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# Participatory Governance for the Development of the Blue Bioeconomy in the Mediterranean Region

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► **To cite this version:**

Héloïse Berkowitz. Participatory Governance for the Development of the Blue Bioeconomy in the Mediterranean Region. [Research Report] PANORAMED. 2020. hal-02555685

**HAL Id: hal-02555685**

**<https://hal.science/hal-02555685>**

Submitted on 27 Apr 2020

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# **Participatory Governance for the Development of the Blue Bioeconomy in the Mediterranean Region**

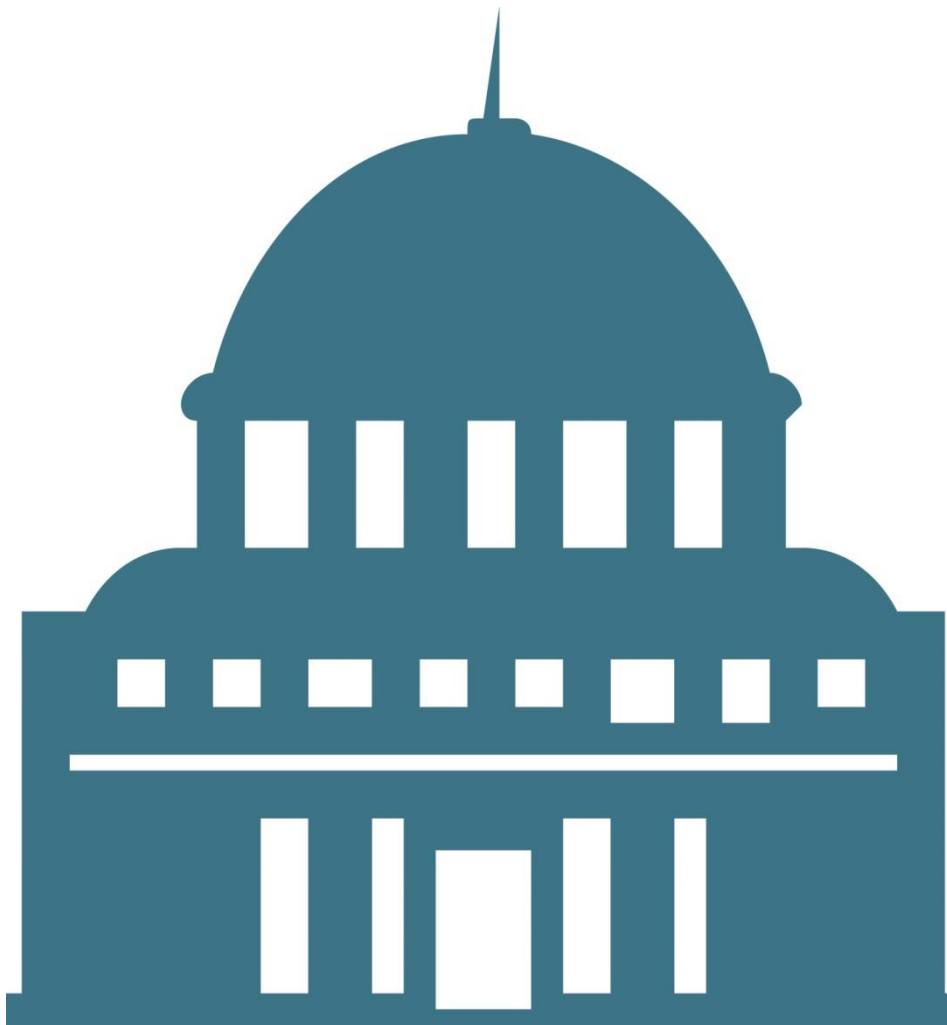
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January 2020

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Héloïse Berkowitz

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## **Participatory Governance for the Development of the Blue Bioeconomy in the Mediterranean Region**

This working document has been elaborated in the framework of the the Work Package Innovation of the Panoramed project, financed by the Interreg MED Programme 2014-2020. Panoramed Governance Platform (2020)

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## EXECUTIVE SUMMARY

Participatory governance is crucial to ensure transition. The development of the blue bioeconomy is no exception, and requires participatory governance models, especially to foster and frame niche local experimentation in the field of blue sustainability. The principle of participatory governance needs to be more systemically integrated in all local and transnational transition projects in Panoraméd and future transnational funding programmes.

