has allowed us to identify a range of dimensions whereby the learning from the policy experiments can support future engagements promoting multi stakeholder collaboration on innovation, addressing sustainable development challenges**. These engagements might be other policy experiments, but could also be broader, and more ambitious initiatives. The latter is the case of the governance model advanced in the deliverable 4.3.1, which intends to promote collaboration on innovation to address sustainable development challenges, in a multilevel and transnational setting like the Mediterranean.

1. Theoretical framework

1.1. Literature guiding the policy experiments

This chapter discusses the literature that has been used to build the theoretical framework of the report. It presents the concepts and theories that have been used to analyse existing reference governance arrangements as well as the results of previous policy experiments (figure 2 provides a summary of the chapter layout).

Figure 2: Theoretical framework



The chapter starts with a review of the recent developments taking place in the innovation policy literature; an emerging consensus is rising in the community over the need for more directionality in innovation policies, as a tool to address sustainability transitions, with emerging concepts such as mission oriented innovation policy and transformative innovation policy. These two concepts are linked through shared agendas, a framework for the governance of innovation coalitions interested in addressing sustainable development challenges. The second part of the chapter is more focused on the governance models being adopted in innovation strategies that are promoting sustainable transitions, offering this layer of analysis that better links governance and innovation. Such governance models present the characteristics that should be considered when defining a governance model based on multi-level cooperation and the need for directionality. It explores the main characteristics of collective governance models, which have

a similar approach used in the definition of shared agendas, and continues defining the characteristics of governance models that promote innovation. It concludes specifying the different levels of governance that are being considered for the analysis of mission oriented innovation policies.

1.1.1. Directionality as a crucial dimension of innovation policy

The last years have witnessed an increased interest on the part of scholars on the directionality of innovation policy. While traditional frames to justify innovation support measures emphasised the relevance of innovation as a driver of economic growth, scholars increasingly pay attention to the social and environmental consequences of innovation (Fitjar et al., 2019; Mazzucato, 2016; Schot and Steinmueller, 2018).

As part of this shift towards directionality, responsible research and innovation (Stilgoe et al., 2013) is being implemented in innovation policy, for instance in the new wave of smart specialisation strategies (S3) for the EU programming period 2021-2027 (Ariño and Fernández, 2021; Fitjar et al., 2019). Under responsible research and innovation (RRI), the positive and negative impacts of innovations have to be anticipated, taking into account their economic, social and environmental outcomes. Secondly, a broader range of societal stakeholders has to be included in the formulation and implementation of innovation policy, beyond those that have been traditionally related to economic growth. This represents a move from a triple helix framework –covering businesses, research institutions and governmental authorities– to a quadruple helix framework, where the views of civil society and citizens are also taken into account (see also Warnke et al., 2016). Thirdly, reflexivity in innovation policies is required, so that they take into account potential and actual impacts within the areas where they are implemented, and outside them; this point, and that of anticipation, are highly related with the extent to which participatory foresight processes are integrated into the definition of research and innovation priorities (Rosa et al., 2021). Finally, such strategies need to be responsive to criticism by the impacted communities, and adapt innovation policy along its implementation period.

1.1.2. Shared agendas: Implications for multi-level and transnational settings like the Mediterranean

This wave of changes in innovation policy enables the development of innovation governance arrangements that harness the potential of the blue bioeconomy, to address sustainable development challenges in the Mediterranean. Indeed, such governance models can be built from the shared agendas framework (Ariño and Fernández, 2021; Fernández and Romagosa, 2020; Fernández and Herrera, 2022; Marinelli et al., 2021). This is an S3 framework aimed at promoting inclusive multi-stakeholder coalitions addressing sustainable development challenges, like those related to the promotion of the blue bioeconomy. Additionally, the framework, although largely regional, can be suited to a transnational setting like that of the Mediterranean, where multiple levels of government are involved. This is because shared agendas are inspired by the contributions of the transformative innovation policy literature (Molas-Gallart et al., 2020; Schot et al., 2020; Schot and Steinmueller, 2018) which, as discussed in more detail below, is grounded in the multi-level perspective of change in socio-technical regimes (Geels, 2002).

A regional innovation strategy based on the shared agendas framework departs from a shared vision for a future, where a sustainable development challenge has been addressed. This vision is to be constructed and shared by a broad stakeholder constituency including actors representing public administration, businesses, universities and research institutions, as well as civil society, through a process whereby these stakeholders come up with a joint definition of the current situation in connection with the challenge; this joint definition enables in turn agreeing on a shared vision for the future. Additionally, the framework advances a governance arrangement aimed at implementing in practice the shared vision, by experimenting with alternative types of innovations, technological or not (Ariño and Fernández, 2021; Fernández and Romagosa, 2020; Marinelli et al., 2021). Social innovation labs such as living labs are an essential component of the shared agenda implementation, since they allow through participatory approaches the development and testing *in real-life settings* of the innovations proposed within the shared agenda, probing the scale-up potential of transformative innovations (Fernández and Herrera, 2022).

Within transformative innovation policy, it is assumed that the kind of innovations, technical or not, needed to address a sustainable development challenge are likely to overcome the limitations of the dominant socio-technical regime. Dominant socio-technical regimes –with dimensions such as core technologies, investment patterns, user preferences, regulations, or cultural norms– define the frame of the innovations pursued by society, posing a limitation into its ability to address global emerging changes in the landscape, such as the urge to address sustainable development challenges like climate change or the need to diffuse circular economy practices in the blue bioeconomy. Such landscape shifts overwhelm the dominant socio-technical regime's ability to satisfy societal needs, providing an opportunity for alternative innovators to challenge the regime. Operating in protected niches -spaces where innovations can be developed without necessarily abiding to the socio-technical regime's conforming pressures-, alternative innovations have then the opportunity to develop and upscale these innovations, transforming the dominant socio-technical regime towards more sustainable development paths (Ghosh et al., 2021; Molas-Gallart et al., 2020; Schot et al., 2020). Social innovation labs can be seen as an example of such spaces (Fernández and Herrera, 2022).

Multi-level interactions (Geels, 2002) are thus essential in transformative innovation policy. Indeed, regime transformation towards sustainable development is likely to require the interaction of developments taking place at different territorial scales. Concretely, experimentation in local niches is unlikely to transform a socio-technical regime, unless accompanied by macro-level trends highlighting the limitations of the regime, and creating windows of opportunity for niche-level experiments to develop, upscale and gain relevance (Molas-Gallart et al., 2020; Schot et al., 2020).

Shared agendas, like other challenge-oriented regional innovation strategies, can be useful to initiate the development of alternative innovations with regime de-stabilising potential (Tödtling et al., 2021). Following the previous paragraph however, the innovations promoted by these strategies are likely to require the involvement of actors operating in other regions, and at the national and international levels of government, in order to develop and upscale. A broad range of multi-level and transnational interactions can thus be foreseen, including access to national or EU funds (Tödtling et al., 2020), and cooperation with established players in public administration of industry in order to promote policy changes, gain market access or attract investment (Schot et al., 2020).

For these reasons, the multi-stakeholder networks defining a shared agenda are likely to take into account developments in other regions, and at higher levels of government (Ariño and Fernández, 2021; Fernández and Romagosa, 2020); these developments might support the scaling-up of innovations promoted at protected spaces such as social innovation labs (Fernández and Herrera, 2022). However, while these extra-regional developments are used to inform the shared agenda, they could also serve as a departure point to transform what is for the most part a regional innovation policy framework into a fully-fledged multi-level innovation policy framework, aimed at promoting cooperation for transformative innovation across the Mediterranean –thus involving actors operating at different countries and levels of government in the basin–. Indeed, such cooperation is likely to support the goals pursued by a *transnational* shared agenda, when it comes to gaining access to resources useful to upscale regime de-stabilising innovations, such as markets, investments, or policy influence.

The few structural elements discussed in the shared agenda framework (the steering committee, the technical groups) could be adapted to operate in a transnational setting, coordinating working groups addressing sustainable development challenges or specific problems within these challenges; such transnational support structure would be key in providing policy influence, funding and other resources needed to scaling up of the innovations co-created by the alliance's working groups. For further multi-level connections, the working groups could also include stakeholders operating transnationally, even if focusing their actions in specific regions. Furthermore, involving transnational governance arrangements already operating in the Mediterranean (e.g. BlueMed initiative, Union for the Mediterranean) could provide additional leverage to the transnational support structure.

1.1.3. Linking transnational shared agendas with mission-oriented innovation policy

The opportunities highlighted by bringing the shared agendas framework to a transnational environment should also be analysed in parallel to the rise of mission-oriented approaches in the EU innovation policy (Mazzucato, 2018), with its implementation in the launch of the Horizon Europe Mission Restore Our Oceans and its lighthouses (European Commission, 2021b, 2021a). Mission-oriented innovation policy entails the existence of governmental agencies capable of setting missions goals; these goals, in turn, provide a concrete benchmark for measuring the extent to which a wider sustainable development challenge is being addressed[1]. Accordingly, governmental agencies should have the resources needed to monitor the accomplishment of the mission through different metrics, and adjust the mission goals along the way, promoting different types of multi-stakeholder innovation projects according to need (Mazzucato, 2017; Miedzinski et al., 2019). Experimentation with these innovations in niches is promoted, in order to fulfil the mission goals.

In comparison, transnational shared agendas frameworks are based in bottom-up innovation coalitions, lacking a governmental agency that can set a measurable mission goal top-down. The

[1] Miedzinski et al. (2019, p. 34) provide an example of an hypothetical mission for plastic-free oceans, contributing to address the sustainable development challenge of clean oceans. The mission goal is to reach a 90% reduction of plastics entering the marine environment, and collecting more than half of plastics present in our oceans, seas and coastal areas by 2040.

lack of such concrete benchmarks, in addition, might pose an obstacle to the extent to which shared agendas coalitions can measure their progress in addressing the challenge. Additionally, it might be more difficult for shared agendas coalitions to possess the resources needed to monitor the extent to which their innovation projects are contributing to address a wider sustainable development challenge, compared to mission-oriented governmental agencies. Despite these differences, some of the recommendations stemming from mission-oriented innovation policy might resonate in transnational shared agendas.

Mission-oriented approaches promote the mapping *in the innovation chain* -research, concept/invention, early stage development, product development, production and marketing- of those actors that can contribute to the development and upscaling of transformative innovations, in order to coordinate their efforts; and coordination is also promoted across bottom-up innovation projects in order to develop synergies between them (Mazzucato, 2017, 2018). In parallel, structured approaches to experimentation and learning are developed, with roadmaps setting goals in different time scales; actors can thus learn from the implementation of the shared agenda, and adapt their innovation projects to take into account unforeseen events (Miedzinski et al., 2019). Such adaptation might be essential given the experimental character of the processes mediating between the generation of niche-level projects and their scaling-up into disruptive, transformative innovations (European Environment Agency, 2019). Finally, the involvement of *patient* financial institutions such as the EU-wide EIB or the KfW in Germany is to be promoted in order to guarantee capital investments that can withstand the uncertainties associated with transformative innovation projects (Mazzucato, 2017, 2018).

Additionally, transnational shared agendas can tap into the opportunities brought about by the practical implementation of mission-oriented innovation policy in multi-level governance settings such as the EU. Conceptually, the characteristics of the EU missions -calling for joint innovation projects involving stakeholders operating at different levels of government across the EU (Mazzucato, 2018)- suit the multi-level, and multi-stakeholder nature of transnational shared agendas. With the launch of Horizon Europe Missions (European Commission, 2021b, 2021a), bottom up multi-stakeholder coalitions such as those of shared agendas might thus be able to draw from the economic, human and organisational resources that will be channelled by the missions. For instance, in their development phase, the research and innovation projects promoted by shared agendas' networks can tap into mission project calls; later on, these coalitions might be able to attract patient capital from institutions such as the EIB to scale-up the innovations developed. Finally, the goals set by mission boards and -such as protecting a minimum of 30% of the EU's sea area, reducing by at least 50% plastic litter at sea, or eliminating greenhouse gas emissions from maritime economic activities in the EU by 2030 (European Commission, 2021b)- provide a benchmark against which the collective impact of the shared agenda can be measured.

In turn, mission-oriented innovation policy can benefit from the launch of transnational shared agenda coalitions. While the former can be seen as an innovation policy framework led top-down, the bottom-up nature of the latter promotes the participation of a broad range of stakeholders, across territorial scales and countries, in joint innovation projects. Thus, shared agenda coalitions facilitate the participatory, bottom up experimentation required for mission-oriented innovation policy to succeed.

As an approach inspired by transformative innovation policy, shared agendas also provide an arena where conflicts between stakeholders can be highlighted, and addressed (Fernández and Romagosa, 2020). By highlighting these conflicts, shared agendas can help illuminate those

obstacles that might prevent niche-level actors from developing and upscaling innovations, while also favouring consensus-building processes that can help niche-level actors marshall support (financial, material or otherwise) around their innovations.

Thus, the outcomes of transnational shared agendas coalitions can provide valuable information to the monitoring agencies in charge of overseeing the implementation of the mission, helping redirect policies -whether related to funding or regulation- to more adequately support the mission. Obstacles limiting the regime de-stabilising potential of transformative innovations might be more easily highlighted, and mission support actions can be redirected to help remove these impediments, supporting shared agendas' efforts to be consensu around scalable transformative innovations. In this way, RRI principles (Stilgoe et al., 2013; Fitjar et al, 2019) can be more easily imbued in the functioning of missions; in particular, missions can be more responsive to the conflicts highliglighted before.

Hence, the present analysis of the literature suggests that combining transnational shared agenda and mission-oriented innovation policy frameworks can increase both frameworks' ability to address sustainable development challenges. The key stems from the different approaches through which these frameworks promote multi-stakeholder, and multi-level innovation collaboration in transnational settings. While governmental agencies can set clear and measurable goals, and channel resources -patient capital, monitoring capacity- that guarantee learning and adaptation along the implementation of the mission, shared agenda coalitions reinforce the establishment of niches where experimentation with transformative innovations can be promoted. Additionally, shared agenda coalitions help overcome conflicts between stakeholders that might prevent the scaling up of niche-level innovations.

1.1.4. Governance models supporting mission oriented innovation and shared agendas

The concept of governance might be defined in different ways according to the area of study, the focus of analysis and the level or levels being analysed. Considering the concepts explained in the previous sections, the governance definition that will be used in this report takes into account the characteristics of transnational shared agendas and mission-oriented innovation policies for the promotion of a sustainable transition.

After defining the link between governance and the theories previously discussed (shared agendas, mission-oriented innovation policies…) this section continues a) explaining how a governance model is needed to promote collaboration among different stakeholders, b) to facilitate a multi-level cooperation, c) in a flexible manner due the high degree of complexity and d) to promote coalitions with a strong orientation towards SDG. The section concludes with the description of governance that will be considered in the development of this paper.

A basic definition of governance can be based on the five key characteristics that constitute the basis of contemporary understandings of governance defined by E. Grande (2012):

- Importance of non-hierarchical forms of decision-making, more agile and suitable for complex systems that are constantly and rapidly changing.
- Growing role of non-state actors, which provide resources, knowledge, skills, experience and openness for changes.

- Growing interdependencies between policy areas and societal subsystems, which allows the generation of sinergies and brings a more systemic thinking in framing and addressing challenges.
- Increasing complexity, strictly related with the increasing uncertainty and interdependencies among actors and challenges
- Increasing importance of coordination and cooperation, as part of the existing interdependencies and the possibility of generating synergies.

These five governance elements are present in mission-oriented innovation policies as well as in transnational shared agendas; they support these innovation frameworks in enhancing coordination and cooperation when addressing systemic, complex problems.

Shared agendas require a governance framework able to bring the different stakeholders that share the agenda to work together towards addressing the focal sustainable development challenge. Responding to this need, collaborative governance brings public and private stakeholders together in collective forums, bringing the public stakeholders to engage in a consensus-oriented decision making (Ansell, C. et al., 2008). Among the characteristics of a collective governance approach (ibid), there are some that show explicitly its suitability to complement shared agendas in the implementation phase of initiatives and activities, such as the leadership of the public sector or the engagement of non-state actors in decision making, beyond consultation.

Linking such governance models with innovation, collaborative innovation is being used to address complex issues and it requires a governance model based on relationships of trust, supported by technological tools and with a strong leadership and commitment towards well-established goals (Lopes, A. V. et al., 2022). Similar to shared agendas, collaborative innovation opens innovation to a large variety of stakeholders, taps the available resources for innovation across borders, overcomes cultural restrictions and creates socio-political support for public-led innovation (Bommert, B., 2010). In particular for the public sector, collaborative innovation offers three elements that respond to restrictive organisational and cultural aspects that tend to be present in public sector innovation (ibid): opens the innovation cycle to internal and external innovation assets; facilitates risk-taking to the public sector; and promotes a positive attitude towards public sector innovation and risk taking in the socio-political environment.

While collective governance emphasises the need for decision making by consensus among public and non-public stakeholders, promoting a shared arena where public and non-public entities interact, it does not specifically consider the existence of different levels that might lead to a more decentralised model, as it does the concept of multi-level governance. As defined by Katherine A. Daniell and Adrian Kay (2017), a multi-level governance model is a "...system of governance where there is a dispersion of authority upwards, downwards and sideways between levels of government – local, regional, national and supra-national – as well as across spheres and sectors, including states, markets and civil society." This approach is very much suited to the diversity of governance levels and policy frameworks operating in the Mediterranean.

While shared agendas require a governance model able to promote cooperation and definition around a common ground, mission oriented innovation policies need for a structured and flexible multi-level governance model able to address all the needs of multi-stakeholder collaboration, with higher degree of uncertainty, conflict and complexity (Janssen and Van der Voort, 2016). Innovation per se implies a certain degree of uncertainty towards the output of

innovation policies (which might imply the need for trial and error strategies) and it has to deal with the conflicts of interest among stakeholders, particularly between regime incumbents and emerging innovators (Geels, 2002). Moreover, contemporary missions are increasingly complex, since they intend to address challenges with social, as well as technological components (Janssen and Van der Voort, 2016).

The governance model used in mission oriented innovation policies will depend on how the challenge is being broken down into three dimensions: strategic orientation, policy coordination and policy implementation (Larrue, P., 2021). These three dimensions, summarised in figure 3, already provide a valuable framework for a governance model definition:

- **Strategic information**: selects specific societal challenge(s) and provides the guidance for collective policy intervention towards clear objectives.
- **Policy coordination**: it is based on the coordination of strategies and activities of the different stakeholders involved in the policy.
- **Policy implementation**: it ensures the consistency and effectiveness of the modes of intervention, as well as the resources allocation and the monitoring of the actions that will lead to the achievement of the policy objectives.

Figure 3: The three dimensions of MOIPs

Source: STIP Compass (https://stip-pp.oecd.org/moip/dimensions)

These three dimensions can be used to analyse existing mission oriented innovation policies but also to structure future ones, considering the three levels that are being used in order to provide the right framework in terms of strategic definition of the challenge and to coordinate the definition of the policies and their future implementation.

The last element being considered for the definition of the concept of governance used in this report is related to sustainability transitions. While the previous models are more focused on the structures that might lead to more cooperation or directionality, the transition element also implies the temporal dimension and a gradual change from a current situation to a more sustainable one. Policies for sustainability transitions usually have three main characteristics (Rauschmayer, F. et al., 2013): i) they are prescriptive with regard to dynamic societal processes, ii) linked to the normativity of sustainable development, iii) and are able to link the societal and the individual levels.

This implies the importance of considering sustainability not only at societal level, but also at individual or niche level. Going back to the multi-level perspective of change in socio-technical regimes (Geels, 2002), the need for a specific governance of niches becomes obvious; this implies a certain degree of freedom for experimentation as well as the ability to select those niches with the greatest potential for system transition. Hence, a governance model emerges, that should be able to support novelties and connect stakeholders while promoting alignment towards a new regime configuration. In practical terms, this is a model flexible enough to identify, encourage and support new solutions, even if they imply a change in the status quo.

Thus, based on the present discussion on governance models we can conclude defining the governance model as:

"An approach to governance that promotes cooperation and collaboration across multiple types of stakeholders at different levels of governance towards sustainability transitions through innovation; to do so, the governance model counts with the long-term support of stakeholders, a shared common agenda and co-defined mission, while being balanced between the necessary flexibility to promote experimentation and the structure that supports the consolidation of new solutions."

2. Methodology

The present study, which is the final deliverable of WP4, intends to propose a governance model for transformative innovation policy in the multi-level, and transnational context of the Mediterranean. To fulfil this goal, the study relies on a multiple case study methodology combining inductive and deductive aspects (Eisenhardt, 1989; Eisenhardt and Grabner, 2007; Gilbert, 2005), where common learnings from the implementation of the policy experiments methodology are unearthed by comparing the outcomes of implementing the four policy experiments. This identification of these common learnings is backed by the literature review carried out in the preceding chapter, and the shared insights gathered from an analysis of existing strategic governance arrangements and initiatives (see chapter 3). Departing from a range of dimensions extracted from the literature, the findings from the case study will extend their reach. Additionally, cross-case comparisons will help unearthing new dimensions hitherto not recognised by the literature.

This approach is most suited to the present study, since it enables to identify findings that are transferable to similar experimental policy engagements, despite contextual differences (Yin, 2014). The transferability of the research findings will be crucial, in turn, to devise a governance model that can promote collaboration on innovation addressing sustainable development challenges, between stakeholders *operating at different governance levels and countries* in the Mediterranean. The governance model should be robust enough to support stakeholders efforts' to address sustainable development challenges, despite differences in socio-economic and policy contexts in the basin.

The remainder of the chapter is organised as follows. The first part discusses how the literature review contributes to the theoretical foundations guiding the multiple case study; specifically, a set of principles are unearthed that should guide the design of the governance model. The second part advances how the comparative analysis of strategic governance frameworks and initiatives helps identify traits that could be taken into account along the design of the

governance model, based on a set of shared dimensions. Finally, the chapter concludes with an explanation of how the comparative case study approach chosen for the present study will help identify shared findings from the policy experiments that will feed into the development of the governance model.

2.1. Theoretical foundations guiding the multiple case study

The present study takes into account the theoretical foundations provided by the governance literature (Ciasullo, M.V. et al., 2020; Gertler, M. et al., 2004; Kallis, G. et al., 2009), as well as recent developments in the innovation policy literature. The following branches of the literature are thus taken into account:

- **Responsible Research and Innovation** (Fitjar et al., 2019; Stilgoe et al., 2013)
- **Transformative Innovation Policy** (Ghosh et al., 2021; Molas-Gallart et al., 2020; Schot et al., 2020; Schot and Steinmueller, 2018)
- **Mission-oriented approaches** (Larrue et al., 2021; Mazzucato, 2016, 2017; Miedzinski et al., 2019)
- **Shared Agendas** (Ariño and Fernández, 2021; Fernández and Romagosa, 2020; Fernández and Herrera, 2022; Marinelli et al., 2021)[2]

As part of a common move towards directionality in innovation policy (Schot and Steinmueller, 2018), all these contributions share the view that innovation should not be promoted simply for the sake of securing economic growth and competitiveness, but rather to address sustainable development challenges threatening the sustainability of human societies, and their ability to provide high standards of living without compromising the ecological limits of the planet.

Through different approaches, these strands of the innovation policy literature offer a conceptual framework pointing out the goals and principles that should be followed by a governance model intended to address sustainable development challenges. Additionally, they highlight tools that could be implemented in the development of such a governance model, taking into account that it will operate in a setting like the Mediterranean, where the coordination problems stemming from promoting multi-stakeholder collaboration on innovation are heightened by the multi-level and transnational nature of this setting.

Hence, the following dimensions emerge from the literature review, that will be taken into account in the identification of common outcomes through the case study comparison:

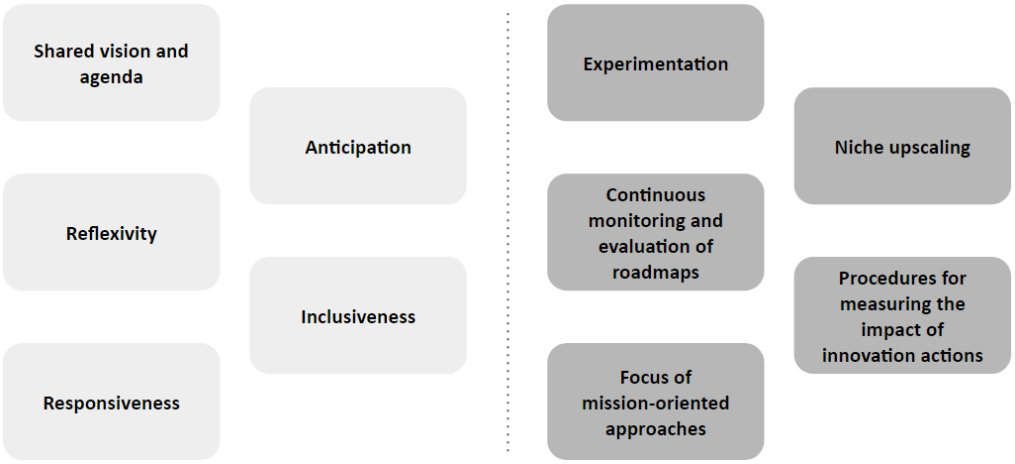
- **Shared vision and agenda**: Governance arrangements should promote a consensus across stakeholders on the (i) current state of art in connection with the challenge; (ii) the vision to be pursued to address the challenge; (iii) and the range of innovations that should be promoted to realise this vision.
- **Anticipation**: Governance arrangements should help multiple stakeholders anticipate the positive (and negative) outcomes of the innovations they pursue, within the sustainable development challenge they address but also beyond.

[2] The authors held meetings with key informants from the economic promotion area of the Catalan Government (PANORAMED WP Innovation), who suggested references on the Shared Agendas approach. The authors are grateful for the support provided by the key informants.

- **Reflexivity**: The positive (and negative) outcomes of the innovations pursued should be taken into account, since they affect the ability to address the focal sustainable development challenge.
- **Inclusiveness**: The involvement of a broad range of quadruple helix stakeholders from all over the Mediterranean, operating at different governance levels should be pursued.
- **Responsiveness**: Governance arrangements should be able to respond to criticisms on the impacts of the innovations they promote, and modify their actions accordingly.
- **Experimentation**: Governance arrangements provide spaces where multiple types of stakeholders can experiment with innovative solutions in order to test and adapt them to different contexts and governance levels, learning from the process.
- **Niche upscaling**: The resources available at different governance levels (financial, knowledge-related, policy-related or otherwise) should be tapped into, in order to promote the scaling up of local innovations with transformative potential.
- **Continuous monitoring and evaluation of roadmaps**: The evaluation of the innovation projects pursued should be seen as a continuous process, with milestones at the short, mid and long term enabling to alter previous courses of action. Particularly important is the contribution of monitoring systems to the identification and overcoming of obstacles to the upscaling of innovations.
- **Procedures for measuring the impact of innovation actions**: The evaluation of the innovation projects pursued should include indicators to measure the impact of the innovative actions carried out within the lifespan of the innovative projects, and afterwards.
- **Focus of mission-oriented approaches**: Mission-oriented innovation initiatives might follow, to different degrees, three different approaches, which are: i) Strategic orientation, focused around the selection of specific societal challenges; ii) Policy coordination, focused around the coordination of strategies and activities in different institutions; iii) Policy implementation, aimed at ensuring the consistency and effectiveness of the interventions mobilised to achieve policy objectives.

These dimensions are summarised in figure 4, below.

Figure 4: Dimensions of analysis: Characteristics and approaches



2.2. State of art in innovation governance: Comparative analysis of strategic governance initiatives and frameworks

These guiding principles will be taken into account in the next step of the multiple case study, where governance arrangements and frameworks are reviewed, with an eye on the development of the governance model to address complex sustainable development challenges in the Mediterranean. Following the inductive, multiple case study approach formulated at the beginning of chapter 2, the governance arrangements are analysed with an eye on the shared contributions they provide to the development of the governance model, on specific dimensions (see chapter 3).

Based on the multiple case study approach formulated above (Eisenhardt, 1989; Eisenhardt and Grabner, 2007; Gilbert, 2005), the goal at this step will be to identify common elements shared by the governance arrangements, along the selected dimensions. The fact that these elements are common to different governance arrangements suggests that they can be put in place to address different sustainable development challenges, despite differences in the context and purpose of the governance arrangement (Tsang, 2013), thereby being useful to the development of a governance model.

Indeed, two types of arrangements and frameworks have been taken into account in the multiple case study, with the aim of assessing how the governance model could operate within and outside the blue bioeconomy field. Such variation -indeed a *robustness test*- should enable the identification of elements that can support the effective functioning of a relatively broad range of governance arrangements:

- **Governance arrangements promoting multi-stakeholder collaboration on innovation**, in topics related to the Blue Bioeconomy: B-Blue, Blue Growth Community (BGC), Submariner Network.
    - These cases have been selected based on their contribution to the bottom up development of transnational innovation ecosystems related to the Blue Bioeconomy, in the Mediterranean or in other European basins as in the case of the Submariner Network. Including the latter provides further flexibility and learning opportunities to the category, taking into account the different context of the Mediterranean and Baltic basins.

- **Governance arrangements promoting multi-stakeholder collaboration on innovation**, without a specific focus on the Blue Bioeconomy: European Institute of Innovation and Technology (EIT) Knowledge and Innovation Communities (KICs), Green Growth Community (GGC), Prima Foundation, Vanguard Initiative.
    - Similarly to the previous subset, these cases provide different instruments on how to promote multi-stakeholder collaboration on innovation transnationally, often leading to the bottom up development of transnational innovation ecosystems. Additionally, their focus on problems and needs beyond the blue bioeconomy allows drawing findings on elements for the effective functioning of governance arrangements, that can be extrapolated outside such a field.

However, in order to ensure that the cases are similar enough in their context to facilitate comparisons (Tsang, 2013) the selected governance arrangements share the trait of being initiatives constructed bottom-up, i.e. emerged from the initiative of organisations and/or local and regional governments. Under this criteria, governance arrangements launched by national

governments are not taken into account; although their influence in promoting multi-stakeholder collaboration in the basin is fundamental, these are seen as initiatives launched top down. Hence, the processes taking place within these initiatives might hold notable differences compared to those of bottom up initiatives.

2.3. Comparative analysis of the WP4 policy experiments

The shared findings from the comparative analysis of existing governance initiatives and frameworks will, combined with the guiding principles extracted from the literature review, help identify the shared outcomes from the policy experiments. These were aimed at help multi-stakeholder networks address the following sustainable development challenges affecting the Mediterranean: Sustainable Aquaculture (led by ART-ER); Marine Macro Plastic pollution (CREDA); Invasive Alien Species (IFAPA); Digitalisation of the Blue Bioeconomy (Demokritos).

These differ in two main characteristics: i) the sustainable development challenge addressed in the policy experiment; ii) the specific approaches (i.e. workshop techniques) through which the policy experiment methodology was implemented. While taking into account these differences in context and how they might causally relate to the specific outcomes of the focal policy experiment, the case study methodology focuses on those outcomes that are common to the policy experiments compared. By doing so, findings are unearthed that are more likely to be transferable to future implementations of the policy experiment methodology, increasing the external validity of the case study (Yin, 2014). Thus, the case study approach chosen for the present document would be in-between that of a contextualised explanation, and theory building as defined by Tsang (2013).

3. State of art

This chapter aims at identifying and analysing the characterising elements of governance frameworks currently in operation, that can provide valuable knowledge in defining the governance model to address complex sustainable development challenges in the Mediterranean. The governance frameworks that have been analysed are mainly related to the Mediterranean scale and the blue bioeconomy, although additional projects are being considered due to their focus on innovation at the transnational level.

Following the multiple-case study approach advanced in the methodology chapter, the analysis departs from a range of dimensions extracted from the literature review (see section 3.1). These are further operationalised to be included in the comparative analysis:

- **Shared vision and agenda**: Extent to which the governance frameworks promote a consensus across stakeholders on the (i) current state of art in connection with the challenge; (ii) the vision to be pursued to address the challenge; (iii) and the range of innovations that should be promoted to realise this vision.
- **Anticipation**: Extent to which the positive (and negative) outcomes of future innovations are anticipated, within the sustainable development challenge they address but also beyond.
- **Reflexivity**: Extent to which the governance frameworks reflect about the positive (and negative) outcomes of the innovations already pursued, in connection with the sustainable development challenge.
- **Experimentation**: Extent to which governance arrangements provide spaces where multiple types of stakeholders can experiment with innovative solutions in order to test and adapt them to different contexts and governance levels.
- **Inclusiveness**: Extent to which the governance frameworks involve a broad range of quadruple helix stakeholders from all over the Mediterranean, operating at different governance levels. A methodology to identify, attract and involve stakeholders is expected here.
- **Responsiveness**: Extent to which the governance frameworks help stakeholders respond to criticisms on the impacts of the innovations they promote, and modify their actions accordingly.
- **Niche upscaling**: Extent to which the governance frameworks can facilitate access to resources available at different governance levels (financial, knowledge-related, policy-related or otherwise) to promote the scaling up of local innovations with transformative potential. Coordination and synergy development between the governance frameworks and existing networks and missions is expected here.
- **Continuous monitoring and evaluation of roadmaps**: Whether the governance frameworks foresee (and how) the establishment of monitoring systems, with milestones at the short, mid and long term enabling to alter previous courses of action (i.e. flexible roadmaps). Particularly important is the contribution of monitoring systems to the identification and overcoming of obstacles to the upscaling of innovations.
- **Procedures for measuring the impact of innovation actions**: Whether, and how the governance frameworks foresee indicators to measure the impact of the innovative actions carried out within the lifespan of the innovative projects, and afterwards (mid-long term).
- **Focus of mission-oriented approaches**: Extent to which the governance frameworks follow, to different degrees, three different approaches to mission orientation, which

are: i) Strategic orientation, focused around the selection of specific societal challenges; ii) Policy coordination, focused around the coordination of strategies and activities in different institutions; iii) Policy implementation, aimed at ensuring the consistency and effectiveness of the interventions mobilised to achieve policy objectives.

Considering the purpose of this report, the multiple case study approach followed, combining inductive and deductive traits, brings four main benefits:

- **Comparison among frameworks, identification of common traits useful to the design of an *adaptable* governance model**: By identifying elements common to a relatively broad range of governance frameworks, to is possible to identify elements for a governance model adaptable enough to promote multi-stakeholder collaboration in connection to different sustainable development challenges.
- **Critical view of the current state of art, context awareness**: By controlling for contextual differences across the case studies, excessive variation across cases is avoided, and the contextual specificity of the case studies are taken into account (Tsang, 2013).
- **Orientation to policy making, rapid identification of dimensions of interest**: the structure of the multiple case study aims to facilitate the usability of this report for policymakers. By comparing through key dimensions the elements of the governance arrangements, it is easier for policymakers to identify which elements could be useful to them when devising and implementing a governance model.
- **Identification of dimensions not recognised by the literature**. Inductive cross-case comparison enables to expand the reach of the literature with new dimensions, thereby reinforcing the utility of the findings for practitioners and scholars (Eisenhardt, 1989; Eisenhardt and Grabner, 2007; Gilbert, 2005).

Below, the shared findings from the cross-case comparison are discussed, based on the aforementioned dimensions.

3.1. Shared vision and agenda

Across the studied governance arrangements, it is common to observe a process whereby these have come up with a **shared understanding of the (i) current state of affairs in connection with the problems they address**; **(ii) the overall goals to be pursued when addressing the problems**, and **(iii) how –through which actions– should these goals be pursued**. It should be noted, however, that while some of the governance arrangements directly addressed problems linked to sustainable development challenges –EIT KICs, GGC, PRIMA Foundation, Submariner Network– in other governance arrangements the problems of interest were more closely related to an innovation for growth paradigm (Schot and Steinmueller, 2018). In the latter, the linkage to sustainable development challenges appears to be more indirect –B-Blue, BGC, Vanguard Initiative–.

Whether the problem of interest was related to a sustainable development challenge or not, the existence of a shared vision and agenda helped concentrate resources towards common goals in the governance arrangements. Under this approach, the problem of interest structured the sustainable development challenge or challenges of interest, from the structure of the organisation to resource allocation. This translation into the structure might be more or less

explicit, from being just part of the main goal to be achieved to having specific indicators that determine the performance in addressing the challenge.

Among governance arrangements explicitly addressing sustainable development challenges, a diversity of approaches to co-define a shared vision and agenda can be identified. In the case of the EIT KICs, those stakeholder communities that intend to become KICs have to co-design a proposal specifying the objectives and expected impact of the candidate KIC against other would-be communities, its business model, and a work plan as well as a structure. Hence, a shared agenda is in-built within the application process to become a KIC. Similarly, the Submariner Network's shared vision and agenda is strongly grounded around an assessment of obstacles and opportunities around marine resources as well as a participatory process in the Baltic region, with a roadmap with 2030 as the final milestone (Schultz-Zehden et al, 2021). Some of the goals in the shared agenda cover sustainable development challenges such as reducing climate change, increasing biodiversity, or addressing demographic change.

By design, the operations of the BGC and the GGC also respond to a shared vision and agenda logic, however as a capitalisation project the process of building, developing and adapting the shared agenda appears to acquire a more ex-post character. Hence, their efforts focus on identifying linkages across a community of modular projects, with an eye on highlighting the shared impact of these projects around common challenges. Within the GGC, the projects are aligned within thematic working groups, and a range of indicators measures the impact of the modular projects around shared dimensions, tightly linked to sustainable development challenges: (i) environmental sustainability; (ii) adoption of tools for sustainable production and consumption; (iii) green jobs and innovation activities; (iv) social inclusion; (v) green culture (CUEIM and UVic, 2021). As for the BGC, activities such as conference lectures, workshops are implemented to bring together the contribution of the modular projects, together with the writing of position and policy papers (Bocci et al., 2019).

In the case of PRIMA Foundation, it is interesting to highlight the approach in tackling sustainable development challenges together, being aware of the interconnectivity among them. Each of the three themes that PRIMA works with - water management, farming system, agri-food value chain - has a set of priorities and projects; at the same time, however, there is the WEFE (Water, energy, food and ecosystems) Nexus which considers the three themes together. In this way, potential synergies among stakeholders are developed, identifying shared benefits and trade-offs across WEFE sectors and reducing inter-sectoral tensions[3].

Finally, shared visions can also be implemented at different governance levels, and the multi-level nature of shared agendas should be taken into account in the development of the governance model. While most of the governance arrangements developed a *transnational* shared agenda, the B-Blue project relied on *regional* and *national* shared agendas: Within each of the blue biotechnology living labs launched within the project, a community of local key stakeholders addressed the needs and goals of the living lab as well as its action plan.

[3] More information: https://prima-med.org/what-we-do/nexus/

3.2. Anticipation

Among governance arrangements explicitly targeting sustainable development challenges within their shared vision and agenda, roadmaps include an **analysis of the potential impacts of the innovations pursued and their contribution to defined mission goals**, as in Miedzinski et al. (2019); nevertheless, these exercises tend to focus mostly on the positive impacts of the innovations, with limited attention to their negative side effects. This characteristic stands especially visible in the case of the Climate-KIC. As part of its strategic agenda for 2021-2027, an analysis was produced assessing the potential impacts of the innovations promoted by the KIC, and how they would contribute to the goals for the period (2021b). However, while a risk assessment was implemented on the obstacles that might prevent the projects supported by KIC from taking up, little attention was paid to the negative side effects that might stem from innovations. This limitation also appears to be visible in other governance arrangements that have carried out comprehensive exercises to foresee the impact of the innovations promoted, such as the GGC. Specifically, its list of indicators is fundamentally focused on positive impacts such as reduced use of raw materials or reduced CO2 emissions (CUEIM and UVic, 2021).