In this report, we develop a participatory governance model based on a review of the literature, best practices of successful cases collected through a Panoraméd online survey and existing Interreg examples which are already developing this governance component.

First, we show that innovation can have negative effects on environment and society. Therefore, to ensure a responsible blue bioeconomy, innovations in that field need to be sustainable. This means developing six capabilities: anticipation, resilience, reflexivity, responsiveness, inclusion and accountability.

Next, we design a model of locally-embedded, participatory, multi-stakeholder governance for sustainable innovation in the blue bioeconomy, with the contributions of each sphere (economic, public administration, science, civil society). This model of governance for sustainable innovation presents four characteristics: embeddedness, multi-stakeholder, collective and bottom-up decision-making process, and self-regulation mechanisms.

Indeed, results show that the first key level of action for transition is the niche or local experiment. Governance needs, first and foremost, to be locally embedded, i.e. to take into account local or regional specificities in terms of geography, culture, social capital, climate change variations, pollution, etc. This embeddedness in the local context, i.e. geographies, regulations, economies, cultures, organizational configurations and so on, makes it possible to avoid or reduce regulatory misfits between national or transnational levels of regulation and local realities. Our findings also highlight the crucial importance of participatory governance being multi-stakeholder, i.e. integrating a broad diversity of actors with different interests, knowledge and capacities. To be fully multi-stakeholder, collaborations need to be quadruple helix and to engage with local businesses, local governments, local scientists and local civil society. This means a strong shift in mindsets in all spheres, including science and administration, to rely much more on co-construction in an open approach (i.e. open science or citizen science, and co-management). Next, a collective and bottom-up decision-making process is needed, i.e. decisions must be made jointly and involve all actors. Lastly, the governance model involves self-regulation mechanisms, established mostly by economic actors or jointly with them, resulting from voluntary compliance with and control of collectively-decided rules of actions and management.

Our findings also highlight some boundary conditions such as the importance of developing a holistic approach to transition, of focusing on collective sustainable innovation and of developing innovation capacities while implementing outreach strategies aimed at end users to raise awareness and willingness to participate and to pay, and, lastly, of building trust

among participants. In addition, the results outline the crucial role of certain new organizational actors, such as innovation brokers, boundary meta-organizations and institutional entrepreneurs.

The report identifies several multi-level obstacles and their solutions or opportunities for scaling up the governance model in the Mediterranean Region.

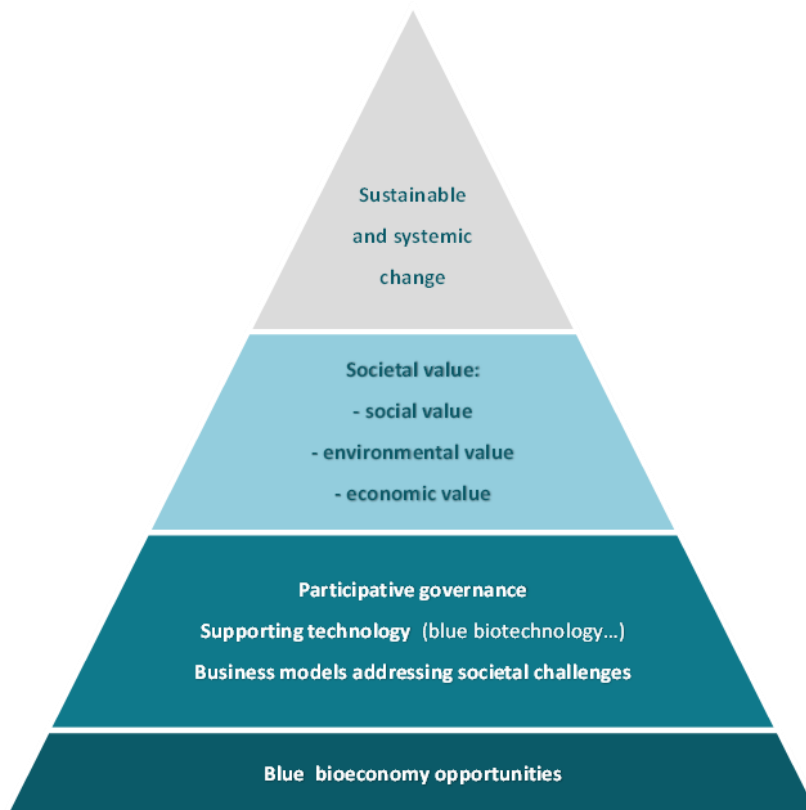
Finally, the report makes policy recommendations. These include developing twinning projects between North and South. We also propose the creation of a European status of “Experimenting Meta-Organization” (EMO) to facilitate multi-stakeholder governance and enable participants to request and manage funding. We also recommend the creation of a “Transition Experimentation Open Data Platform”, to give projects visibility, to encourage multi-stakeholder transnational collaborations, and to enable knowledge dissemination and project cross-fertilization. A final major recommendation consists of systemically integrating governance into project selection. To that end, we draw up a checklist to assess projects in competitive funding schemes, for instance at the stage of selection, but also at the stage of completion. We organize these criteria, which can act as key performance indicators (KPIs), according to three themes: sustainable innovation, participatory governance, and effectiveness of coordination.