The lack of an explicit foresight of the negative impacts of the innovations promoted by the governance arrangements might also correlate with the lack of involvement of stakeholders with limited resources to influence the definition of research and innovation pathways. Recent research beyond the governance arrangements compared (Rosa et al., 2021) suggests that foresight exercises with a strong participatory component have been better able to gather a more balanced range of insights on what goals should be pursued, to increase the positive impacts of research and innovation, and decrease its negative impacts. This limitation leads to the dimensions of reflexivity and inclusiveness, below.

3.3. Reflexivity

Similarly to the previous dimension, **governance arrangements addressing sustainable development challenges within their shared vision and agenda reflect on impacts of innovation projects already carried out**, opening the door to the revision of the innovation projects promoted should they not fulfil the goals of the shared agenda. Hence, they devote resources to measure, and reflect on the impacts of the innovations they promote, much in line with the push towards directionality in the management of innovation systems, that has been argued for in the innovation policy literature. Being able to fulfil this reflexivity dimension is crucial, given the uncertainty associated with the impacts of innovation, and thereby the sustainable transitions promoted by the governance arrangements. In addition, reflexivity promotes a learning process that brings stakeholders to better adapt themselves and their common agenda, adding reaction capacity. Linking reflexivity with the previous element, this increasing learning can promote anticipation, since a proper study of the past, as well as the experience accumulated, can modify how the governance arrangement approaches uncertainty.

Such exercises are typically carried out together with the governance arrangements' efforts to anticipate the impacts of the innovations promoted, through the collection of key performance indicators (KPIs) related to the impact of their innovations. Given the internal diversity of the stakeholder coalitions involved in the governance arrangement, KPIs are fundamental in putting together otherwise fragmented information and aligning the efforts of the different parties in the governance arrangements; they provide a clear indication of what are the impact goals of

the governance arrangement, and the extent to which they are being reached. KPIs can be devised in connection to the global goals of the governance arrangement –see the reports of the Climate-KIC (Climate-KIC, 2021a), the GGC (CUEIM and UVic, 2021) and the PRIMA analytics platform of the PRIMA Foundation[4] for example–. KPIs can also be linked to more specific goals adjusted to the characteristics of the stakeholders involved as well as the working groups where they might participate, with examples such as those of the Submariner Network (Schultz-Zehden et al, 2021) and the B-Blue community (Charlène et al., 2020).

Although data availability allows for an easier impact of ongoing or completed innovation projects compared to anticipation exercises, they tend to face the same limitation as anticipation exercises. Limited resources appear to be devoted to analyse negative impacts that might have stemmed from the innovations supported by the governance arrangements. Such exercises might be carried out, but not explicitly enough to be identified in the comparative analysis; thereby it is unclear whether governance arrangements might be able to monitor the negative externalities that inevitably will stem from innovation, and take them into account. Doing so is essential in order to ensure that the losses stemming from transformative innovations are not blocked by those stakeholders losing from system transition (European Environment Agency, 2019).

3.4. Inclusiveness

The governance arrangements have deployed a **range of approaches to promote the involvement of quadruple helix stakeholders**. These techniques should ensure the inclusion of a broad range of actors in the co-design and implementation of innovations.

Some of these approaches might involve stakeholder engagement actions promoted by **national or regional living labs**, as in the case of the B-Blue project (Charlène et al., 2020). This approach can strengthen the applied character of the governance arrangement; this feature might be particularly attractive to stakeholders with relatively limited resources and a stronger need for rapid returns to participation, such as civil society organisations (Bruneel et al., 2016; Fernández-Guerrero, 2020). The stakeholders to be involved in the living labs were identified through a mapping exercise by each of the project partners; additional support in identifying stakeholders was provided by the project's communication channels as well as searches in specialised portals. Of particular interest was the identification of frontrunners –experienced stakeholders rooted in the local blue biotechnology value chain–. Given their experience and their interest in supporting other BBt actors, their bottom-up leadership might have been crucial in attracting other stakeholders.

Relatedly, national or regional living labs approaches carry with them an additional advantage: Living labs support the autonomous organisation of local stakeholder communities, and the adaptation of innovation projects to their interest, particularly if they emphasise stakeholder inclusion (Fernández and Herrera, 2022). Local stakeholders might thereby feel further empowered and motivated to participate. In the case of B-Blue (Charlène et al., 2020), multi-stakeholder “Sherpa Groups” were organised to provide advice to each of the living labs and

[4] This platform provides a control panel with figures and graphics that arrange information on the projects through multiple axis: per year, country, themes or projects: https://app.powerbi.com/view?r=eyJrIjoiZTIwOThjOTItNzE4NS00MDBkLTg0ZjItYjRlYzA0NzBjZTE2IiwidCI6IjdhNzM2ZDlkLWQ3NDMtNDVlMC1iMTk3LTRjYWM5NTNkMTI3YiIsImMiOjl9

attract further stakeholders through different formats, relying on the self-initiative of the members of each living lab. Some of the open innovation formats include hackathons, fab labs or competitions involving stakeholders with ideas on the same topic. According to the data available, the expectations of stakeholder participation initially formulated have well been surpassed with close to 300 stakeholders participating in 6 living labs[5]. However, it should be noted that certain types of stakeholders such as environmental organisations, administration, civil society and end users appear to have been underrepresented. Similarly, bottom-up definition of goals and activities appears to have also been crucial to the functioning of the BLUEfasma living labs, attracting stakeholders otherwise difficult to involve such as fishing communities (BLUEfasma project, 2022).

In parallel to territorialised approaches to stakeholder engagement, other initiatives might rely on different working groups, including:

- **Thematic working groups**, whereby members share specific knowledge on a concrete topic. For instance the Submariner network includes working groups in blue bioeconomy such as those focused on mussel aquaculture and macroalgae (Schultz-Zehden et al., 2021). Additionally, the structure of horizontal projects such as the BGC[6] and the GGC[7] entails that its modular projects operate as thematic working groups.
- **Policy oriented working groups**. In this case, the members are more diverse and provide different types of expertise to propose policies. These working groups provides thus stakeholders with an opportunity to influence how problems are framed in policy making, as well as the solutions proposed; an example of this approach would be that of the PRIMA Foundation, which is structured on different working groups with a specific policy purpose, as for example the farming system theme, which aims to promote the adaptation of agriculture to climate change[8].
- **Task oriented working groups**. This structure is focused on aggregating the stakeholders based on a specific task to be done, such as communication, funding, policy influencing, etc. It allows a higher specialisation in the outputs being produced and facilitates the distribution of competences. For instance, the Vanguard Initiative includes working groups on areas such as pilot project monitoring, policy influencing, co-funding and financing, or communications[9].

Different types of working groups may coexist within the same structure, at different governance levels. For instance, while most modular projects of the BGC operate as thematic working groups, some of them (e.g. BLUEfasma) are focused on territorial living labs (BLUEfasma project, 2022), providing an hybrid territorial-thematic nature to the community's working groups.

Besides working groups, the networking services provided by the governance arrangement secretariat might be crucial to engage a broader constituency of stakeholders, beyond those interested in participating in the arrangement's working groups. In the case of the Submariner

[5] In the closing event of the B-Blue project, it was disclosed that 284 organisations were involved in its living labs, well above an initial target of 120 stakeholders for 6 living labs. Of these organisations, 29 were Sherpa Group members and 96 frontrunners.

[6] More information: https://blue-growth.interreg-med.eu/

[7] More information: https://interregmedgreengrowth.eu/

[8] More information: https://prima-med.org/what-we-do/farming-system/

[9] More information: https://www.s3vanguardinitiative.eu/about/governance

Network, the activities of the secretariat are heavily devoted to services that might be of interest to stakeholders interested in being part of innovation project consortia, such as matchmaking activities or coaching services to access funding opportunities and set-up project consortia. Overall, the initiative relies on a broad network of more than 3,000 blue bio-economy actors to attract new members. This approach might lack territorial grounding compared to territorial living labs, however the emphasis of the initiative on setting pilot sites for the testing innovation might compensate for this limitation (Schultz-Zehden et al., 2021).

Usually, a relatively small number of less empowered stakeholders (e.g. SMEs and civil society organisations) tend to be involved, compared to stakeholders with more abundant resources – see also CUEIM and UVic (2021) for an example–. Such limitations might stem from the foundations of most of the project consortia supporting the governance arrangements. Due to the organisational commitment involved in being part of these project consortia, these stakeholders might have relatively little incentives to become involved, revealing a tension between the need for broad participation and effectiveness in the stakeholder networks that contribute to innovation co-creation (Fernández and Herrera, 2022). On the other hand, some of the participatory structures included here (e.g. BLUEfasma living labs) appear to have been successful in drawing the involvement of less empowered stakeholders (BLUEfasma project, 2022). Key to this success is the applied nature of the innovation projects co-developed in the living labs, whereby stakeholders could foresee rapid returns to their participation. Hence, the results suggest that a **skillful combination of territorialised approaches to stakeholder inclusion (e.g. living labs strongly grounded on local needs and demands) and non-territorialised approaches might succeed in drawing the participation of stakeholders with abundant and limited resources**, while also providing opportunities for the upscaling of innovations developed locally and regionally.

On a related note, recent research (Rosa et al., 2021) also points towards the utility of combining territorialised and non-territorialised approaches beyond the governance arrangements compared; by coordinating workshops at different governance levels, the involvement of citizens and stakeholders with limited resources can be incentivised locally, and feed into the research and innovation priorities defined at higher governance levels, in a way that is respectful of local priorities.

Additionally, the findings of Rosa et al. (2021) and the BLUEfasma project (2022) suggest that multi-level approaches to stakeholder inclusiveness can benefit from increased resources devoted to communication activities. Consistent communication efforts might help simplify a seemingly complex initiative such as the governance arrangements to stakeholders, particularly those with limited resources and a need for short-term returns to participation. Furthermore, their effectiveness might be increased when combined with territorial approaches as in the BLUEfasma living labs (2022).

Finally, how membership structures are defined also influences the extent to which the governance arrangements promote the inclusion of a broad range of stakeholders, while guaranteeing the financial stability of the arrangement. A solution to this conundrum emerges based on a tiered membership, whereby different stakeholders have different kinds of duties and benefits according to their membership. This solution has been implemented in the case of the Submariner Initiative[10], where new stakeholders are offered different advantages depending on whether they want to be involved as full or associate members. Without being necessarily

[10] More information here: https://www.submariner-network.eu/joinus

members, stakeholders might also collaborate with the initiative (e.g. co-create or sponsor selected activities) or make use of its services (e.g. access to databases, participation in matchmaking events), at the expense of less benefits. For instance, full members and associate members are prioritised in the selection of partners for project consortia applications.

3.5. Responsiveness

Based on the findings highlighted in the previous points, the results suggest that the **governance arrangements include procedures to ensure its ability to respond to emerging needs and criticisms along the process of design and implementation of innovations**. Monitoring procedures like the ones applied by the Climate-KIC (2021a), the Submariner Network (Schultz-Zehden et al., 2021) and the GGC (CUEIM and UVic, 2021) should provide governance arrangements with crucial data on the impact of innovations. Likewise, territorial participatory routines such as those of the B-Blue project, or transnational stakeholder engagement activities such as those of the Submariner Network should give voice to a relatively broad range of stakeholders. Furthermore, many of the governance arrangements (e.g. Submariner Network, Climate-KIC) have developed a shared agenda grounded on multi-stakeholder participation. Nevertheless, the results also highlight limitations to be addressed, should the responsiveness of the governance arrangements be increased.

As pointed out, the participation of resource-strained stakeholders should be supported, in order to include their views in the innovation process; often, these actors might provide inspiration for non-technological forms of innovation, expanding the transformative character of the innovations promoted by the governance arrangement.

Additionally, exercises assessing the ex-post and ex-ante impact of innovations should explore, and curtail any negative impacts. However, as seen in the analysis of the anticipation and reflexivity dimensions, it is unclear whether the governance arrangements devote enough resources to assess negative impacts stemming from the innovations promoted, as well as positive impacts. Nevertheless, the monitoring procedures implemented by governance arrangements such as those of the Climate-KIC and the GGC might be suited to fulfil this goal (see section 4.8).

3.6. Experimentation

Across the observed governance arrangements, it is common to implement **place-based approaches to promote experimentation with emerging innovations**. Multiple types of stakeholders collaborate in the design, implementation and testing of the focal innovations locally, previously to their scaling-up, doing so in one or a few sites. Through local experimentation, it is expected that user communities will have produced the inputs needed to assess the feasibility of the innovations.

The scale of these place-based experiments can vary notably across governance arrangements. Whereas the B-Blue project (Charlène et al., 2020) and the Submariner network (Schultz-Zehden et al., 2021) rely on regional pilot sites to test innovations, EIT KICs like the Climate-KIC promote experimentation through an EU-wide network of local innovation hubs based on sites such as research institutions (Climate-KIC, 2021a). The latter approach thus combines elements of local

experimentation with multi-level interactions; at the EU level, knowledge exchange is promoted across a network of local innovation hubs.

Similar to the other dimensions, it is also noteworthy the different emphasis that the governance arrangements assign to experimentation with transformative innovations. Whereas the aforementioned initiatives open the door to experimenting in their living labs and pilot sites with innovations of a relatively low TRL (below or equal to 5) aimed at addressing sustainable development challenges, the Vanguard Initiative pilot sites focus on a relatively high TRL (above 5) solutions, on a range of problems more strongly aligned to innovation for growth paradigms such as advanced manufacturing and bioeconomy. The partners involved in the hubs also vary accordingly; while civil society and environmental organisations might be more present in hubs such as those of the B-Blue project, this is less the case for innovation for growth-oriented hubs such as those of the Vanguard Initiative (Charlène et al., 2020).

3.7. Niche upscaling

The analysis of the observed governance arrangements has shown **how the coordination among actors at different governance levels has facilitated the access to resources (financial, staff, knowledge…) for the promotion of local innovations with transformative potential** (for example by increasing access to project calls or replicating the innovation in other settings). Tightly related to the previous blocks of inclusiveness and experimentation, niche upscaling entails that the network of actors involved in the governance arrangements provides the resources to identify, sustain and promote solutions developed at the local level, for example through living labs. Such support efforts are essential, to increase the likelihood that the innovations nurtured by the governance arrangement indeed contribute to socio-technical regimes' disruption and reconfiguration. Relatedly, the extent to which the governance arrangements combine territorialised and non-territorialised approaches to innovation co-creation might be key in defining research and innovation priorities at higher governance levels (Rosa et al., 2021), and thus the extent to which transformative innovations can be scaled-up.

This is the case of the Blue Living Labs promoted by BLUEfasma to empower the innovation capacity of SMEs, maritime clusters and networks in Med islands and coastal areas to support blue circular economy growth in fishing/aquaculture. These living labs are "based on a systematic user co-creation approach that integrates research and innovation processes and with a special focus on the co-creation, exploration, experimentation and evaluation of innovative ideas, scenarios, concepts and related technological artefacts in real-life use cases, to arrive at a circular economy model" (BLUEfasma project, 2022, p 1.). Through its communication activities as well as those of the broader BGC, BLUEfasma intends to promote the replication and scalability of niche-level, territorial innovations to higher governance levels. Other approaches might be those of the Climate-KIC network of local innovation hubs or deep demonstration sites across the EU (Climate-KIC, 2021a). The Climate-KIC demonstration sites are locations (e.g. cities, regions) where a broad range of innovations are tested, and evaluated; those innovations with high potential impact are further promoted to be scaled up. Furthermore, as a pan-European network, the Climate-KIC includes a range of assets that can support further scaling-up of transformative innovations, such as (Climate-KIC, 2021a, pp. 17-18): i) 13 colocation centres, which are the main physical sites of the governance arrangement and active network orchestrators; ii) 14 RIS (Regional Innovation Scheme) hubs, providing physical sites for the mobilisation of local stakeholders; iii) A large network of stakeholders

(about 200) of which 13% are large companies that can potentially support the scaling-up of innovations.

Because horizontal projects such as the BGC and the GGC are mainly focused on communicating the results of its member, modular projects to broader audiences, these communities constitute a key tool to increase access to resources and opportunities. The efforts of the BGC and the GGC focus on identifying linkages across a community of modular projects, with an eye on highlighting the shared impact of these projects around common challenges. Within the BGC, activities such as conference lectures and workshops are implemented to bring together the contribution of the modular projects, together with the writing of position and policy papers (Bocci et al., 2019); in the case of the GGC (2019) these activities were organised through thematic, cross-project working groups, facilitating the identification of scalable research and innovation outputs. Impact indicators coordinated by the project, furthermore, increase the capitalisation efforts of the community.

For both projects (Green Growth Community, 2019; Nunes and Guzzon, 2019) establishing alliances and collaboration arrangements with Mediterranean and EU institutions (UfM, EU DGs, Circular Economy Stakeholder Platform at the European Economic and Social Committee) has been identified as a crucial step in increasing the influence of its member projects. In other basins such as the Baltic basin, the Submariner Network has engaged in similar practices with its Blue Platform project, which intended to showcase the capabilities of the network and its outputs; events have been organised capitalising on the outputs of the network to influence higher-level policy developments in, among others, the Smart Specialisation Strategies, the EU Blue Bioeconomy Strategy, or the EMFF and ERDF operational programmes.

Indeed, the establishment of such alliances highlights the relevance of multi-level and transnational cooperation. Transnational organisations or networks play a crucial role in promoting cooperation and knowledge transfer, for example, the interregional cooperation projects between companies and knowledge institutes in a specific technology field or application domain promoted by Vanguard Initiative. The bridges set by governance arrangements such as the BGC and GGC enable linking the local/regional realities of niche-level experiments with actors operating at the national and transnational governance levels. Particularly relevant appears to be the connection that these governance levels provide to the Mediterranean and EU policy-making arena, potentially influencing the upcoming project funding calls.

Some drawbacks, however, have been identified that should be addressed to increase the effectiveness of these approaches: future horizontal project calls could strengthen the alignment of projects around common sustainable development challenges, with common indicators (Borut et al., 2020); additionally, the timeframe of these projects might still be excessively limited for the long-term processes mediating between the testing of niche-level innovations in settings such as living labs, and impacts at higher governance levels (e.g. policy influence, scaled up innovation projects).

3.8. Continuous monitoring and evaluation of roadmaps

The need for ensuring alignment among stakeholders and the coordination in the implementation of initiatives requires a structure of KPIs able to provide enough information to

the stakeholders involved in a governance arrangement. Especially in complex and transnational initiatives, where information might be highly fragmented, it might be necessary to have a common platform to concentrate data and at the same time make it accessible. Such a platform could in addition support the responsiveness and anticipation dimensions of the governance arrangement. An example of such a platform is the PRIMA General Analytics developed by PRIMA Foundation[11]. This platform provides a control panel with figures and graphics that arrange information through multiple axes: per year, country, themes or projects.

With the purpose of defining the actions to be taken in long-term projects and with a large number of stakeholders, some of the case studies analysed have defined a specific roadmap or action plan. **The roadmap specifies the actions to be taken, supporting the delegation of responsibilities along a timeline**[12]. Similar to KPIs, roadmaps are a powerful alignment tool in complex, multi-level initiatives like governance arrangements. To generate buy-in, they need to be co-designed with stakeholders as part of the process to build the governance arrangement (see *shared vision and agenda*), and they need to be supported by continuous monitoring and evaluation procedures ensuring the adaptation of the roadmap along the way. This flexibility is needed to fulfil the dimensions previously reviewed (particularly that of reflexivity), and to ensure that the roadmap is flexible enough to adapt to uncertain innovation processes like those behind system transition (European Environment Agency, 2019).

Among the governance arrangements compared, two examples stand out: The roadmap guiding the innovation projects of the Submariner Network until 2030 (Schultz-Zehden et al, 2021) and the Climate-KIC Strategic Agenda for the 2021-2027 period (2021).

Between its launch in 2015 and revision in 2021 (Schultz-Zehden et al, 2021), the Submariner roadmap comprised a range of strategic actions: (i) identification and marchaning of actors; ii) data and tools for environmental monitoring; iii) access to pilot sites and facilities; iv) technology development and transfer; v) regional energy solutions with marine resources; vi) introduction of ecosystem service payments; vii) unlocking financing for innovative uses of marine resources; viii) creating better legal and regulatory conditions; ix) creating public awareness of the benefits of sustainable blue products). For each of these strategic actions, the 2021 revision of the

[11] PRIMA General Analytics - Farming:
https://app.powerbi.com/view?r=eyJrIjoiZTIwOThjOTItNzE4NS00MDBkLTg0ZjItYjRlYzA0NzBjZTE2IiwidCI6IjdhNzM2ZDlkLWQ3NDMtNDVlMC1iMTk3LTRjYWM5NTNkMTI3YiIsImMiOjl9

[12] There are different mechanisms to define a roadmap, but multi-stakeholder involvement is essential along the process. The main steps to be followed could be summarised as follows (Matusiak, M. et al., 2020; Miedzinski et al., 2019):

- Assessment of the existing challenges, trends and innovation capacities
- Reflection of the current state of development or a baseline in connection with the problem to be addressed
- Shared long-term vision and strategic priorities
- Set of priorities and targets
- Explicit time horizon and timelines illustrating the process of getting to the vision; use of scales and intervals in the latter
- Presenting the transition towards the vision on various interrelated layers (e.g. product, sector or policy). The latter allows for anticipating and possibly managing the factors that may enable or hamper the transition process
- Deliberation and appraisal of alternative pathways
- Action plan with concrete decisions, commitments and implementation arrangements
- Monitoring and evaluation framework

strategy evaluated the degree of completion of the related Submariner projects, and proposed a revision of these strategic actions, with new strategic actions to be implemented the following areas, as part of its vision until 2030 (see *Shared Vision and Agenda*): i) Ocean literacy; ii) restore biodiversity and ecosystem services; iii) the role of the baltic blue bioeconomy in climate change reduction and mitigation.

The Climate-KIC Strategic Agenda (2021) includes a range of measurable goals connected with the sustainable development challenge of addressing climate change, to be fulfilled by 2027. These are: i) Helping Europe avoid over 500 million tons (CO2eq) of emissions; ii) strengthening the resilience of 10 million people to the impacts of climate change; iii) leveraging over 100 billion € to scale-up innovations to tackle climate change; iv) generating 50,000 green jobs. The Agenda foresees a range of mechanisms to fulfil the goals, as well as milestones for 2024. Importantly, different data sources are foreseen to monitor the degree of fulfilment of the milestones, as well as annual KPI targets. Furthermore, the Agenda includes a risk assessment exercise where actions are foreseen to address risks that might derail the projects supported by the Climate-KIC.

Although less structured, the case of the GGC might also be highlighted here. Although the governance arrangement does not foresee a clear-cut roadmap as in the Submariner Network and the Climate-KIC, its efforts in coordinating a range of common indicators for assessing the impact of innovation projects are noteworthy (see *Shared Vision and Agenda*). Importantly, they would enable assessing the degree to which shared goals are being achieved, allowing the reorientation of the governance arrangement against new priorities.

3.9. Focus of mission-oriented approaches

Categorising the analysed reference governance arrangements using the three different approaches to mission orientation will provide a valuable insight towards what are the common characteristics of governance arrangements, in connection with their orientation towards missions to address sustainable development challenges. The three dimensions being considered are: i) Strategic orientation, focused around the selection of specific societal challenges; ii) Policy coordination, focused around the coordination of strategies and activities in different institutions; iii) Policy implementation, aimed at ensuring the consistency and effectiveness of the interventions mobilised to achieve policy objectives.

i) Strategic orientation

This dimension includes **governance models that select specific societal challenge(s) and provides the guidance for collective policy intervention towards clear objectives**. It can be easily linked with decision-making bodies where different stakeholders cooperate in the definition of the strategy to be followed and the validation of initiatives implementing the strategy. It is especially relevant to consider this category in organisations that have a General Assembly where different stakeholders can participate and such participation legitimate the decisions taken (Larrue, P., 2021). This is the case of the Vanguard Initiative, where a General Assembly gathers the senior officials of each member region in a High-Level Directors' Meeting to secure the operational commitment of the members to the Action Plan agreed at the Annual

Political Meeting[13]. Already this yearly meeting is a necessary element for a well-articulated governance model, with specific goals and timelines.

ii) Policy coordination

The **policy coordination dimension is responsible for achieving the mission and its breadth and complexity might increase with the number of policy fields and governance levels covered**. This coordination dimension aims at facilitating the alignment between actors implementing initiatives, considering all the potential structures. Amongst the cases analysed, there are two main situations. In one of them, all the members of a governance arrangement organise themselves in working groups, coordinating actors at regional or transnational level in a decentralised manner. This is the case of the BGC, where a horizontal project consortium communicates the activities of the member projects, and promotes a form of loose coordination in which the individual projects learn from each other. The other situation makes reference to a more centralised approach, where a support body is responsible for coordinating and promoting initiatives. For example, in the case of Submariner Network (Schultz-Zehden et al, 2021) a strong Secretariat promotes cooperation through promotion of competences, access and set-up of project consortia and in general giving support to the projects elaborated or launched by members.

These dimensions might increase in complexity if there are members with different roles within the organisation or there are potential and complementary interactions. For example an advisory board with experienced members such as the B-Blue project Sherpa Groups could be involved by request (Auregan, C. et al., 2020).

iii) Policy implementation

The implementation dimension is focused on ensuring the consistency and effectiveness of the modes of intervention, as well as the resources allocation and the monitoring of the actions that will lead to the achievement of the policy objectives. It is based on how stakeholders effectively work together to bring forward initiatives working together. Among the governance arrangements, this dimension can be easily linked to the approaches already explained in the inclusiveness dimensions. Similar to the policy coordination dimension, in this case, the implementation becomes more complex based on the characteristics of the stakeholders of the project. Considering the quadruple helix approach and the aim of achieving a trans-mediterranean cooperation, the implementation level will require the proper communication and monitoring tools in order to guarantee that the work being developed is aligned with the strategy.

These three dimensions to analyse mission-oriented innovation policies represent a valuable framework of analysis, providing insight for the analysis of existing governance arrangements as well as adding key aspects to keep in mind when building or promoting a new one.

3.10. Discussion

To conclude the state of the art, this last section reflects upon the common elements of the governance arrangements that have been analysed and extracts some lessons that will provide valuable insights for the definition of a governance arrangement. These lessons are the result of

[13] https://www.s3vanguardinitiative.eu/about/governance

the inductive analysis of the previous 9 dimensions, following a specific data gathering structure based on comparative analysis and aggregation (Gioia, D. A. et al., 2013): After extracting the findings of each dimension and identifying elements in common, aggregated dimensions have been generated.

The approach followed in the present chapter provides rigour and transparency to the process of extracting lessons useful to the development of future governance arrangements, based on the comparative analysis of the governance arrangements. This rigour and transparency facilitates, in turn, the replicability of the comparative analysis.

Below, the four aggregated dimensions emerging from the comparative analysis are discussed, together with the learnings stemming from them. These dimensions are i) Inclusive, and responsive shared visions; ii) Roadmaps as a tool for anticipation and reflexivity; iii) Experimenting and niche upscaling; iv) Focus of mission orientation.

3.10.1. Inclusive, and responsive shared visions

One of the main elements for building a cohesive governance arrangement able to address sustainable development challenges and concentrating resources towards common solutions is the definition of a shared vision and agenda. These agendas can determine future governance arrangements depending on their role in defining and establishing collaboration and commitments among the stakeholders involved. In some cases, shared agendas have determined the generation of a network of stakeholders and the goals to be pursued by the governance arrangement; in others, the shared agenda is more focused on identifying and overcoming common obstacles, and in other ones the shared agenda links different challenges to be addressed with common solutions. Therefore, there is a strong link between the definition of shared agenda and the structure of a governance arrangement.

A common thread can be identified between the definition of a shared vision and agenda (discussing the process from the current state of affairs in connection with a sustainable development challenge, to the actions to be pursued to address the challenge and realise a shared vision for the future), and the criteria followed by the actions that should implement the shared vision and agenda. Specifically, the implementation of the shared agenda is based on participatory methodologies ensuring multi-stakeholder inclusion and the responsiveness of the shared agenda to stakeholder needs. Such methodologies are essential to preserve the participatory character of the shared vision and agenda, and ensure its adaptation to changes in the challenge landscape.

A strong participation in the definition of a shared vision and agendas will increase the sense of ownership of the stakeholders and facilitate the definition of goals to be achieved and initiatives to be promoted. Specifically, a balance should be found between the participation of a broad stakeholder constituency and efficiency in decision making, keeping in mind that a shared agenda will facilitate future collaboration and therefore justify a more comprehensive initial participatory process. In further stages, participation might be more flexible, with different modes of stakeholder engagement based on the characteristics of the governance model (ex. rapid returns to participation, long-term commitment,...). Such flexibility might represent a key element in guaranteeing different degrees of commitment, balancing inclusiveness with effectiveness in the governance arrangement's ability to promote innovation collaboration, and

in turn increasing its responsiveness to unforeseen events (e.g. unexpected impacts of the innovations promoted, whether negative or positive).

To unleash the real potential of shared agendas in bringing together stakeholders to work together, there should also be the right balance of representativeness of different realities in terms of geographical representation, quadruple helix category and government level. Depending on the scope and the means available to propose a solution, there might be some groups more represented than others, although it is important to be aware of such distribution in case it is necessary to address such imbalances.

Additionally, the shared agendas should take into account the strengths of different governance levels: while the regional/local governance level might promote exchange of local knowledge, expertise and networks, the national and transnational levels might facilitate knowledge transfer and access to the resources needed to diffuse innovations. There is potential for an iterative process among agendas at different scales, having a transnational shared agenda that considers local contexts and opportunities and a regional shared agenda which takes inspiration in the global challenges that have been addressed by transnational shared agendas.

Overview of lessons learned:

- Foresight exercises with a strong participatory component have been better able to gather a more balanced range of insights on what goals should be pursued as part of the shared vision and agenda, to increase the positive impacts of research and innovation, while decreasing its negative impacts.
- The multi-level nature of shared agendas should be taken into account in the development of the governance model, ensuring the inclusion of stakeholders operating at different governance levels and with different expertise to define the shared agenda. Thereby, territorial and non-territorial approaches to multi-stakeholder participation should be implemented, ensuring the involvement of a broad stakeholder constituency.
- Related to the previous point, governance arrangements' shared vision and agenda should take into account innovations emerging in different domains (policy, technology, business models, social practices...), and at different governance levels (regional, national or transnational).
- Governance arrangements should take into account the different incentives of actors to participate (ex. rapid returns to participation, long-term commitment,...), providing different opportunities for the participation of different stakeholders: A skillful combination of territorialised approaches to stakeholder inclusion (e.g. living labs strongly grounded on local needs and demands) and non-territorialised approaches might succeed in drawing the participation of stakeholders with abundant and limited resources, while also providing opportunities for the upscaling of innovations developed locally and regionally.
- It is also necessary to recognise the tension between i) the need for broad stakeholder participation, and ii) the need for foreseeable returns to innovation co-creation. Accordingly, governance arrangements should provide spaces for stakeholder participation suited to these two different needs.

3.10.2. Roadmaps as a tool for anticipation and reflexivity

The definition of a shared agenda is usually complemented with a roadmap that defines the implementation details for achieving a common goal in a specific period of time, such as phases, responsibilities, indicators and targets… Similarly to shared agendas, roadmaps should also be based on multi-stakeholder consensus, being a powerful alignment tool in complex, multi-level initiatives.

Within roadmaps, the definition of working groups allows to distribute the responsibilities of achieving certain goals across groups of agents. In fact, the working groups structure should be defined based on the goals to be achieved, distributing competences based on stakeholders characteristics and availability. Like in the previous section, participation should be promoted aiming for the right balance between effectiveness and representativeness. Specifically, the governance arrangement should be open enough to allow stakeholders to get involved at different degrees at different stages (eg. project ideation, project implementation,...),ensuring in the process the involvement of all the relevant stakeholders.

Roadmaps usually define a system of indicators and targets (that is, KPIs) that provide information about the status of the project, its evolution and the need of adjustments if necessary. Strong KPIs not only inform, but increase transparency and coordination across stakeholders. KPIs need to be clear, understandable and as exhaustive as possible in order to facilitate decision making.

A continuous monitoring of KPIs will provide the right inputs for anticipation, which needs to be complemented with stakeholders participation for a better foresight. Indeed, the definition of future scenarios here becomes a powerful tool to account both for the positive and negative future outcomes of the innovations supported by the governance arrangement. Furthermore, the insights gathered through foresight exercises should also help governance arrangements learn, and reflect on the impacts of the innovations they promote.

Overview of lessons learned:

- Roadmaps, together with KPIs condensing multiple sources of information into manageable indicators, help to anticipate the impacts of innovations, and provide clear indication for the goals that should be pursued by the governance arrangement at different points in time.
- A carefully designed roadmap supports ongoing monitoring efforts, helping stakeholders reflect on the desired, and undesired impacts of the innovations pursued. Overall, this adds reaction capacity to the governance arrangement.
- Emphasis should be placed on the anticipation and on-going realisation of the negative impacts of innovations, to be able to adapt roadmaps (and manage them realistically).

3.10.3. Experimenting and niche upscaling

A governance arrangement should also promote evolution and adaptation to new circumstances, while its roadmap is being implemented. KPIs per se can already show the need for changes, but in the long run, they will also represent a valuable learning source if combined with the proper connection between actions and final outcomes. Indeed, a constant exercise of self-analysis will promote a learning process that will support both anticipation and adaptation.

Having in mind the purpose of achieving sustainable solutions by promoting transformative innovation, governance arrangements should be flexible enough to leave space for experimentation. Such innovation within governance arrangements implies a multi-level governance able to promote a high degree of flexibility at certain levels, supporting new ways of collaboration, the entry of new stakeholders, a lower risk aversion, and so on. Specifically, the governance arrangement needs to connect local and regional experiments with potentially transformative innovations, with the resources available at national and transnational governance levels.

Indeed, scaling-up local niches is the best example to show how important it is to have a multi-level governance arrangement. Experimentation in local niches needs to be supported by macro-level trends in order to transform a socio-technical regime. A skillful combination of territorialised approaches to stakeholder inclusion (e.g. living labs strongly grounded on local needs and demands) and non-territorialised approaches might succeed in drawing the participation of stakeholders with abundant and limited resources, while also providing opportunities for the upscaling of innovations developed locally and regionally. Specifically, place-based approaches such as living labs are used to enable multi-stakeholder experimentation with innovations in real-life settings. Innovations are later on diffused through a diverse array of tools, including networks enabling the adaptation of innovations to other settings than the original test site; large interregional demonstration projects, or influence to multi-level policy fora.

Overview of lessons learned:

- A skillful combination of territorialised approaches to stakeholder inclusion and non-territorialised approaches might succeed in drawing the participation of stakeholders while also providing opportunities for the upscaling of innovations developed locally and regionally.
- Stakeholder networks are crucial to increase access to resources and opportunities for the diffusion of innovations emerging locally.
- Transnational organisations or networks play a crucial role in promoting cooperation and knowledge transfer, as well as influencing the policy environment in ways that can facilitate the diffusion of innovations (e.g. more homogeneous regulatory frameworks). They can also be a source of finance for the niche upscaling. Governance arrangements should thus tightly involve such transnational actors.

3.10.4. Focus of mission orientation

The last lesson being extracted is related to how the governance arrangements have operationalised the concept of mission-oriented innovation policies. Specifically, two approaches to mission-oriented innovation policy are proposed based on the literature (Larrue et al., 2021): strategic orientation and policy coordination.

The governance arrangements analysed combine the first two approaches, not appearing to opt for the third one. The strategic orientation approach includes governance models that select specific societal challenge(s) and define a strategy or roadmap to address them, validating those initiatives that should implement the strategy. An example of this approach would be visible in the Vanguard Initiative. The policy coordination approach focuses on policy coordination, specifically in regards to the actions needed to implement the strategy or roadmap, with

procedures to facilitate the alignment between actors implementing the initiatives. To ensure coordination, the governance arrangement might combine (a) working group-based coordination (BGC) or (b) centralised promotion and coordination of initiatives by the secretariat (Submariner Network).

Overview of lessons learned:

- The approaches to mission-oriented innovation policy relate to different approaches to multi-stakeholder coordination that should be incorporated by governance arrangements. Incorporating these approaches effectively can also contribute to the governance arrangement's ability to address the inclusiveness, anticipation, reflexivity and responsiveness dimensions.
- Given that the goals of the governance arrangements concern innovation collaboration to address societal challenges rather than policy implementation per se, those dimensions that stand out are those of (i) strategic orientation and (ii) policy coordination. A combination of territorial communities (e.g. living labs), thematic working groups and central decision-making and implementation bodies would ensure multi-level and transnational participation in both dimensions. A few examples are provided below:

    i) Strategic orientation: Central decision-making bodies would be crucial to the identification and prioritisation of those challenges that would be the focus of the governance arrangement, and its roadmap; it is equally important that the stakeholders participating in this bodies are present at different governance levels and countries; in this way the inclusiveness and anticipation dimensions are in the design of the roadmap.

    ii) Policy coordination: It is advisable that the bodies in charge of implementing the shared agenda are supported by thematic working groups as well as territorial communities, such as the multi-stakeholder networks collaborating within living labs. Such contributions should ensure not only the involvement of the quadruple helix in the coordination of innovation initiatives, but the involvement of stakeholders operating at different countries and governance levels. Furthermore, the inputs provided by the thematic working groups and territorial communities can also help the technical office in the task of highlighting potential modifications of the roadmap, reinforcing the responsiveness and reflexivity dimensions of the governance arrangement.

Following inductive approaches, the present chapter has carried out a comparative analysis of the *state of art* governance arrangements. In this way, the chapter has enriched the analytical dimensions extracted from the literature on the governance of innovation, narrowing them down to a range of dimensions that will support the comparative analysis of the policy experiments.

4. Lessons from the policy experiments

The last input that will be considered for the purpose of this document is based on the results of the 4 policy experiments that have been developed within the Blue Bio Med project. In this chapter, each policy experiment will be analysed, paying attention to the elements that can be suitable for the construction of a governance arrangement. The policy experiments will be shortly described and then will be analysed using the literature about transformative innovation and governance models and the dimensions of analysis used for the state of art.

The comparative approach applied is similar to the one used in the previous chapter; hence the dimensions gathered from the literature have been combined with those obtained inductively through comparing the approaches pursued by the policy experiments. For further information on how this approach was implemented, Annex I includes tables describing, and comparing how the policy experiments implemented each of the dimensions, and how did the policy experiment contribute to implement the dimension.

4.1. Policy experiments

4.1.1. Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean

Description

CREDA has coordinated the implementation of a policy experiment methodology, **systems mapping**, to help address the sustainable development challenge of Macro-Plastic Pollution in the Mediterranean.

Framing question

What kind of approaches –related to innovation in the policy, social, business or technology domains– are needed to turn the tide, in macro-plastic waste recovery and recycling?

Methodology

The implementation of the policy experiment consisted of three multi-actor workshops involving stakeholders from the Euro-Mediterranean basin to address the challenge of Macro-Plastic Pollution in the Mediterranean.

In order to fulfil these objectives, the experiment pursued the following steps:

1. **Delimitation of the challenge and definition of a common frame for the policy experiment.**
2. **Identification of the relevant stakeholders to be engaged in the workshops.**
3. **Design and implementation of the workshops; definition of a portfolio of actions to address the challenge.**

A systems mapping methodology was implemented together with the consultancy Reimagined Futures (RIF)[14], specialised in the design of workshop methodologies to address complex, systemic problems; and the economic promotion area of the Catalan Government.

Goals

The policy experiment methodology was aimed at fulfilling the following goals:

A. **Stimulating an open discussion among MED key actors** around the value added of a transformative innovation policy approach to address common challenges.
B. **Connecting stakeholders from the quadruple helix and from different MED regions and countries** wanting to work together on the challenge with a transformative approach.
C. **Collecting inputs for the further development of a governance model** to implement transformative innovation policies across the Mediterranean.