## 1. INTRODUCTION

The Mediterranean Region faces several major intertwined challenges particularly related to the blue bioeconomy, from overfishing to marine litter and pressures from mass coastal tourism. The European Union has funded in the past and is still currently funding many initiatives and transnational programmes that encourage research and innovation projects which address these issues in the region. While these initiatives help improve funding opportunities, engage stakeholders, and increase capacities, we still do not understand well how these initiatives contribute to tackling MED challenges and how they may complement each other. Above all, we lack a governance model to systematize, scale up and transfer these projects.

Yet governance is crucial to achieving sustainable blue growth. “Participatory engagement of the local community in all steps of the MPA process is perhaps the most important component to ensure increased support and hence MPA success”, argue Hogg and co-authors in a recent Interreg Report (Hogg, Di Franco, Calò, Krstinic, & Santarossa, 2019, p. 4).

**Figure 1. Conceptual Framework for Panoramed WP Innovation**



Source: Panoramed Project.



Under Axis 4 of the Interreg MED Programme, Interreg Panoramed seeks to support this process of developing multilateral coordination frameworks and strengthening existing ones in the Mediterranean in order to facilitate joint responses to common major challenges. One central aspect in this is participatory governance (see Figure 1), which this report focuses on.

Strategic projects generated by Panoramed should conceive governance mechanisms that enable the following goals:

- Promoting sustainable and systemic change through responsible innovation
- Boosting sustainable opportunities related to the blue bioeconomy
- Developing or combining instruments and means to contribute to resolving major challenges while connecting new forms of participative governance to the development of blue biotechnology and new sustainable business models

Based on a review of the literature, and on the analysis of selected Panoramed case studies collected through online questionnaires and of best practices in existing Interreg projects, this paper proposes a model of governance for local experimentations, identifies key governance actors, presents conditions for success and transfer of the model, and investigates obstacles and their solutions. Finally, the report presents some recommendations.

In the first section of this report, we argue that opportunities in the blue bioeconomy must be developed and encouraged in a sustainable manner. Most policy-making and political discourses nowadays encourage innovation, but without taking into account the necessary boundary conditions for innovation to be actually sustainable. We therefore define and frame the notion of “sustainable innovation”. Sustainable innovation means a socially desirable change, whether technological, strategic or organizational, that draws on six capabilities: anticipation, resilience, reflexivity, responsiveness, inclusion and accountability.

We show that, to foster the development of sustainable innovation in local experimentations, specific local governance mechanisms are needed, in order, firstly, to enable the emergence of said experimentations and, secondly, to monitor their sustainability and enable their dissemination. We propose an initial conceptual model of governance for sustainable local experimentation that relies on four key parameters: local embeddedness; multi-stakeholder engagement; collective & bottom-up decision-making process; and self-regulation mechanisms.

In the second section, we then confront this model of locally-embedded, participatory, multi-stakeholder governance for sustainable innovation with several successful initiatives in the Mediterranean Region. We have selected four cases, two of them in fisheries, one in agriculture and one in energy, because they provide rich information. Next, we derive some general insights for the blue bioeconomy. One of the most key insights is, firstly, the need for a holistic approach between science, policy, businesses and civil society. Developing participants’ innovation through capacity building constitutes another key parameter. Our analysis further highlights the importance of raising end users’ awareness and willingness

to participate and to pay through outreach strategies. This can help reduce resistance to change from both economic actors (including, more generally, those in the supply chain) and consumers. Within this context, trust emerges as an important element for participatory governance to function.

To facilitate these elements, i.e. holistic approach, innovation capacity building, outreach strategies and trust development, we then identify key-category actors and their functions, i.e. innovation brokers, boundary organizations in the form of multi-stakeholder meta-organizations, and institutional entrepreneurs.

The final section of the report investigates some of the model's conditions for success and transferability. Among the conditions, it identifies having a shared goal, actionability of the governance model, joint actorhood and joint responsibility as key features. However, many obstacles in the Mediterranean Region may also impede the scaling up and dissemination of this model. These obstacles include, among others, regulatory inconsistencies in the region (i.e. multi-layered and multi-level governance instruments that sometimes clash with each other or cancel out the efforts of others), variability in cultures, geographies, climates, etc; lack of local collective action (not all countries have a tradition of autonomous self-organization like the Spanish regions, for instance), geopolitical tensions, migratory risks, lack of resources (financial and human resources and social capital are needed for these experimentations and their governance models to be developed and scaled up), lack of trust, which is a long term, fragile, construction; lack of commitment of all stakeholders (public administrations, businesses, scientists, civil society), immaturity of business models in emerging sectors (certain sectors might be too new to have stabilized business models), resistance to change of established actors, lack of entrepreneurial skills in lagging regions, and lack of general capabilities needed for the governance (either in business, science, policy or civil society, or at the level of the boundary meta-organization or the innovation brokers).

Furthermore, the report argues that it could be fruitful to facilitate and encourage the development of boundary meta-organizations with responsibility for the multi-stakeholder governance of experimentations and accountable for decisions made. This could be facilitated through the creation of a European status, like a Producers Organization, which would enable local experimentation in sustainable innovation for transition and its governance. One could imagine a status of "Experimenting Meta-Organization", which would allow members to request and manage funding.

The report is organized into four main sections. The first section synthesizes the empirical issues and develops an initial conceptual framework. Section 2 reviews best practices and enriches the participatory governance model based on findings. Section 3 investigates conditions and challenges to scaling up the model. Finally, Section 4 proposes recommendations.

## 2. FRAMING THE ISSUE

Our oceans face severe pressures resulting from uncontrolled innovations that unsustainably increase resource extraction capacities and marine industries' impacts on the environment. So, how to ensure the development of sustainable innovation for the ocean?

In this section, we develop the basis for an analysis of participatory governance in the context of the blue bioeconomy in the Mediterranean Region. To do so, we first lay the conceptual ground by defining concepts like sustainable innovation and transition management studies. We then propose a theoretical model of locally-embedded, participatory, multi-stakeholder governance for sustainable innovation experimentation in the context of the blue bioeconomy.

### 2.1. The foundations of sustainable development

#### 2.1.1. Back to basics: the political dimension of sustainable development

Sustainable development is, first and foremost, a political problem, that has to deal with the organization of the city and of societies (Berkowitz, 2016). The origin of this key dimension of sustainable development can be traced back to the end of the 18th century, in discussions around the French and United States constitutions.