Results

Desk research and interviews allowed to define a first version of the system map around the challenge of marine Plastic Pollution. Two workshops with quadruple helix stakeholders (one with stakeholders operating in Catalonia, the second with stakeholders from all over the Mediterranean) allowed to refine the map and identify the 7 leverage points, i.e. areas of the map where the relationships between factors suggest that it is possible to trigger change in the system, with relatively limited effort. Through an online vote, these stakeholders prioritised 4 leverage points. The selected leverage points were:

- **Citizen Awareness and Education on Sustainability Issues**
- **Research and Innovation on Marine Plastic Pollution**
- **Public Policies and the Co-Creation and Participation of Stakeholders in Design**
- **Incentives for Research, Innovation and Tech Leading to More Business-Driven Technology and Innovation on Marine Plastic**

In a final workshop with stakeholders from all over the Mediterranean, ideas for innovation actions were developed based on the leverage points. Specifically, key activities, resources and partners were considered, as well as funding streams, impact assessment measures and risks.

In total, 36 organisations participated in the process: 30 of them had their main premises in Italy, Montenegro, Portugal, Slovenia and Spain, whereas the remainder were transnational organisations with premises in different locations in the Mediterranean[15]. It should be noted that, compared to governmental actors and research institutions, a smaller number of civil society organisations and large companies participated[16]. The experiment results suggest that for the former resources were too limited to fully participate in the policy experiment workshops; for the latter, the returns to participation in the experiment might have been too uncertain to be fully committed to the process. To address these limitations, improvements

[14] More information: https://www.reimaginedfutures.org/

[15] Of these organisations, 23 participated in both of the workshops with stakeholders from all over the Mediterranean.

[16] The participants included 12 governmental organisations, 10 universities and research institutions, 10 businesses and 4 civil society actors (from the businesses, only 2 were large corporations).

were suggested for instance in the definition of the policy experiment's scope and in the way the returns to participation are conveyed to these types of stakeholders[17].

Additionally, further workshops to continue co-developing the innovations could be considered, taking into account participants' responses to the feedback surveys launched after the workshops. Although participants saw in system mapping a useful approach to comprehend and address sustainable development challenges, there was the perception that more time was needed to unfold the ideas for innovation actions ideated in the third workshop.

More information about the policy experiment is available on the interim report on the challenge, in the appendix.

4.1.2. Innovation in Sustainable Aquaculture

Description

The implementation of the policy experiment was developed by ART-ER through a series of online **multi-actor workshops involving stakeholders mainly from the Euro-Mediterranean basin** to address a pre-defined systemic challenge related to sustainable development from the MED perspective gravitating around the main challenge of Sustainable Aquaculture in the Mediterranean.

Framing question

How can different **technology/social/business/policy-related innovations be proposed, developed/tested and spread through an interregional and transnational cooperation**, to tackle the s**ystemic challenge of Sustainable Aquaculture in the Mediterranean** in front of a growing global demand for food?

Methodology

The challenge was tackled by applying the methodology of the multi-stakeholder 'Design Tribe' workshop where participants from different organisations work on complex challenges - involving technological, business, social and policy-related aspects, which are mutually interrelated - aiming at developing multi-faceted solutions.

The working methodology, based on Design Thinking and Open Innovation, pivots on 3 key factors:

1) **Parallel work**

The facilitation method that allows many people to work in parallel sessions, sharing information and points of view and developing a common vision and potential solutions from different points of view, thus promoting speed, rigour and completeness.

2) **Fast Interactions**

Any solution can improve when subjected to rigorous testing, commenting and reworking. The possibility of multiple iterations of the work allows groups to engage in detailed design, knowing that they can later step back to apply their own critical judgement and new points of view, before diving back into the work to refine and improve it.

3) **Acceleration**

[17] Finally, the complexity and length of the processes required to involve transnational organisations entailed that they could only be involved in the last of the workshops.

The approach based on the Scan-Focus-Act sequence allows participants to overcome and enhance diversity to arrive at a deep exploration of the challenges to be addressed and the design of an Open Innovation model.

Goals

The policy experiment methodology was aimed at fulfilling the following goals:

A. **Create a common language**, an even level of knowledge, shared understanding and vision, among participants, regarding Sustainable Aquaculture in the Mediterranean
B. **Develop a shared vision** on 4 key aspects: Governance, Environment, Social and Economics
C. **Facilitate a dialogue on Innovation in Sustainable Aquaculture** from the perspective of 3 innovation levers (Technical Innovation; Innovation Governance (innovation through cooperation); Knowledge-related innovation)
D. **Create new networks** with participants interested in developing projects in the future

Results

The workshops, though focussed on the challenge of Sustainable Aquaculture, contributed to the broader attempt to define governance models and methodologies to support the creation of an innovation alliance for sustainable blue bioeconomy among Mediterranean stakeholders aimed at better seizing the opportunities of the new programming cycle.

Connected to this broader purpose, but also valid for the specific context of Sustainable Aquaculture, the policy experiment had 3 main high-level goals:

1. **Stimulating an open discussion among MED key actors** around the added value of a transformative innovation policy approach to address common challenges;
2. **Collecting inputs for the further development of a governance model** to implement transformative innovation policies across the Mediterranean;
3. **Connecting stakeholders from the quadruple helix and from different MED regions and countries** wanting to work together on the challenge with a transformative approach.

Concerning **Goal 1**, the workshop adopted a methodology aimed at triggering an open discussion among participants. The discussion was not on the concept of transformative innovation policy per se but about elements that could lead to a transformation in the aquaculture value chain. **Goal 2** relates to inputs for the development of governance models and other enabling elements to transformative innovation. These were widely examined in workshop 1 during the World Cafè session and in workshop 2 when two working groups were devoted to, respectively, forms of cooperation and knowledge, as potential levers of change to lead to transformative innovation. Furthermore, it is possible to say that one of **the outcomes of the experiment has also been the creation of a community culture**. Finally, Goal 3 was tackled and fulfilled across all of the workshops. Participants were randomly grouped to increase the interactions and their names and email addresses were circulated after the workshops for further exchanges.

In regards to the characteristics of the participants, overall there were a total of 53 participants from 44 organisations engaged in the experiment by participating in 1 or more of the workshops. Among them, there was high representativeness of research centres and public stakeholders (56% and 21% of the total respectively). There is also a high representativeness of Italian and

Spanish actors (35% and 32% respectively). Such imbalances suggest the need to attract stakeholders from the business sector and civil society as well as a more distributed national distribution in order to achieve a truly mediterranean participation. It is worthy to mention how some participants suggested that further workshops would be required to develop the innovative ideas, highlighting the need to keep working together to obtain more tangible solutions.

More specifically regarding the challenge of Sustainable Aquaculture, some key outcomes are:

- **Reaching a common understanding of what are the needs, gaps, optimal approaches, desired benefits regarding the challenge.**
- The **creation of a community culture**, a way of working together, and the awareness of it, by participants.
- T**he architecture of a potential collaborative framework** on which the community reached a consensus, consolidating a first stepping stone for the construction of the MED Blue Bioeconomy Innovation Alliance.
- The **identification of the needs to be fulfilled** in order to move towards an integrated multi-trophic aquaculture (IMTA) model, i.e. an innovative way of performing Sustainable Aquaculture.

More information about the policy experiment is available on the interim report on the challenge, in the appendix.

4.1.3. Digitalization of Blue-bioeconomy

Description

The fourth policy experiment focuses on the i**dentification of problems, initiatives and suggestions of potential solutions that relate in the digitalization of Blue Bioeconomy.** The policy experiment will examine the challenge taking into consideration i) Education and ii) Entrepreneurial aspects, as well as iii) aspects related to collaboration between industries and research organisations.

Framing question

Can digital technologies contribute to the development of innovation methodologies for the business, technology, policy entrepreneurship and education domain in the blue bio economy?

This framing question has been further broken down into three blocks of analysis mentioned in the description of the policy experiment.

Methodology

The methodology followed in this experiment Can be summarised in the following steps:

First step - Shared frame

1. **Delimiting the challenge** in the territory.
2. **Identifying the key actors** committed to change and establishing an initial advocacy group.
3. **Co-developing a shared future vision**.

4. **Co-developing a shared vision of the current situation**, the problems and their causes. - Identifying the opportunities (leverage points in the system) on which action is possible and leverage hypotheses that are expected to break the barriers and dynamics that prevent future progress or accelerate positive dynamics already operating.
5. **Designing an initial governance model**.

S**econd step - Co-design and implementation of solutions**

In this step, it is essential to generate meeting spaces where actors in the territory can work together to co-design possible solutions, implement them, learn from them and generate collective knowledge.

Third step - Transformation and social change

This last step aims at achieving collective impact that is sustained in time and contributes to accelerating the transition towards sustainability.

Goals

The major objective of this experiment is to recognise the reasons and the mechanisms that transform the dominant systems which enable the relationships between technologies, policies, academia, enterprises, governmental organisations, investment preferences and the general public.

Results

The results of the policy experiment were based on actions and initiatives that are answering the three main aspects taken into account.

a) **Educational**: the initiatives consider the need for digitalisation of the Blue Bioeconomy sector, the preparation of training and vocational seminars for professionals and SMEs, and the promotion of interdisciplinary approaches in collaboration. It also notices the lack of knowledge in blue bioeconomy and lack of technological resources in universities, being translated into basic knowledge and skills.

b) **Entrepreneurial**: aquaculture and fisheries are in great need to adopt new technologies in order to support entrepreneurship, having only some initiatives that try to enhance the entrepreneurial spirit combining the domains of blue bioeconomy and digital technologies and not many start-ups.

c) **Collaboration** between industries and research organisations: the sector is familiar with the use and development of digital technologies when the application is simple, but it requires larger collaborations between academia and industries, although aquaculture is a risky venture and researchers' involvement in aquaculture is rather limited.

A total of 15 organisations participated in the 3 workshops according to the registrations. In terms of national representativeness, there is a larger presence of Italy, followed by Greece and Malta (40%, 25% and 19% of the total respectively) and no countries from the southern shore of the Mediterranean. In terms of typology of representatives, 38% of the participants are from academia and 37% SMEs, the rest are classified as "others".

During the discussions that followed the workshops, each of the stakeholders identified their own needs, priorities and aims. Thereafter it was possible to identify the linkages between the

needs and obstacles preventing the successful integration of digital technologies in different sectors of Blue Bioeconomy. The policy experiment team was thus able to map all the obstacles, and their connections with the three aspects of the problem previously mentioned. This systematic mapping is fundamental to generate a first idea on how to develop actions that will rectify this situation and bring innovation in both domains.

More information about the policy experiment is available on the interim report on the challenge, in the appendix.

4.1.4. Impact of aquatic Invasive Alien Species. State-of-the-art and main challenges to deal with

Description

The fourth policy experiment focuses on r**educing and eradicating the impact of Invasive Alien Species** by implementing innovation strategies in terms of quadruple helix stakeholders cooperation, research and innovative business models.

Framing question

Which innovation strategies become a feasible, sustainable mechanism to control or eradicate IAS and support the blue economy? How policies and innovation can be aligned to achieve a major environmental and social impact through social awareness, prevention and control measures?

Methodology

The strategy followed in this experiment is based on a holistic approach between policy makers, researchers, civil society and blue economy actors. The main blocks of the strategy can be summarised as follows:

1) State-of-the art analysis and conceptual framework.
2) Share knowledge and build a common vision or mapping workshop.
3) Reach a wider audience through a validation survey.
4) Data analysis and identification of leverage points.

The mapping event was devoted to co-create a common vision, exchange knowledge and build a shared understanding among participants with respect to the IAS challenge. Hence, stakeholders were invited to identify innovative actions, needs and critical points and stimulate an open discussion among MED key actors of quadruple helix (Governance, Research, civil society and business) around the added-value of a transformative innovation policy. The validation survey tried to reach a wider audience to validate main points from the mapping session and identify leverage points for transformative policies.

Goals

By answering the framing question, the aim of the policy experiment is to identify those innovation action portfolios that can contribute to addressing the challenge of Plastic Pollution. Such aim can be categorised in 4 different categories:

1) **Quadruple Helix Innovation**: Identify and validate actors, main IAS groups, drivers and control actions in the MED.
2) **Innovation through cooperation**: Explore and rate actions, priorities and challenges for cooperation in a better governance in the MED.
3) **Cooperation in Research and innovation**: Identify main topics and priorities to cooperate in research and innovation to tackle IAS in the MED.
4) **Technological Innovation and Business Models**: Identify needs and actions to engage business stakeholders in IAS management through cooperation and explore new initiatives related to IAS within the framework of blue bioeconomy in the MED.

Results

The methodology followed in this experiment provided a co-creation framework that compiled the main inputs of stakeholders in a participative and open manner. As a result, the targeted key strategic lines, priorities and needs in the quadruple helix, that should guide the transformation innovation in IAS, were identified. Support of Research, Innovation and Education and transnational cooperation for innovation appear as key horizontal and consensus actions through all actors. The complexity of the IAS challenge requires a solid scientific knowledge that needs to be supported by stable networks, transnational cooperation, long-term funding programs and focused on niches that support blue bioeconomy throughout preserving biodiversity, natural resources, effective prevention measures and innovative solutions when management measures are required. Also, transnational cooperation is a horizontal element for better governance, knowledge generation, business and social awareness. The IAS are not restricted to specific territories but require collaborative actions and coordinated measures to be effective in prevention and control measures.

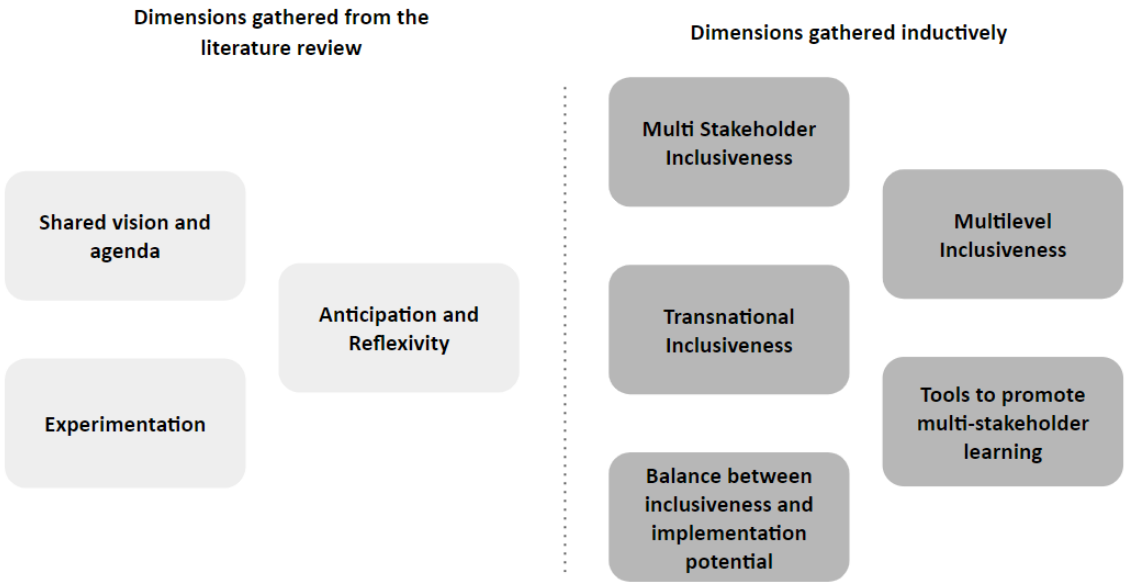
Additionally to the main strategic lines, specific actions have been identified as leverage points through the validation, network analysis and prioritisation.

More information about the policy experiment is available on the interim report on the challenge, in the appendix.

4.2. Comparative analysis

After shortly describing each of the policy experiments, the following section will be devoted to their comparative analysis. As advanced in the methodology (see chapter 2), policy experiments are compared across a range of dimensions, highlighting those commonalities that will be taken into account in the design of the governance model. Following the inductive approach introduced in the methodology, the cross-case comparison has allowed us to unearth a range of inductive dimensions, complementing and deepening on the findings provided by those dimensions already gathered from the literature review (figure 5).

Figure 5: Dimensions of analysis per origin



It should be noted that the inductive dimensions also depart from the literature sources consulted for the present study; what makes them *inductive* is the fact that they are applied to extend, and improve the range of innovative practices carried out by the policy experiments. It is suggested in the study that the *deductive* dimensions did not take well enough into account the multifaceted nature of the inclusiveness dimension. This limitation stands particularly salient in contexts like that of the Mediterranean, where policy experiment engagements not only have to ensure a balanced quadruple helix engagement but also ensure that stakeholders operating at different governance levels and countries are involved; thereby the inclusiveness dimension is divided between its multistakeholder, multilevel and transnational subdimensions. In parallel, two additional inductive dimensions have been identified: i) the broader toolkit that the policy experiments provide, in order to address the added complexity of promoting multi-stakeholder collaboration on innovation, in multilevel and transnational settings; ii) how the policy experiments strive for a balance between the competing goals of facilitating inclusiveness, and guaranteeing the implementation potential of the innovations promoted through the policy experiment.

4.2.1. Shared Vision and Agenda

Across the policy experiments, it is possible to see the application of a range of tools intending to promote a shared understanding of i) the current state of affairs in the challenge, ii) what should be the ideal state of affairs in connection with the challenge, and iii) what should be the strategic agenda or roadmap -however broadly defined- leading to that ideal state of affairs. To reach these common goals, the policy experiments *tested* a diverse toolkit of methodological approaches, on aspects such as:

Combining the expression of diverse views with consensus-building: In here, the experiments on the challenges of Plastic Pollution and Sustainable Aquaculture aimed at combining both aspects through a mixture of group work and plenary discussions, to reach a shared understanding on the goals i), ii) and iii). The experiment on the challenge of Digitalising the Blue

Bioeconomy followed a similar approach, however it focused on the goals i) and ii), leaving the definition of the strategic roadmap for a later stage, after the experiment itself. Finally, the experiment on the challenge of IAS opted for a different approach, combining a workshop for idea exploration and consensus formation with survey methods to give voice to, and measure the weight of diverse views across types of quadruple helix stakeholders.

Specifically, group work on the Plastic Pollution challenge revolved around areas of a System Map -a technique whereby the factors related to a sustainable development challenge, and the relationships between them are mapped-; groups of quadruple helix stakeholders worked firstly on the identification of factors that should be taken into account in these areas, and how these factors should be related to each other. Later on, stakeholders selected those areas whereby interrelationships between factors had the strongest potential to address the challenge -that is, *leverage points*-. Thus, through an iterative process stakeholders expressed their discrepancies and reached consensus on those interrelationships between factors that could be crucial in addressing the challenge. In the case of Sustainable Aquaculture challenge and the Blue Bioeconomy Digitalisation challenge, this iterative process was based on the combination of parallel sessions, whereby quadruple helix stakeholders would discuss different aspects related to Shared Agenda (such as the role of governance, environment, social and economic aspects for the Sustainable Aquaculture Challenge) and plenary sessions; parallel sessions would allow to delve in depth in each of these aspects, offering room for expressing discrepancies and reaching consensus. Later on, the outcome of the parallel discussions would be shared with the rest of participants, for further iteration between the expression of diverse views, and consensus-building.

Meanwhile, the IAS challenge opted for a stronger emphasis on the expression of diverse views on i), ii) and iii), at the expense of a smaller number of iterations between the expression of discrepancies and consensus building. An initial mapping workshop allowed stakeholders to discuss, and reach an initial consensus on the main needs in connection with the challenge, and the bundles of innovative actions that could help address these needs. In a second step, stakeholders could express their support for these bundles of innovative actions by participating in a survey. While this approach enables a comparatively more precise identification of which actions convey broad multi-stakeholder support, it offers less opportunities for negotiating consensus around the ones eliciting discrepancy.

In sum, the policy experiments approached the need for combining a) the expression of diverse views and b) consensus building through techniques that emphasised both aspects in different degrees. Based on the comparative analysis, it could be concluded that an equilibrium should be sought for, in such a way that stakeholders could iterate between a) and b). Otherwise, the foundations of the multi-stakeholder consensus backing the shared agenda might be too thin.