Indeed, in 1789, in France, groups of deputies were working on a declaration of human rights. On the 11th of July 1789, Lafayette proposed a draft which included, in Article 10, a mention of "the right of generations to come". This was not retained in the final text, but where does it come from? From discussions with Thomas Jefferson, ambassador of the United States at the French Court at that time. In a letter, Jefferson writes:

"The question whether one generation of men has a right to bind another, seems never to have been started either on this or our side of the water. Yet it is a question of such consequences as not only to merit decision, but place also, among the fundamental principles of every government. The course of reflection in which we are immersed here on the elementary principles of society has presented this question to my mind; and that no such obligation can be so transmitted I think very capable of proof.—I set out on this ground, which I suppose to be self-evident, "that the earth belongs in usufruct to the living": that the dead have neither powers nor rights over it [...] Then no man can, by natural right, oblige the lands he occupied, or the persons who succeed him in that occupation, to the payment of debts contracted by him. For if he could, he might, during his own life, eat up the usufruct of the lands for several generations to come, and then the lands would belong to the dead, and not to the living, which would be the reverse of our principle".

(Letter of Thomas Jefferson to James Madison, 6 Sept 1789, Jefferson, 1958, p. 392)

This paragraph is still incredibly modern and relevant to today's debates and challenges. It states that today's living people have no right to oblige future generations that will live on the

Earth when they are dead. In particular, the text argues that living people should not contract debts, whatever their nature, which would bind future generations.

The principle according to which the Earth only belongs to the current generation in usufruct means that the generation should not threaten the Earth’s capital. This is held to be *self-evident* and surpasses other political decisions. As such it ought to bind any government.

However, this political dimension of sustainable development has been neglected to the advantage of a more economic approach.

### 2.1.2. Moving towards an economic approach? The tragedy of the commons

Sustainable development has been largely framed as a technical-economic problem, as the works of the Club of Rome show (Meadows, Meadows, & Randers, 1992; Meadows, Meadows, Randers, & Behrens III, 1972), in a context of accelerating industrialization, demographic growth, depletion of non-renewable resources and a deteriorating environment.

The environment around us, the air we breathe, the water we drink, the oceans, the forests, constitute common goods, whose characteristics precisely trigger economic and management challenges for the sustainable development of societies. Figure 2 synthesizes the various categories of goods based on criteria of excludability (how hard it is to prevent agents from using the resources) and of rivalry (the extent to which the consumption of the resource by one agent prevents others from consuming it).

**Figure 2. Classification of types of good based on criteria of excludability and rivalry**



Source: The Author.

Natural goods like fisheries, forests and underwater basins are considered as common pool resources (Ostrom, 1990). They are rivalries and non-excludable. As a consequence they are prone to what has been called the tragedies of the commons. For instance, fishermen and women may be tempted to harvest as many fish as possible, fearing that someone else will if they do not do so. However, this endangers the resource as a whole. In the tragedy of the

commons, short term individual interests are in conflict with collective interests. Yet recent literature on the topic has contributed to questioning the so-called tragedy and to showing that, on the contrary, many solutions are possible through participatory or co-management strategies, in line with Ostrom (Di Franco *et al.*, 2016).

## 2.2. Collectively governing sustainable innovation in the context of the blue bioeconomy

Conceptually, the blue bioeconomy describes the introduction of innovations in the field of marine industries that are inspired by nature and generate multiple benefits, including jobs and social capital. The blue bioeconomy means any economic activity related to the use of renewable aquatic biological resources to generate economic and social value.

Aquatic biomass (both wild and cultured) from the seas and oceans, rivers and lakes, has, for instance, a large potential to ensure future food, feed and nutrition security. It is also a potential source of raw materials for use in value chains of high value, products and processes, such as pharmaceuticals, food ingredients, bioprocessing, chemicals, novel materials and cosmetics while factoring in environment and climate change risks. In many cases, the utilization of aquatic bioresources can be more sustainable than terrestrial production methods. Examples of such products include novel foods and food additives, animal feeds, nutraceuticals, pharmaceuticals, cosmetics, materials (e.g. clothes and construction materials) and energy.

### 2.2.1. What is sustainable innovation?

Any innovation in these fields is not by nature desirable. On the contrary, recent literature increasingly shows that technical innovation, for instance in fisheries, can aggravate overexploitation and have serious impacts on fauna and habitats (Finkbeiner *et al.*, 2017).