Extent to which the policy experiment workshops provide tools to implement the shared agenda: The policy experiments provided different tools to enable the operability of the shared agenda. Particularly noteworthy is the role played by leverage points in the Plastic Pollution challenge, and the use of survey methods in the IAS challenge. The former allows a broad stakeholder constituency to converge their efforts on innovation proposal co-creation in a narrow set of key points in the map, whereby correlations between factors enable system transformation; the latter allows to assess support for the implementation of innovation proposals aiming to realise the shared agenda.

Here, it should be noted that some policy experiment approaches are more amenable to condense complexity than others. In particular, the System Mapping approach implemented for the Plastic Pollution challenge might be prone to increase complexity -at the expense of applicability-, the larger the number of participants. More factors might be introduced in the map, reducing its parsimony. However, skillful facilitation and the prioritisation of multi-stakeholder collaboration around the leverage points can counterbalance the risks of excessive complexity.

4.2.2. Anticipation and Reflexivity

It is possible to identify some practices related to anticipation and reflexivity in the four policy experiments. Both concepts have been analysed separately (as can be seen in Annex I) but will be explained together due to the existing linkages between them; the common themes between them justified their merger (Gioia et al., 2013). While anticipation requires certain mechanisms that allow governance arrangements to predict future outcomes and allow preparation for their arrival, reflexivity focuses on the positive (and negative) outcomes of the innovations already implemented. This analysis of already achieved outcomes can be taken into account within the innovations already promoted within the experiment; in turn, it is crucial for anticipation exercises.

In general, the different methodological approaches used by each policy experiment show how anticipation and reflexivity are related to the capability of each policy experiment of obtaining the right inputs for analysis, the aim of obtaining valuable insights from the knowledge generated and the capacity to promote the right spaces for interaction and exchange of knowledge and experiences.

It is possible to identify three main anticipation approaches:

System Mapping: in this approach, the policy experiments on the challenge of Plastic Pollution promoted the anticipation of positive and negative impacts by analysing supporting the collective identification of factors related to the challenge, as well as the loops, correlations and dimensions between them. The methodology used is strongly based on collective experience and knowledge, legitimising the connections and correlations identified. Specifically, the loops are showing how one element has a positive or negative impact on other elements and at the same time, how this first element is connected with the rest of the map. The anticipation is graphically represented by the arrows and the positive or negative sign that connects one element to another; by reading the loop "backwards" it is possible to understand the origin of each consequence, hence anticipating the impacts of developments (e.g. innovations) already considered in the map.

The same process of iteration that has allowed the definition of connections and correlations and the validation of the outcomes is based on reflexivity. Indeed, this process represents an opportunity for participants to reflect upon the complexity of sustainable development challenges and the outcomes of factors related to it. The same definition of loops is based on a reflection on the positive (and negative) outcomes of each of the factors.

To a certain degree, the policy experiment on Blue-Bioeconomy digitalization followed a similar approach, mapping the needs, and the gaps and identifying potential solutions/initiatives that could address the challenge. In this case, there was not a system thinking approach supporting

the methodology, but it was specifically focused on identifying opportunities, gaps and obstacles, not obtaining loops but more direct correlations. By being aware of existing interconnections and impacts between factors, it could be possible then to anticipate the impacts of the innovations promoted and their impacts.

Similar to the policy experiment on Plastic Pollution, the focus on the existing interconnections between factors can facilitate a certain degree of reflexivity by understanding potential correlations.

Open dialogue that promotes transfer of experiences across the Mediterranean: the policy experiment on the Sustainable Aquaculture challenge has indirectly obtained anticipation by promoting open dialogue among all the stakeholders. This open and constant dialogue is being used to promote a common understanding of identifying potential threats and opportunities, linked with the previous point of defining a common vision and agenda. Moreover, all the information and experiences being shared might be the basis for a mechanism of anticipation since what happened in one region might happen in the future in another one. Additionally, the same trends might impact differently depending on the region and time period. However, open dialogue per se does not directly imply anticipation, since it requires the right approach to collect information about potential future impacts of innovations, and connect them with the current situation.

It is interesting to highlight how iterations among participants allow groups to engage in detailed design, knowing that they can later on step back to apply their critical judgement and new points of view, before refining previous agreements. Such iterations within the methodology promote reflexivity around the current impacts of the innovations promoted. Being based on open dialogue, the reflexivity is more implicit in comparison with other policy experiments, although it is a relevant component, being the basis of the accumulated knowledge that characterised this policy experiment.

Focus on potential positive and negative impacts: this approach involved a discussion on the negative impacts that might stem from the innovative actions to address the challenge. This approach is directly related to the main focus of the . Specifically, the IAS policy experiment explicitly focused on anticipating negative impacts by dealing with the risks of some of the innovations proposed to address the IAS challenge. In regards to the methodology followed to achieve such outcomes, the survey and the Social Network Analysis allowed stakeholders to express openly their concerns about the negative impacts of innovations, and take into account these concerns in the prioritisation of some types of innovations over others.

Including a survey instead of additional workshops has diminished the opportunities for the reflective processes that might stem from participatory research tools, although the focus of the policy experiment on negative impacts supports a certain degree of reflectivity, especially in the mapping workshop.

4.2.3. Experimentation

Although the relatively short duration of the policy experiments did not allow for testing innovations in real-life settings and exploring how they might be diffused, the policy experiments have provided temporary spaces for experimenting on:

- How to formulate a shared agenda aimed at addressing the focal sustainable development challenge (see Shared Vision and Agenda).
- How to start co-developing innovation ideas that could implement the shared agenda roadmap.

Experimentation on the second point entailed typically that policy experiments included workshops whereby stakeholders would start co-developing ideas of innovations, connected to the shared agenda. These approaches are particularly visible in the case of the Plastic Pollution and Sustainable Aquaculture challenges. Overall, it is recognised that experimenting with the implementation of innovative ideas would require more stable spaces whereby stakeholders can engage in prolonged testing in real life settings. These spaces could include networks of living labs, operating at different locations in the Mediterranean; such networks of living labs would not only enable innovation testing in concrete locations, but also enable the adaptation of promising innovations to different settings, promoting their diffusion across regions and territorial scales.

This limitation being said, it should be noted that the policy experiments also promoted different tools useful to experiment with innovation proposals. In the case of the Plastic Pollution challenge, system mapping helped stakeholders identify leverage points, whereby they could concentrate their efforts to co-develop innovation proposals. Meanwhile, the experiment on the Sustainable Aquaculture challenge allowed stakeholders to assess which collaboration routines could help multiple stakeholders work together, in the context of a Mediterranean Innovation Alliance for a Sustainable Blue Bioeconomy. Although all the policy experiments intended to collect inputs useful to the development of a governance model for this Innovation Alliance, it should be noted that this goal was particularly salient in the Sustainable Aquaculture policy experiment. Finally, the quantitative research techniques applied in the case of the IAS challenge allowed to identify which innovation proposals gather support for further innovation co-creation, and which ones might be supported only by some types of stakeholders.

4.2.4. Multi stakeholder Inclusiveness

All the policy experiments have tried to have balanced representativeness of their participants. Such balance is a key element of the policy experiments, which aim to promote transformative innovation by engaging representatives from the quadruple helix. Specifically, in regards to this last element, there is a common imbalance in all the policy experiments, with universities and research centres, and public administration participants being more common than other types of stakeholders. Some of the reasons for this unequal participation might be summarised in the following points:

- **Policy experiment coordinators are mostly research institutions and public administration organisations**, and the same can be argued for the rest of the Blue Bio Med partners. Their networks, accordingly, tend to involve similar types of stakeholders, and have less accessibility to civil society organisations and the business sector
- The scope of promoting shared agendas and the innovation strategies for local and regional economic development (e.g.S3) might have given **more responsibility to public institutions**, especially at a regional level.

- The implementation of the policy experiment suggests that its **framing and format were not well enough suited** to the incentives of the less represented categories of stakeholders.
- The limited participation of civil society organisations was related to their relatively **limited resources** and, relatedly, their need for relatively rapid, and tangible returns to their participation (e.g. social innovations).
- The limited participation of large corporations was related to their **need for relatively rapid and tangible returns** to their participation (e.g. product, process or organisational innovations).

Through the policy experiments, a range of strategies have been put forward to address imbalances. These include:

- **Defining internally (un)balanced working groups**. Such a solution has been seen in the Sustainable Aquaculture experiment, where participation imbalances have been mitigated through stakeholders' distribution across sub-groups, having a working group balanced and others still unbalanced. Such a situation could be an advantage, using the balanced working group to obtain transversal and shared insights, while the imbalanced one could be used for working towards innovation co-creation.
- **Additional framing sub-questions** defining the scope of the challenge tangibly enough for different types of stakeholders, especially businesses and civil society organisations.
- **Adaptation of the policy experiment's communication** strategy towards the interests of different types of stakeholders (e.g. product/process/organisational innovation for businesses, social innovation for civil society organisations).
- **Identification of lead stakeholders** that can represent relatively uninvolved types of stakeholders; such lead stakeholders should also be able to draw the participation of these actors.
- **Promoting linkages between the policy experiment and living labs** for a faster implementation of innovation ideas into actual innovation projects. This linkage might stand as particularly attractive to stakeholders in need for relatively rapid innovation co-creation (e.g. businesses and civil society organisations).
- **Iterate in the policy experiment between qualitative and quantitative approaches**; the latter provide a less time consuming venue to stakeholder participation in the policy experiment, at the expense of a less intense involvement.
- The **sub-categorization of each group** can promote a deeper level of balance, understanding the composition of each group and the needs and contributions provided. The more accurate the identification of needs for specific groups of stakeholders, the easier to propose more targeted solutions. In the end, each policy experiment aims at finding solutions working together with stakeholders, therefore, having more detailed information about stakeholders' characteristics will promote more specific proposals and even the need to look for more specific subcategories under-represented.

4.2.5. Multilevel Inclusiveness

As suggested in the literature review (see chapter 2), the participation of stakeholders operating at different governance levels is of the utmost importance (regional, national, transnational whether this includes organisations operating at the EU and/or the Mediterranean), in order to

promote the identification, emergence and diffusion of innovations with transformative potential. Those innovations that can challenge existing routines in socio-technical systems tend to originate locally and regionally, however the resources required to diffuse them (e.g. finance, access to markets, policy influence) tend to be available at the national and transnational levels.

To a greater or lesser extent, the policy experiments have been able to draw a multistakeholder constituency capable of supporting the nurturing and maturation of transformative innovations. On that matter, the networks of the Blue Bio Med project partners appear to have sufficed to involve a relatively broad range of organisations, and the organisation of workshops through online participatory tools (e.g. Zoom breakout rooms, Miro) might have facilitated the engagement of actors that would have been more difficult to involve in face-to-face meetings.

However, the experiments appear to have faced difficulties in engaging stakeholders operating regionally and transnationally. Such difficulties stem from the mismatch between the incentives of these organisations, and the design and implementation of the policy experiments.

Regional stakeholders (particularly SMEs and civil society actors) tend to be organisations with relatively limited resources including personnel fluent enough to participate in English-speaking engagements like the policy experiments. Associated with this lack of resources, local and regional stakeholders tend to have a stronger need than other stakeholders for rapid returns to their participation in the policy experiment workshops, i.e. participation in actual innovation co-creation, rather than the definition of a shared agenda to address a sustainable development challenge. Some of the tools for the co-definition of innovation proposals put in place by the policy experiments (the leverage points in the case of the Plastic Pollution challenge, or workshops focused on the identification and co-creation of innovation proposals in the case of the Sustainable Aquaculture challenge) might be a step towards the direction pursued by these stakeholders, however they still fall short of their interest.

As for transnational stakeholders, different obstacles might be in place. The focus of the policy experiments on the co-creation of shared agenda action plans, and the innovation opportunities associated with them might suit the interests of intergovernmental organisations; however, attracting these actors sometimes involved lengthy, bureaucratic processes that did not fit the tight time schedule of the policy experiments. On the other hand, the processes to involve multinational corporations (the other main type of transnational stakeholders) might not be as lengthy as those of intergovernmental organisations. However, the relatively broad and uncertain returns of the policy experiments entailed that corporations would see these engagements as an opportunity for blue sky research and networking, rather than a concrete research engagement. Furthermore, as socio-technical systems incumbents multinational corporations might have little incentive to support the transformative innovations that might stem from policy experiments.

Hence, the comparative analysis of the policy experiments in this dimension has unearthed a range of limitations in ensuring the involvement of the different types of stakeholders, that might be mitigated with the following approaches:

- Bidirectional communication efforts to ensure that the framing question is linked to the needs of stakeholders at different governance levels. If need be, framing sub questions might be devised.
- Linkage of the policy experiment workshops with living labs; the latter provide a stable spaces whereby the feasibility of innovation proposals is tested in real-life settings. As a result, local/regional stakeholders (e.g. civil society, SMEs) might see more clearly in the

policy experiments an opportunity to test innovations addressing local social challenges, while transnational private stakeholders (e.g. multinational corporations) might see more clearly in the policy experiments an extension of their open innovation strategies.

The following mitigation approaches might be implemented specifically for local/regional stakeholders:

- Targeting leading local/regional stakeholders, to tap on their power to attract broader stakeholder constituencies.
- Regional/national workshops in other languages than English.

The following mitigation actions might be implemented specifically for transnational stakeholders:

- Increased desk research efforts to draw transnational stakeholders, particularly intergovernmental organisations. Such desk research efforts should be carried out from the very beginning of the policy experiment, in order to allow for the relatively long timespan required to recruit these stakeholders.

4.2.6. Transnational Inclusiveness

Similar to other sub-categories related to inclusiveness, in terms of regional/national distribution, the policy experiments generally show limitations in involving stakeholders from the southern shore of the Mediterranean. Southern Mediterranean stakeholders could not be recruited, being represented indirectly through transnational stakeholders, which became a bi-directional communication channel, providing the perspective from the stakeholders not represented and bringing the potential solutions to national and regional stakeholders.

Additionally to this gap, limits in the participation of northern shore countries should also be mentioned. On the one hand, there is an over-representation of Italian and Spanish participants in the 4 policy experiments, unbalancing the participants among the countries that are being represented. On the other hand, stakeholder participation has not been consistent along the process (participation in all the workshops and a survey in the case of the policy experiment on the IAS challenge) reducing the capacity of accumulating knowledge and building a network, as it could be the case of transitional organisations in the Plastic Pollution challenge. These two considerations show the necessity of implementing measures that can guarantee the quality of the participation in terms of balanced national representativeness and consistency in the participatory process (brainstorming, proposal, validation…).

The mitigation actions suggested in the other inclusiveness dimensions should also contribute to compensate for the limitations in the policy experiment's transnational inclusiveness. Specially, the following efforts should contribute:

- The organisations involved in the coordination of the policy experiments (experiment leaders, project partners supporting the experiments) should encompass a relatively broad range of countries, and in particular Southern Mediterranean countries, to draw their country networks to the policy experiment workshops.
- Increased desk research efforts to draw intergovernmental organisations representing Southern Mediterranean stakeholders. Such desk research efforts should be carried out

from the very beginning of the policy experiment, in order to allow for the relatively long timespan required to recruit these stakeholders.
- Regional/national workshops in other languages than English.
- Iterate between the workshops and surveys in other languages than English.

4.2.7. Tools to promote multi-stakeholder learning (transversal)

The four policy experiments have promoted the sharing of knowledge among all the participants, aiming at generating connections and networking that could promote the co-generation of innovative solutions. The policy experiments have provided the opportunity not only to think about how to tackle sustainable development challenges but have also provided methodological tools that can be further used in other projects, whether these referred to the use of different workshop techniques (system mapping, open dialogue), or ways to interpret quantitative research data (use of SNA techniques to identify variations across clusters of stakeholders). This methodological characteristic is not secondary, since it gives new tools to work and is an added value for participants and future cooperation.

In general, the tools to promote multi-stakeholder learning could be summarised as follows: i) shared vision and agendas, ii) techniques to visualise complex systemic relationships, iii) taking into account the positive and negative impacts of innovation and; iv) combining the use of qualitative and quantitative research techniques.

Shared visions and agendas allow stakeholders to learn from each other's points of view while finding a way to reach a common ground. Although this process is focused on the definition of the current assessment of a challenge and the future vision to work towards, it is also a negotiation exercise, where the participants learn to bring forward proposals and have to be open to adjustments and concessions. Additionally, by listening to other stakeholders' needs and proposals, they have the opportunity to perceive the complexity of a challenge. Both the Plastic Pollution and the Sustainable Aquaculture policy experiments have focused on the definition of a shared agenda as a starting point: while the first challenge has defined the shared agenda through system mapping exercises, the second one has highlighted the need for a challenge owner to lead and promote the definition and implementation of innovative solutions.

A relevant tool related to shared visions and agendas is the use of **techniques to visualise complex systemic relationships**, with the Systems Mapping technique applied in the Plastic Pollution policy experiment being a prime example. It shows how relevant it is to visualise in a map the relationships between factors configuring a sustainable development challenge, to understand its complexity and propose innovative solutions that can address it. Particularly interesting is the role that leverage points play, being areas within the map whereby relationships between factors can be tapped into, to trigger system transformation. Here, it is important to properly frame challenges, i.e. desk research should balance complexity and specificity in the definition of the challenge, ensuring a sufficiently operational variety of factors. Otherwise, it will make it difficult to use a system mapping approach to identify relevant stakeholders for the workshops, define a system map specific enough, and come up with a list of well-defined leverage points whereby innovation proposals can focus (for more details, see 5.2.1., on the description of the findings for the Shared Vision and Agenda dimension).

Thirdly, the policy experiments have deployed approaches to take into account the **positive and negative impacts of innovation**, whether these are direct or indirect. These approaches are

particularly visible in the policy experiments on the challenges of plastic Pollution, Digitalisation of the Blue-bioeconomy and the impact of aquatic Invasive Alien Species:

- Plastic Pollution: positive and negative feedback loops have been defined between factors; while the former contribute to address the challenge, the latter contribute to maintain or worsen tendencies against tackling the challenge. The analysis of such feedback loops allowed, in turn, to identify leverage points whereby innovation action should focus.
- Digitalisation of the Blue-bioeconomy: the policy experiment intended to promote multi-stakeholder learning by helping stakeholders identify together bottlenecks preventing the deployment of digital technologies in the blue bioeconomy sector.
- Impact of aquatic Invasive Alien Species: it identifies critical aspects and/or needs of IAS governance, Research and Innovation, civil society and businesses by using open questions and a survey. Particularly important is the space provided to explicit discussions on the risks of negative impacts stemming from the innovations proposed in the policy experiment, and how to address them. For instance, stakeholders identified the risk that strategies valorising IAS byproducts promote the maintenance of these species in the marine environment; in response, they suggested that the businesses valorising IAS byproducts should be pop-up companies, thereby less likely to generate vested interests.

Finally, although qualitative research techniques were predominantly used in the policy experiments, the policy experiment on the IAS challenge offered the opportunity to assess the utility of combining quantitative and qualitative research techniques. Specifically, survey data allowed quantifying support for proposals of innovations by type of quadruple helix stakeholder. Through Social Network Analysis, it was possible to assess which ones might muster more consensus, or more interest in one type of quadruple helix stakeholder. Here, the use of quantitative techniques allowing to identify, and quantify points of agreement and discussion across stakeholders might be a strong complement to the conversations held in workshop settings. Such quantitative measurements can be included in the iterations behind the formulation of a strong research agenda, enriching the negotiations over the innovations that should be prioritised in a shared agenda roadmap.

4.2.8. Balance between inclusiveness and implementation potential

As engagements promoting innovations that can transform socio-technical regimes towards sustainable development paths, policy experiments have to deal with the uneasy balance between the opposite goals of ensuring multi-stakeholder inclusiveness, and increasing the implementation potential of the outcomes stemming from the experiments themselves i.e. shared multi-stakeholder agendas and proposals of innovations. To fulfil this goal, the policy experiments have applied a diverse range of approaches, which intend to promote synergies between both goals.