We can argue that a sustainable innovation is also one that considers the Sustainable Development Goals (see Figure 3), without threatening one while trying to achieve another.

In addition to these desirable outcomes for innovation, recent literature has more specifically conceptualized the nature and principles of sustainable or responsible innovation (Owen, Bessant, & Heintz, 2013; Stilgoe, Owen, & Macnaghten, 2013).

Sustainable innovation and research can first be defined as a: “transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)” (Von Schomberg, 2011, p. 9). Further, sustainable innovations can be considered as: “(1) innovation [that] avoid harming people and the planet, (2) innovations [that] ‘do good’ by offering new products, services, or technologies that foster sustainable development, and (3) global governance schemes [that] are in place that facilitate innovations [...]” (Voegtlin & Scherer, 2015, p. 1). This emphasizes the importance of

governance frameworks that allow the development of such sustainable innovation, i.e. that allow interactions among “societal actors and innovators”.

Recent literature has outlined specific capabilities related to sustainable innovation (Berkowitz, 2018; Stilgoe *et al.*, 2013). These capabilities include: anticipation, resilience, reflexivity, responsiveness, inclusion, accountability, as summarized in Table 1.

**Figure 3. Sustainable Development Goals**



Source: United Nations (2015).

**Table 1. Identifying capabilities for sustainable innovation**

Capability	Definition
<b>Anticipation</b>	Systematic questioning of emerging technologies’ potential impacts on environment and society to increase resilience and shape the evolution and regimes of innovation
<b>Resilience</b>	Sustainability to crises, i.e. the ability to resist over the long run, especially to deal with system risks
<b>Reflexivity</b>	Ability to examine an innovation’s impacts on environment and society, and therefore its own limitations
<b>Responsiveness</b>	Capacity to adapt to unforeseen exogenous shocks, to stakeholders and public demands, and to changing circumstances
<b>Inclusion</b>	Participation of stakeholders to the decision-making process related to the emergence, dissemination and control of sustainable innovation
<b>Accountability</b>	Taking responsibility for decisions made, explaining them, and being transparent about them

Source: The author.



In a pioneering work, Stilgoe, Owen and Macnaghten (2013) demonstrate the importance of anticipation in sustainable or responsible innovation. Anticipation consists in a systematic questioning of emerging technologies' potential impacts on environment and society, to increase resilience and shape the evolution and regimes of innovation. Resilience means the sustainability to crises, i.e. the ability to resist over the long run, especially to deal with system risks. To achieve these two first capabilities, reflexivity is required, i.e. the ability to examine an innovation's impacts on environment and society, and therefore its own limitations. Responsiveness constitutes another important capability necessary for sustainable innovation, that is to say the capacity to adapt to unforeseen exogenous shocks, to stakeholders and public demands, and to changing circumstances. Inclusion describes the necessary engagement of not only core stakeholders but also members of the wider public (civil society at large) in the governance or decision-making process related to the emergence, dissemination and control of sustainable innovations. Finally, sustainable innovation requires taking responsibility for decisions made, explaining them, and being transparent about them, i.e. accountability.

Once we have defined sustainable innovation and the necessary capabilities for sustainable innovation, how to achieve sustainable innovation, especially in the context of the blue bioeconomy, which is characterized by severe issues of common goods management, overexploitation and habitat destruction in a context of climate crisis (which contributes to exacerbating all these issues)?

### 2.2.2. Transition studies: the bases for a theory of systemic change?

Going beyond sustainable innovation, recent literature has argued that ensuring sustainable development implies deep transformations of infrastructures, regulations, social values, mindsets, etc. The notion of "transition" plays a key role: it is defined as a process of transformation where a complex socio-technical system moves from one stable state (an unsustainable one) to another one (a sustainable one) (Geels, 2005). And these transitions have to be actively managed to ensure their acceleration (Loorbach, 2010).

According to Loorbach (2010), the Transition Management Cycle has four stages (see Figure 4), which provide the basis of an operational understanding of managing transitions in society. These stages are: 1) problem structuring, envisioning and establishment of a strategic transition arena (where experiments will be conducted), 2) developing coalitions, images and transition-agendas, 3) mobilizing actors to execute projects and experiments, thus moving to a more operational phase, and 4) a reflexive stage where processes and outputs are monitored, evaluated and produce some learning that will be then used in the next cycle.

Socio-technical system transformation implies processes of change that interact at three different levels:

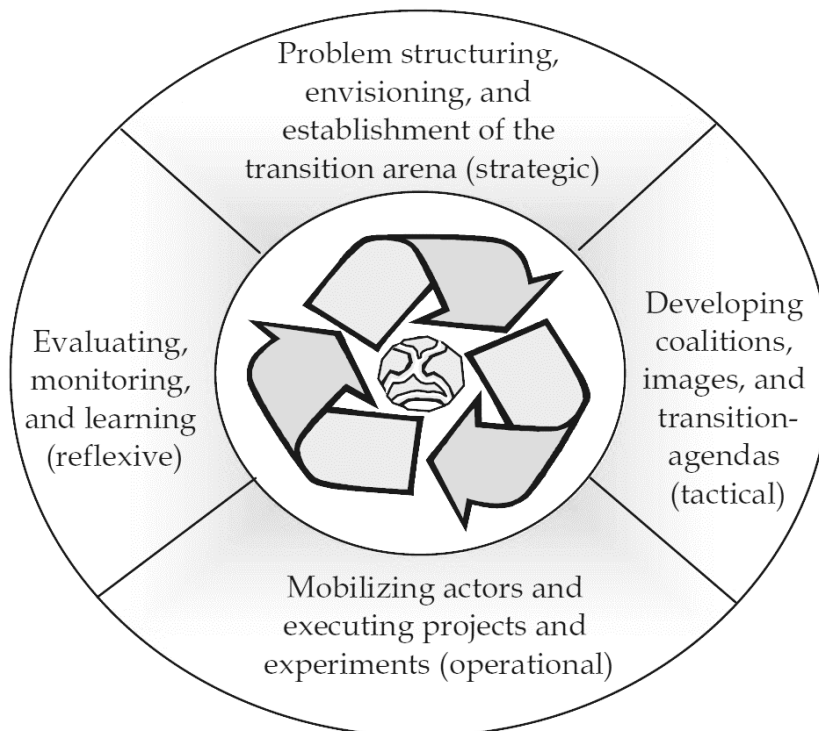
- General social landscape (i.e. the slow transformation of paradigmatic dimensions of society, like culture, economic models, social values),

- Regimes, i.e. sets of production, transportation, communication and consumption infrastructures and models, and lastly
- Niches, the spaces where innovation emerge through experiments.

In this perspective, there is no single best pathway to sustainability. Therefore, diverse pathways through local generation, experimentation and adaptation should be promoted. All regions, whether in the North or in the South of the Mediterranean Sea, are able to experiment with and contribute to transformative change, and there are many gains to be made from mutual deep learning.

Socio-technical system transformation implicates co-production of social, behavioural and technological change in an interrelated way. System innovation always involves multiple actors, including civil society and users. Socio-technical system transformation requires new forms of governance and dynamic, flexible and open approaches, which include experimentation, learning, reflexivity and reversibility. Experiments should be temporary spaces of stakeholders (governments, academia, business, civil society) working together to tackle common challenges, focusing on the articulation of new shared expectations and visions, the building of new networks and the shaping of new markets which will eventually challenge dominant current practices (Schot & Steinmueller, 2018).