In the case of the Plastic Pollution challenge, these synergies are promoted within the policy experiment methodology itself. System maps are visual representations of sustainable development challenges, whereby the complexity inherent to the challenges is condensed enough to ensure their interpretation. To this end, skilled facilitation is essential in order to prioritise those factors that should indeed be included in the map and, perhaps even more

importantly, guide participants to identify and prioritise the leverage points. The latter operates as a focusing device, whereby multi-stakeholder efforts to implement the shared agenda can be concentrated. Hence, leverage points operate as an intermediate step between the current state of affairs and trends in the challenge (represented by the system map) and the co-creation of innovation proposals to bring the socio-technical system towards the end goal of the shared agenda, i.e. the resolution of the challenge.

Another approach where synergies between inclusiveness and implementation potential might be that of the IAS challenge, however in this case the implementation potential relates more to the quantification of stakeholder support for the implementation of innovation proposals. By combining a multi-stakeholder workshop with a survey gauging support for the proposals of innovation actions stemming from the workshop, the policy experiment extends the range of stakeholders that could be involved in the policy experiment, while quantifying which actions might gather more support. Crucially, Social Network Analysis (SNA) techniques are applied in the experiment, allowing to identify whether certain types of stakeholders are more prone to support some innovations over others. Hence, policy experiment promoters can use this information to identify which stakeholder groups would be more likely to support specific innovation portfolios.

At the other end of the spectrum, the policy experiment on the Sustainable Aquaculture challenge uses its relatively strong tendency to favour multi-stakeholder inclusiveness over implementation as an opportunity to provide outcomes slightly different from those of the other experiments. Specifically, the experiment organisers have organised the multi-stakeholder workshops as an opportunity to identify and promote collaboration routines that will serve the construction of a future Innovation Alliance for Sustainable Blue Bioeconomy in the Mediterranean. Hence, the goal of the experiment was to identify ways of promoting effectively a multi-level and transnational alliance organised by the stakeholders themselves, rather than addressing the focal challenge. Indeed, the alliance would serve as a vehicle for supporting stakeholders coalitions interested in concretising innovation ideas introduced within the policy experiment.

4.3. Discussion

The present deliverable concludes with a discussion of the shared findings gathered from the policy experiments. These shared findings support a more effective design and implementation of future policy experiment engagements, identifying ways to muster the participation of a broader multi-stakeholder constituency in transnational and multi-level policy settings like the Mediterranean. More importantly for the context of the Blue Bio Med project, the shared learning from the policy experiments will provide the empirical foundations for the last deliverable in WP4 (4.3.1): The document will propose and unfold a governance model to support multi-stakeholder collaboration across the Mediterranean, aimed at addressing a range of sustainable development challenges. Here, it is expected that the obstacles and mitigation strategies identified across the policy experiments will also be useful to the governance model.

Departing from the comparative analysis of existing governance arrangements (see chapter 3), the present chapter has also applied an inductive approach akin to the principles of Gioia et al. (2013). Following this approach, two of the principles extracted from the literature, anticipation

and reflexivity, have been condensed into one; the needs they addressed could be readily combined into a joint category.

At the same time, some of the dimensions gathered from the literature were discarded since they could not be applied in the context of the policy experiments: These were the dimensions of niche upscaling; continuous monitoring and evaluation of roadmaps; procedures for measuring the impact of innovation actions; focus of mission-oriented approaches. Additionally, one of the dimensions extracted from the literature, that of inclusiveness, was divided into three (sub)dimensions. These were i) multi-stakeholder, ii) multi-level and iii) transnational inclusiveness. The results of the comparative analysis of the policy experiments suggests that the three (sub)dimensions had to be taken into account; the setting that policy experiments address, in their pursuit of innovations tackling sustainable development challenges, is one where multiple levels of governance have to be aligned, across regions and countries in the Mediterranean; thereby inclusiveness goes well beyond ensuring that key quadruple helix stakeholders are involved in the process of developing, and implementing shared agendas. Below, the core findings, and lessons learned for each of the dimensions are described.

4.3.1. Shared Vision and Agenda

The policy experiments have put in place a diverse methodological toolkit to promote a shared understanding on: i) the current state of affairs in the challenge; ii) what should be the ideal state of affairs in connection with the challenge, and iii) what should be the strategic agenda or roadmap -however broadly defined- leading to that ideal state of affairs. This methodological toolkit included diverse techniques providing a different leaning more towards addressing either the need for expressing different views, and building consensus among stakeholders. Overall, however, the results of the comparative analysis suggest that tensions between both needs can be sought for productively. Indeed, techniques that emphasise one or another need can be usefully combined, to maximise the applicability potential of the policy experiments.

For instance, in the case of the policy experiment on the IAS challenge the use of survey methods helped identify different views across stakeholders on the main needs that should be addressed in connection with the challenge, and the types of innovative approaches that would contribute to address these needs. This type of mapping on the priorities of different types of stakeholders can later on be taken into account in the organisation of group work, within multi-stakeholder workshops. Stakeholders with differing interests can be put together in the same working group(s) to negotiate a middle ground on the innovations to be supported; thus, discrepancies are not negated, and contribute to enrich the consensus stemming from the workshops. Importantly, stakeholders should not have diametrically opposed interests to ensure any possibility of agreement.

In parallel, the use of techniques that emphasise visually the linkages between priorities in connection with the challenge (whether these are positively related, or are in tension) can be a very useful technique to promote synergies between giving voice to differing views and promoting multi-stakeholder consensus. As the example of the System Map in the Plastic Pollution challenge suggests, visual displays of inter-relationships between factors allow diverse stakeholders to see how their views conflate with those of other actors. Simultaneously, differences between stakeholders can be more readily understood and incorporated into

graphic representations. Thus, stakeholders should be better prepared to take into account opponents' views, and consensus formation should have a stronger foundation.

The policy experiment methodologies can usefully exploit synergies between the need for expressing differing views and consensus formation, to facilitate the process of implementing the shared agenda. Following the previous examples, survey approaches can be used to identify like-minded stakeholders ready to work on implementing a portfolio of innovations that they agree upon; techniques specialised on visual representation such as System Mapping can help identify areas where relationships between factors in connection to the challenge (leverage points) can be usefully exploited through innovation co-creation.

Overview of lessons learned:

- Iterations can be sought for, between techniques that emphasise stakeholders' diversity and techniques that promote consensus across stakeholders. Careful planning of these iterations will ensure that any consensus stemming from the workshops is enriched with the views of a broad stakeholder base.
- Techniques emphasising visual representation of differing views support stakeholders in the process of recognising the views of other stakeholders, providing nuance to the consensus stemming from the policy experiment.
- The policy experiment methodologies can usefully exploit synergies between the need for expressing differing views and consensus formation, to support shared agenda implementation. The examples of the survey approaches and the identification of leverage points through System Mapping suggest ways in which policy experiment methodologies can support shared agenda implementation.

4.3.2. Anticipation and reflexivity

By comparing the policy experiments, it has been possible to highlight different approaches to the implementation of anticipation and reflexivity exercises. The results of this comparative exercise suggest that policy experiments can benefit from implementing techniques that allow to assess current and future impacts of innovations. Importantly, such techniques should also help stakeholders identify actual and potential negative impacts; although a well-balanced constituency of quadruple helix stakeholders should consider the pros and cons of the innovations pursued, there is the risk that negative impacts are overlooked, unless explicitly addressed.

The policy experiments hosted multi-stakeholder workshop sessions explicitly aimed at exploring the current impacts of the innovation ideas proposed to address the focal challenge, thereby taking into account the reflexivity dimension. These sessions also allowed stakeholders to explore potential future impacts of the same innovation ideas, hence taking into account the anticipation dimension. To do so, a range of techniques were taken into account that helped stakeholders consider the linkages between factors related to the challenge. These included workgroup discussions about such linkages (e.g. workshops challenges Sustainable Aquaculture and Blue Bioeconomy Digitalisation), but also techniques relying on visual representations of such linkages, to steer collective reflection (e.g. workshops challenge Plastic Pollution in the Mediterranean).

As for the negative impacts of innovations, these were explicitly addressed in the workshop carried out as part of the IAS challenge. Specifically, participants rated the innovation action proposals put forward to address the challenge taking into account their desirability and

feasibility. This technique, relatively simple to implement and interpret, allowed to rule out innovation proposals whose negative impacts might be excessively burdensome on the view of stakeholders. Additionally, the survey allowed a broader stakeholder constituency to rate support for the innovation proposals, and enabled them to identify which types of stakeholders supported/rejected the most the innovation proposals.

Overview of the lessons learned:

- Policy experiments can benefit from implementing techniques that allow assessing the current and future impacts of innovations. Particularly important is that these techniques incentivise stakeholders to consider explicitly the negative impacts of innovations; otherwise these might be overlooked even if the policy experiments enjoy the participation of a well-balanced constituency of quadruple helix stakeholders.
- Techniques to assess the current and future impacts of innovations should incentivise stakeholders to consider linkages between factors, particularly indirect relationships. Because the latter are relatively difficult to assess, techniques allowing to visualise such relationships might be of use (e.g. Plastic Pollution challenge experiment).

4.3.3. Experimentation

Although the relatively short duration of the policy experiments did not allow for testing innovations in real-life settings and exploring how they might be diffused, the policy experiments have provided temporary spaces for experimenting on: i) How to formulate a shared agenda aimed at addressing the focal sustainable development challenge; ii) how to start co-developing innovation ideas that could implement the shared agenda roadmap.

Concerning the second point, the policy experiments provided some spaces whereby the process to co-develop innovation ideas could be initiated; the extent to which these spaces steered the initiation of idea co-development depended on their emphasis on supporting the development of the innovation ideas. For instance, the Sustainable Aquaculture challenge experiment offered such spaces in their final workshop, however the experiment did not intend to continue facilitating the process of innovation idea co-development, since its goal was to foster a multi-stakeholder community that would work towards the implementation of these ideas within the architecture of a Mediterranean Innovation Alliance for a Sustainable Blue Bioeconomy, i.e. a governance arrangement that would provide technical support to the multi-stakeholder networks interested in the co-development of actual innovations.

In the case of the policy experiment on the Plastic Pollution challenge, more emphasis was placed in the development of innovation ideas, and to this end the two workshops fostered the process. The first one did so by supporting the identification of leverage points, whereby stakeholders could concentrate their efforts on innovation idea co-creation; the second one helped the process proceed further by incentivising stakeholders to start thinking about the innovation ideas, in business model canvasses.

A related point to be considered here is the utility of the leverage points, as a technique allowing the identification of relationships between factors that innovations could tap into, in order to achieve a high transformative impact. In connection with the previous point on Anticipation and Reflexivity, it could be argued that leverage points might work best when represented visually, through techniques such as those of System Mapping. Through System Mapping, stakeholders

can visualise and exchange views about the relationships between factors that should be considered as leverage points, and how potential innovations could tap into these leverage points to trigger transformative change in the system.

Regardless of the technique, it should be noted that further efforts towards the co-creation of innovations require more permanent spaces whereby they can be probed in real-life settings, and reshaped based on the feedback from these probing exercises. Networks of these spaces (e.g. living labs) would be particularly important at the stage where innovations are diffused, with experimentation in different settings facilitating adaptation beyond the original context.

Overview of the lessons learned:

The policy experiments have provided temporary spaces for experimenting on: i) How to formulate a shared agenda aimed at addressing the focal sustainable development challenge; ii) how to start co-developing innovation ideas that could implement the shared agenda roadmap.

- The policy experiments provided some spaces whereby the process to co-develop innovation ideas could be initiated; the extent to which these spaces steered the initiation of idea co-development depended on their emphasis on supporting innovation co-creation.
- The identification of leverage points can help stakeholders focus their efforts to co-develop innovation ideas, supporting the formation of multi-stakeholder networks involved in innovation implementation. Visual representation through e.g. System Mapping can multiply the effectiveness of the leverage points.
- Further efforts towards the co-creation of innovations require more permanent spaces whereby they can be probed in real-life settings, and reshaped based on the feedback from these probing exercises. Networks of these spaces (e.g. living labs) would be particularly important at the stage where innovations are diffused.

4.3.4. Multi-stakeholder inclusiveness

Although the policy experiments have sought for the participation of quadruple helix stakeholders in their workshops, imbalances have been identified across the policy experiments in such a way that participants are mostly research institutions and public administration organisations, with businesses and civil society organisations playing a lesser role.

These limitations stem from factors such as the weight of research institutions and public administration organisations in the project, or the fact that the policy experiments are more suited to inform innovation policies such as S3 than to support actual innovation co-creation. A range of strategies have thus been proposed to address imbalances in future policy experiment engagements. These are described below.

Overview of the lessons learned:

- Combining internally balanced, and unbalanced working groups, using the balanced working group to obtain transversal and shared insights, while the imbalanced one could be used for working towards innovation co-creation.
- Additional framing sub-questions defining the scope of the challenge tangibly enough for different stakeholders, especially businesses and civil society organisations.

- Adaptation of the policy experiment's communication strategy towards the interests of different types of stakeholders (e.g. product/process/organisational innovation for businesses, social innovation for civil society organisations).
- Identification of lead stakeholders that can represent, and attract relatively uninvolved types of stakeholders.
- Promoting linkages between the policy experiment and living labs for a faster implementation of innovation ideas into actual innovation projects.
- Iterate in the policy experiment between qualitative and quantitative approaches; the latter provide a less time consuming venue to stakeholder participation in the policy experiment, at the expense of a less intense involvement.
- The sub-categorization of each type of quadruple helix stakeholder can promote a deeper level of balance, understanding the composition of each subtype and the needs and contributions provided.

4.3.5. Multilevel inclusiveness

Those innovations that can challenge existing routines in socio-technical systems tend to originate locally and regionally, however the resources required to diffuse them (e.g. finance, access to markets, policy influence) tend to be available at the national and transnational levels. Thereby policy experiments should guarantee the participation of stakeholders at different governance levels, in order to promote the identification, emergence and diffusion of innovations with transformative potential.

Although the policy experiments appear to have succeeded at involving a relatively broad range of organisations drawing on the networks of Blue Bio Med project partners and the use of online participatory tools, the experiments appear to have faced difficulties in engaging stakeholders operating regionally and transnationally, owing to the i) incentives of these organisations, ii) the resources that they have at their disposal, iii) the design and implementation of the policy experiments. To address these limitations, a range of strategies has been proposed. These are described below.

Overview of the lessons learned:

- Bidirectional communication efforts should help ensure that the framing question is linked to the needs of stakeholders at different governance levels.
- Linking the policy experiment workshops with living labs should provide a stable space whereby the feasibility of innovation proposals is tested in real-life settings, incentivising the participation of local/regional stakeholders and transnational private stakeholders.
- By targeting leading local/regional stakeholders, it should be possible to tap on their power to attract broader stakeholder constituencies.
- Regional/national workshops in other languages than English should help draw the participation of local/regional stakeholders.
- Increased desk research efforts should be targeted to draw the participation of transnational stakeholders, particularly intergovernmental organisations. Such desk research efforts should be carried out from the very beginning of the policy experiment, in order to allow for the relatively long timespan required to recruit these stakeholders.

4.3.6. Transnational inclusiveness

The comparative analysis suggests that the policy experiments have faced two main limitations when drawing a stakeholder constituency encompassing different countries in the Mediterranean; both limitations are related to the country distribution of the consortium behind the project, and in particular the experiment leaders.

On the one hand, few stakeholders from the Southern shore of the Mediterranean could be involved in the policy experiment workshops, with intergovernmental organisations performing an intermediary role, representative role. This limitation stemmed from the fact that Southern Mediterranean stakeholders were not involved in the coordination of the policy experiment; furthermore, the lengthy procedures involved in achieving the participation of intergovernmental organisations (see multilevel inclusiveness) entailed that few of these organisations could participate in the policy experiment workshops, and perform an intermediary role.

On the other hand, although a broad range of Northern Mediterranean countries were involved in the policy experiments, Spain and Italy were clearly the countries with the larger number of participants; a limitation probably related to the fact that most experiment leaders were organisations settled in Spain and Italy. Furthermore, these inequities tended to aggravate in the long run, with a larger concentration of Spanish and Italian stakeholders participating in e.g. , follow-up workshops compared to the initial workshops.

To address these limitations, a range of activities have been proposed in the overview of lessons learned:

- The organisations involved in the coordination of the policy experiments (experiment leaders, project partners supporting the experiments) should encompass a relatively broad range of countries, and in particular Southern Mediterranean countries, to draw their country networks to the policy experiment workshops.
- Increased desk research efforts should be devoted to drawing intergovernmental organisations representing Southern Mediterranean stakeholders. Such desk research efforts should be carried out from the very beginning of the policy experiment, in order to allow for the relatively long timespan required to recruit these stakeholders.
- Regional/national workshops should be arranged in other languages than English, to amplify the range of stakeholders involved in the policy experiment workshops and broaden the range of countries.
- Iterating between the workshops and surveys in languages other than English, to amplify the range of stakeholders involved in the policy experiment workshops and broaden the range of countries.

4.3.7. Tools to promote multi-stakeholder learning

In addressing sustainable development challenges through a broad range of techniques, the policy experiments have allowed us to identify a range of tools to support quadruple helix stakeholders in their efforts to negotiate on how to understand these challenges, and how to co-develop innovation ideas addressing them.

Firstly, the policy experiments have helped stakeholders learn how to negotiate a shared understanding on the current state of affairs in the challenge, and how it should be addressed, even if broadly defined. In the process, stakeholders develop a shared understanding of the complex interplay between factors within the challenge, ruling out one-sided solutions.

Secondly, techniques to visualise complex systemic relationships like Systems Mapping crucially support multi-stakeholder networks in understanding the complex relationships between factors characterising a sustainable development challenge, also identifying those relationships between factors that could serve as a leverage for the design and upscaling of transformative innovations. It should be noted that efforts to visualise complex systemic relationships should be backed by a framing of the challenge concrete enough to support the co-design of innovations.

Thirdly, approaches to take into account the positive and negative impacts of innovation have been deployed. These include for instance the visualisation of positive and negative feedback loops between factors, as well as setting specific spaces for discussing explicitly negative impacts of innovation, and how to address them.

Finally, the use of quantitative research techniques (e.g. survey data and SNA) allows us to identify which groups of stakeholders support innovation ideas to the greatest extent. By identifying the main lines of disagreement between stakeholders, it is possible to enrich the discussions held in workshops, leading to a strongly backed multi-stakeholder consensus.

Overview of lessons learned:

- The policy experiments have helped stakeholders learn how to negotiate a shared understanding on the current state of affairs in the challenge, and how it should be addressed, taking into account the complex interplay between factors in the challenge.
- Techniques to visualise complex systemic relationships should support multi-stakeholder networks in understanding the complex relationships between factors characterising a sustainable development challenge.
- Approaches to take into account the positive and negative impacts of innovation should be deployed. These can include the visualisation of positive and negative feedback loops between factors, as well as setting specific spaces for discussing explicitly negative impacts of innovation, and how to address them.
- The use of quantitative research techniques should allow us to identify which groups of stakeholders support which innovation ideas to the greatest extent. This information would help inform the discussions held in multi-stakeholder workshops.

4.3.8. Balance between inclusiveness and implementation potential

After analysing the policy experiments in terms of inclusiveness (see points iv), v) and vi)) it is necessary to consider how such inclusiveness has been managed to facilitate the potential implementation of innovations. The policy experiments have applied a diverse range of techniques aiming at promoting a balance between ensuring multi-stakeholder inclusiveness and increasing the implementation potential of the outcomes stemming from the experiments themselves. Each technique shows specific benefits and it can be implemented by aiming at specific goals, always considering the characteristics of the experiment and its participants.

Overview of lessons learned:

- System maps as a visual representation of the challenge, which allows to condense its complexity and identify leverage points that guide the co-creation of innovations
- Multi-stakeholder workshops to engage with stakeholders while generating networking and knowledge-sharing opportunities
- Deployment of technological tools to increase participation by reducing the need for travelling and providing accessible platforms for the co-creation of innovations
- Quantitative tools (surveys) help to gather a large amount of data, reaching a broad number of stakeholders.
- Social Network Analysis that helps land discussion about what innovations can be implemented with broad multi stakeholder support
- More conceptual discussions (nature of the challenge, shared agenda to deal with it ...) that help to structure collaboration architectures to face the challenge (e.g. MedIA).

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ANNEX I - Interim reports form policy experiments

Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean

CREDA has coordinated the implementation of a policy experiment methodology, systems mapping, to help address the sustainable development challenge of Macro-Plastic Pollution in the Mediterranean.

Link to report

Innovation in Sustainable Aquaculture

The implementation of the policy experiment was developed by ART-ER through a series of online multi-actor workshops involving stakeholders mainly from the Euro-Mediterranean basin to address a pre-defined systemic challenge related to sustainable development from the MED perspective gravitating around the main challenge of Sustainable Aquaculture in the Mediterranean.

Link to report

Digitalization of Blue-bioeconomy

The fourth policy experiment focuses on the identification of problems, initiatives and suggestions of potential solutions that relate in the digitalization of Blue Bioeconomy. The policy experiment will examine the challenge taking into consideration i) Education and ii) Entrepreneurial aspects, as well as iii) aspects related to collaboration between industries and research organisations.

Link to report

Impact of aquatic Invasive Alien Species: State-of-the-art and main challenges to deal with

The fourth policy experiment focuses on reducing and eradicating the impact of Invasive Alien Species by implementing innovation strategies in terms of quadruple helix stakeholders cooperation, research and innovative business models.

Link to report

ANNEX II - Comparative analysis per dimensions

Dimensions gathered from the literature review:

Shared Agendas

	Policy experiments Dimensions	Shared vision and agenda
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - System mapping as a tool to build a shared agenda among different stakeholders. - Leverage points increase operability due to their capacity to concentrate multi-stakeholder efforts to implement the Shared Agenda. **How does the policy experiment contribute to implementing the dimension:** - The larger the number of participants, the wider and more complex the system map will become; however the skilled use of facilitation techniques and the leverage points can help condensing this complexity. - A shared vision in regards to risks and mitigation strategies should also be taken into account.
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - Promoting parallel work among quadruple helix stakeholders, allowing many people to work in parallel sessions, sharing information and points of view. - Within the Scan-Focus-Act model, specifically the scanning phase aims at promoting a common language and facilitating communication among stakeholders, building a common vision and community. - In practical terms, the shared agendas have been built in 4 key aspects of the Med Sustainable Aquaculture: Governance, Environment, Social and Economics. **How does the policy experiment contribute to implementing the dimension:** - The approach based on the Scan-Focus-Act sequence allows participants to overcome and enhance diversity to arrive at a deep exploration of the challenges to be addressed
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - The process to define a shared vision and agenda was based on specific steps: delimiting the challenge; identifying the key actors; co-developing a shared understanding of the current situation; identifying opportunities; designing an initial governance model. - The methodology was based on mapping the needs and the gaps, identifying potential solutions/initiatives that could address the challenge in three dimensions: educational, entrepreneurial and collaborational. **How does the policy experiment contribute to implement the dimension:** - The approach specifically considers 2 time points (present and future), highlighting the need to have a shared vision for the future based on a shared understanding of the present.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The policy experiment relied on a two-stage methodological approach to promote a shared agenda across stakeholders. - Firstly, in a multi-stakeholder workshop (mapping session) participants agreed on broadly defined problems and innovative actions in connection with the challenge. - Secondly, the inputs of this participatory session would later on feed into an online survey, whereby multi-stakeholder support would be quantified. **How does the policy experiment contribute to implement the dimension:** - The use of statistical techniques and social network analysis allows to quantify stakeholders' support for the main needs and innovative actions constituting a shared agenda, helping assess its operatibility. - A broader stakeholder constituency can be mobilised given the relatively limited opportunity cost of participating in the process (see inclusiveness). - The process offers less room for stakeholders' contributions, reflexivity and consensus-building compared to workshop-centred approaches.

Anticipation

	Policy experiments Dimensions	Anticipation
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - The existing correlations within the system map are an explicit exercise of anticipating. By knowing actions and consequences from the past, it is possible to anticipate positive effects of innovations, as well potential risks. **How does the policy experiment contribute to implementing the dimension:** - The methodology used is strongly based on collective experience and knowledge, legitimising the connections and correlations identified. - The structure of the map unearths relationships between factors, including them in anticipation exercises.
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - The open dialogue can be used to promote a common understanding on potential threats and opportunities. - The open dialogue might also be the basis for a mechanism of anticipation since what happened in a region might happen in the future in another one. **How does the policy experiment contribute to implementing the dimension:** - The concept of anticipation can be better understood and developed among the different stakeholders.
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - By being aware of existing interconnections and impacts between factors, the experiment allows to anticipate the impacts of the innovations promoted. **How does the policy experiment contribute to implementing the dimension:** See “How was the dimension implemented”.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The approach followed launched a discussion on the negative impacts that might stem from the innovation actions to address the challenge. **How does the policy experiment contribute to implement the dimension:** - At the expense of limited room for consensus-building, survey approaches and Social Network Analysis allowed stakeholders to express openly their concerns about the negative impacts of innovations. - In workshop settings, group thinking and the pressure to build premature consensus might diminish the opportunities for critical stakeholders to express themselves.

Reflexivity

	Policy experiments Dimensions	Reflexivity
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - The process of validating the map and defining a portfolio of actions was based on constant iterations to co-design the solution. **How does the policy experiment contribute to implementing the dimension:** - The process of definition and validation of the system map represents an opportunity for participants to understand the complexity of sustainable developmet challenges. - The system mapping and specifically the loops defined, are an example of the reflection upon the outcomes of factors related to the challenge, and the (un)desired impacts of solutions proposed.

ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - The reflexivity around the current impacts of the innovations promoted could partially be covered by the fast interactions within the working methodology applied. - Multiple iterations allow groups to engage in detailed design, knowing that they can later step back to apply their critical judgement and new points of view, before refining previous agreements. **How does the policy experiment contribute to implementing the dimension:** - Future implementations of the policy experiment methodology should provide more detailed outcomes that can facilitate the discussion around the impacts of the innovation actions proposed.
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - Focusing the workshops on the existing interconnections between factors can facilitate a certain degree of reflexivity by understanding potential correlations. **How does the policy experiment contribute to implementing the dimension:** - Future implementations of the policy experiment methodology should provide more opportunities for workshop discussion, guaranteeing a further development of the map.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The use of quantitative research techniques diminished the opportunities for the reflective processes that might stem from participatory research tools. **How does the policy experiment contribute to implement the dimension:** - Future implementations should provide more opportunities for workshop discussion.

Experimentation

	Policy experiments Dimensions	**Experimentation**
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - The process of definition and validation of the system map represents an opportunity for participants to understand the complexity of sustainable development challenges. - Shared Agenda approaches like the one applied in the experiment have been implemented at the regional and national level, less so at the transnational level. **How does the policy experiment contribute to implementing the dimension:** - The leverage points allow for identifying correlations between factors, that could be exploited through innovation co-creation in more stable spaces (e.g. living labs).
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - As part of the Scan-Focus-Act model being used, the last phase is focused on experimentation. - The idea is to advance toward more concrete, and easier to implement innovation proposals; however in this policy experiment, the final results remained at a high level. - The policy experiment's experimental focus also revolved around gathering data in regards to a future Mediterranean Innovation Alliance for a Sustainable Blue Bioeconomy. **How does the policy experiment contribute to implementing the dimension:** - Future implementation of the methodology should focus on achieving a higher degree of detail at the end of the process, promoting links with more stable spaces for innovation co-creation (e.g. living labs).
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - The policy experiment aimed at identifying opportunities and challenges and at generating ideas, not expecting to reach any experimentation phase. **How does the policy experiment contribute to implementing the dimension** - Future implementations of the policy experiment methodology should continue with the next phases of the pathway to innovation, development and testing, before any real implementation and scale-up.

IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The survey allowed the involvement of stakeholders with limited opportunities to co-develop and experiment with innovations. **How does the policy experiment contribute to implement the dimension:** - Future implementations should seek continuity between the policy experiment and those spaces where stakeholders can select, and experiment with innovation co-creation (e.g. living labs).

Inclusiveness

	Policy experiments Dimensions	**Inclusiveness**
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - The inclusiveness in participation has been identified as one of the areas of improvement in the project, promoting the identification of potential strategies to increase inclusiveness. **How does the policy experiment contribute to implementing the dimension:** - The methodology shows the importance of a variety of stakeholders in defining the system map since it will consider different perspectives (horizontal complexity). - The system map shows the need for understanding correlations between factors, helping to better understand the complexity of sustainable development challenges(vertical complexity).
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - The open discussion around the added value of a transformative innovation policy approach to address common challenges had the purpose to let every participant talk and bring forward ideas. - The inclusiveness in participation has been identified as one of the areas of improvement in the project, promoting the identification of potential strategies to increase inclusiveness. **How does the policy experiment contribute to implementing the dimension:** - The open discussion approach, within the Scan-Focus-Act structure of the three workshops, has shown the importance of framing workshops not so much in terms of topics but goals.
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - The policy experiment was able to gather 15 participants, obtaining transversal representativeness of the northern shore of the Mediterranean. **How does the policy experiment contribute to implementing the dimension:** n.d.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The methodology is aimed at supporting the involvement of a relatively broad stakeholder constituency, offering to the participants the opportunity to reply to a survey in English and Spanish. **How does the policy experiment contribute to implement the dimension:** - A lower opportunity cost of involvement for resource-strained participants, allowing flexible participation. - Lower barriers to participation appear indeed to have enabled the involvement of a broader stakeholder base. - The distribution of responses suggests a broader stakeholder involvement, combined with a more even stakeholder distribution by quadruple helix categories. - Diminished language barriers to participation.

Dimensions gathered inductively:

Multilevel inclusiveness

	Policy experiments Dimensions	**Multilevel inclusiveness**
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** -The policy experiment has been able to draw a multilevel stakeholder constituency. -The policy experiment has had relatively limited success in attracting local and transnational stakeholders, the latter only being present in the last of the workshops. **How does the policy experiment contribute to implementing the dimension:** -The limited participation of local and transnational stakeholders relates to their incentives: rapid returns for resource-constrained local stakeholders, lengthy bureaucratic processes for transnational stakeholders. - A range of measures could be devised for future policy experiment engagements, including: Bidirectional communication efforts to ensure that the framing question (or in any case framing subquestions) are linked to the needs of local/regional stakeholders; targeting leading local/regional stakeholders, to tap on their power to attract broader stakeholder constituencies; regional/national workshops in other languages than English; increased desk research efforts to draw transnational stakeholders; linkage of the policy experiment workshops to their implementation in living labs.
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - Most of the participant organisations corresponded to national (34.09%) and transnational (29.55%) stakeholders, suggesting a certain detachment from the needs of regional and local stakeholders. **How does the policy experiment contribute to implementing the dimension:** -The limited participation of local and transnational stakeholders relates to their incentives: rapid returns for resource-constrained local stakeholders. - The same measures as those applied in the challenge of Plastic Pollution apply.
Demokritos	Digitalization of Blue-bioeconomy	**n.d.**
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - Through an approach combining a multi-stakeholder workshop and a survey, the policy experiment aimed at drawing a broad multi-level stakeholder constituency. **How does the policy experiment contribute to implementing the dimension:** - Combining workshops and surveys might support the involvement of a multi-level stakeholder constituency, however the data (only available for the mapping workshop) points to a lack of transnational stakeholders. - Universities and research institutions perform roles in-between national and transnational organisations, providing access to resources available at both levels. - The same measures as those applied in the challenge of Plastic Pollution apply

Multistakeholder inclusiveness

	Policy experiments Dimensions	Multistakeholder inclusiveness
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - The analysis of the quadruple helix categories shows unbalanced representativeness, with a limited presence of civil society organisations (8.3%) and large corporations (5.6%). - The sub-categorisation of stakeholders helps to better understand the characteristics of the participants. **How does the policy experiment contribute to implementing the dimension:** - The implementation of the policy experiment suggests that its framing and format were not well enough suited to the incentives of the aforementioned stakeholders. - Limited participation of civil society organisations was related to their relatively limited resources and, relatedly, their need for relatively rapid, and tangible returns to their participation. - Limited participation of large corporations was related to their need for relatively rapid and tangible returns to their participation.
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - There is an over-representation of research and education, reaching 59% of the participating organisations. - The sub-categorisation of stakeholders helps to better understand the characteristics of the participants. **How does the policy experiment contribute to implementing the dimension:** - Policy experiment workshops should be designed and implemented to ensure that a broad quadruple helix constituency is involved in the policy experiment, for instance in the configuration of working groups. - Participation imbalances can be mitigated through stakeholders' distribution across sub-groups, ensuring quadruple helix involvement and increasing opportunities to contribute to the process. - Ballance in quadruple helix involvement might be relevant at the initial stages of the workshops, less so at later technical stages.
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - Academia and SMEs represent most of the stakeholders' distribution (37% and 38% of the total). **How does the policy experiment contribute to implementing the dimension:** - Efforts to communicate the challenge might be crucial to draw different types of stakeholders to participate in the workshops. - Policy-making circles and civil society organisations should be treated with care to incentivise their involvement.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - Academia was the most represented stakeholder both in the mapping workshop and the validation survey (61%), followed by public administration bodies (19%). - The sub-categorisation of stakeholders helps to better understand the characteristics of the participants. **How does the policy experiment contribute to implementing the dimension:** - The mix of participatory tools (workshops and surveys) allows for reaching a larger number of participants, increasing inclusiveness. - Further efforts should be devoted to reaching a balanced stakeholder distribution

Transnational inclusiveness

	Policy experiments Dimensions	Transnational inclusiveness

CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - The policy experiment succeeded in guaranteeing a broad enough representation to ensure the transnational character of the networks stemming from the workshops. - Southern Mediterranean stakeholders could not be recruited, being represented indirectly through transnational stakeholders. **How does the policy experiment contribute to implementing the dimension:** -Difficulty to engage Southern Mediterranean stakeholders -Difficulty to engage transnational stakeholders: See multilevel inclusiveness - As in the other policy experiments (see below), the difficulty to engage Southern Mediterranean stakeholders suggests the need for specific strategies in policy experiment design and implementation.
ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - In terms of transnational representativeness, there is a higher national participation of stakeholders from Italy and Spain (27% and 39% respectively). - Stakeholders from 9 countries participated in the policy experiment, out of which 7 were Northern Mediterranean countries and one Southern Mediterranean. - Most of the countries had stakeholders participating in at least 2 workshops, except for Croatia and Germany, which only had one representative each and participated in only one session. **How does the policy experiment contribute to implementing the dimension:** - Importance to provide data registering the extent to which stakeholders participate in the co-creation process, i.e. in more than one activity. - Data of participation in at least 2 workshops suggests continuous commitment on the part of national stakeholder communities (strength of the network, knowledge being accumulated,…)
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - This policy experiment lacks participants from the southern shore of the Mediterranean. The countries with more participants were Italy (38%), followed by Greece (25%) and Malta (19%). **How does the policy experiment contribute to implementing the dimension:** - The policy experiment results suggest that how communication efforts are managed is essential, in order to guarantee that stakeholders from both shores of the Mediterranean are involved.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The mix of participatory tools (workshop and survey) allows for reaching a larger number of participants, increasing inclusiveness **How does the policy experiment contribute to implementing the dimension:** - The mix of workshops and surveys presents strenghts and inconveniences akin to the other subdminesions of inclusiveness.

Tools to promote multi-stakeholder learning (transversal)

	Policy experiments Dimensions	**Tools to promote multi-stakeholder learning (transversal)**
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - Participating in the policy experiment has increased knowledge and skills for the participants not only related specifically to the challenge but also methodology-wise. **How does the policy experiment contribute to implementing the dimension:** - Considering shared vision and agendas as a starting point for any long-term collaboration focused on promoting development and innovation - Key: Properly framing the challenge (and the research question) that will guide the entire experiment. - Using system thinking as a new approach to analysing complex challenges. - Particularly useful within system mapping is the identification of leverage points.

ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - Building a common vision based on the high heterogeneity of the participants. **How does the policy experiment contribute to implementing the dimension:** - Considering shared vision and agendas as a starting point for any long-term collaboration. - Identifying challenge owners as a strategy to guarantee the commitment of stakeholders. - Reaching a common vision with a heterogeneous group of stakeholders might reduce the capacity of the policy experiment to reach in detail solutions to the challenge. - Extending the process by adding further sessions after the preliminary phase of analysing, sharing and converging towards a vision or a direction. - Expert participants should be involved in thematic groups to work on actual innovation actions. - A challenge owner should be identified.
Demokritos	Digitalization of Blue-bioeconomy	**How was the dimension implemented:** - The policy experiment intended to promote multi-stakeholder learning by helping stakeholders identify together bottlenecks preventing the deployment of digital technologies in the blue bioeconomy sector. **How does the policy experiment contribute to implementing the dimension:** - Through techniques identifying the bottlenecks and the relationships between them, the policy experiment provides stakeholders with a tool that can help them reach a shared understanding.
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - Validating the results of the mapping workshop through a survey might have limited the learning from the policy experiment; however the workshop included two stages that promoted multi-stakeholder learning: sharing knowledge session and co-creation session. - Some stakeholders participate either in the workshop or the survey, missing part of the learning process. **How does the policy experiment contribute to implementing the dimension:** - Combining workshop and survey approaches allowed to engage a wider audience. Diffusing the workshop both in English and Spanish further supported wider engagement. - A detailed analysis of stakeholder's engagement in the mapping and survey identified a representativity bias towards ResearchandEducation and Spanish stakeholders.

Balance between inclusiveness and implementation potential

	Policy experiments Dimensions	**Balance between inclusiveness and implementation potential**
CREDA	Recovery And Recycling Of Macro-Plastic Waste In The Mediterranean	**How was the dimension implemented:** - A broad stakeholder network has been included in the identification and validation of the elements and the interconnections that have built the system map. - The system map approach, in turn, has supported the identification and prioritisation of leverage points, opening the door to the practical co-design and implementation of innovations. - The mix of participation and preparatory work was crucial to the right combination between system map co-creation, and advancing towards its implementation in the leverage points. **How does the policy experiment contribute to implementing the dimension:** - The process of co-creating the system map and identifying leverage points allowed stakeholders to combine the strengths of inclusiveness and implementation potential; multiple points of view on the challenge contributed to define the system map, while the leverage points provided a focusing device. - Complementarily, the identification of leverage points enables, as a trait specific to system mapping, the formation of multi-stakeholder coalitions whereby innovation portfolios can start being co-created

ART-ER	Innovation in Sustainable Aquaculture	**How was the dimension implemented:** - The policy experiment managed to be inclusive enough considering the 3 levels of analysis and having small imbalances common to the rest of the experiments. - This policy experiment, based also on the learnings shared in the report, admits the lack of balance between inclusiveness and implementation, having prevailed the first over the second. **How does the policy experiment contribute to implementing the dimension:** - The outcomes of the policy experiment point to the need for a longer time to build a common vision and have time to work together towards that vision. - The policy experiment's emphasis on inclusion rather than implementation allowed to obtain valuable insights into the willingness to build an innovation alliance for a sustainable blue bioeconomy in the Mediterranean, and the routines needed to ensure its functioning. - Implementation is in part left to the future innovation alliance, which aims at facilitating the development of more specific projects at the Mediterranean level.
Demokritos	Digitalization of Blue-bioeconomy	**n.d.**
IFAPA	Impact of aquatic Invasive Alien Species (IAS). State-of-the-art and main challenges to deal with	**How was the dimension implemented:** - The mix of workshops and surveys allowed include stakeholders' insights on how should the challenge be addressed with concrete data on which innovation proposals enjoyed more implementation support. **How does the policy experiment contribute to implementing the dimension:** - The use of surveys provides a large amount of data that can support the decision-making in terms of solutions and activities to prioritise and implement. Particularly important is the information on the preferences of different types of stakeholders regarding the implementation of innovation proposals.