**Figure 4. The Transition Management Cycle**

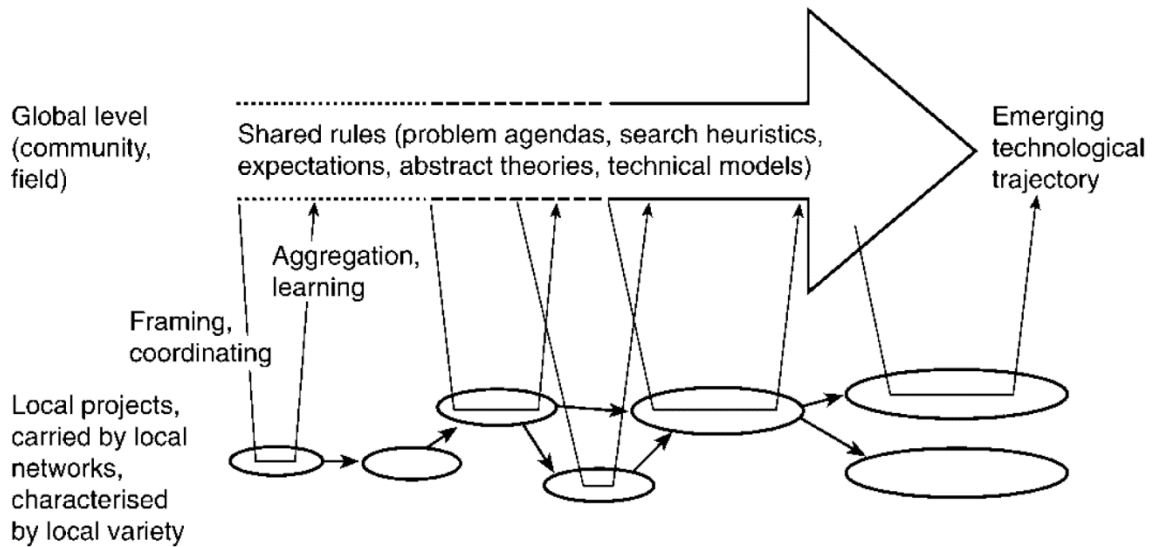


Source: Loorbach, 2010, p. 173.



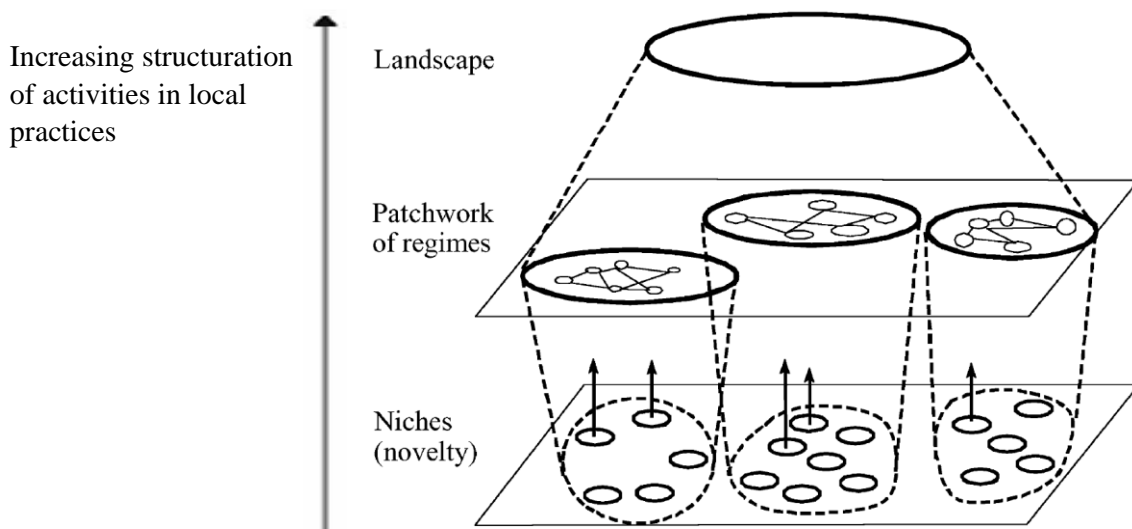
But how can the European Union then build on these experiments? Experiments are occurring at a very local level, i.e. in niches (see figures 5, 6 and 7). The European Union can play a role at various levels. First it can act at a global field level by setting problem agendas, search heuristics and expectations that can drive the framing and coordinating of local projects (Figure 5). Next, by coordinating the structuring of activities in local experiments, it will contribute to transitions at a landscape level (Figure 6).

**Figure 5. Emerging technical trajectory carried by local projects**



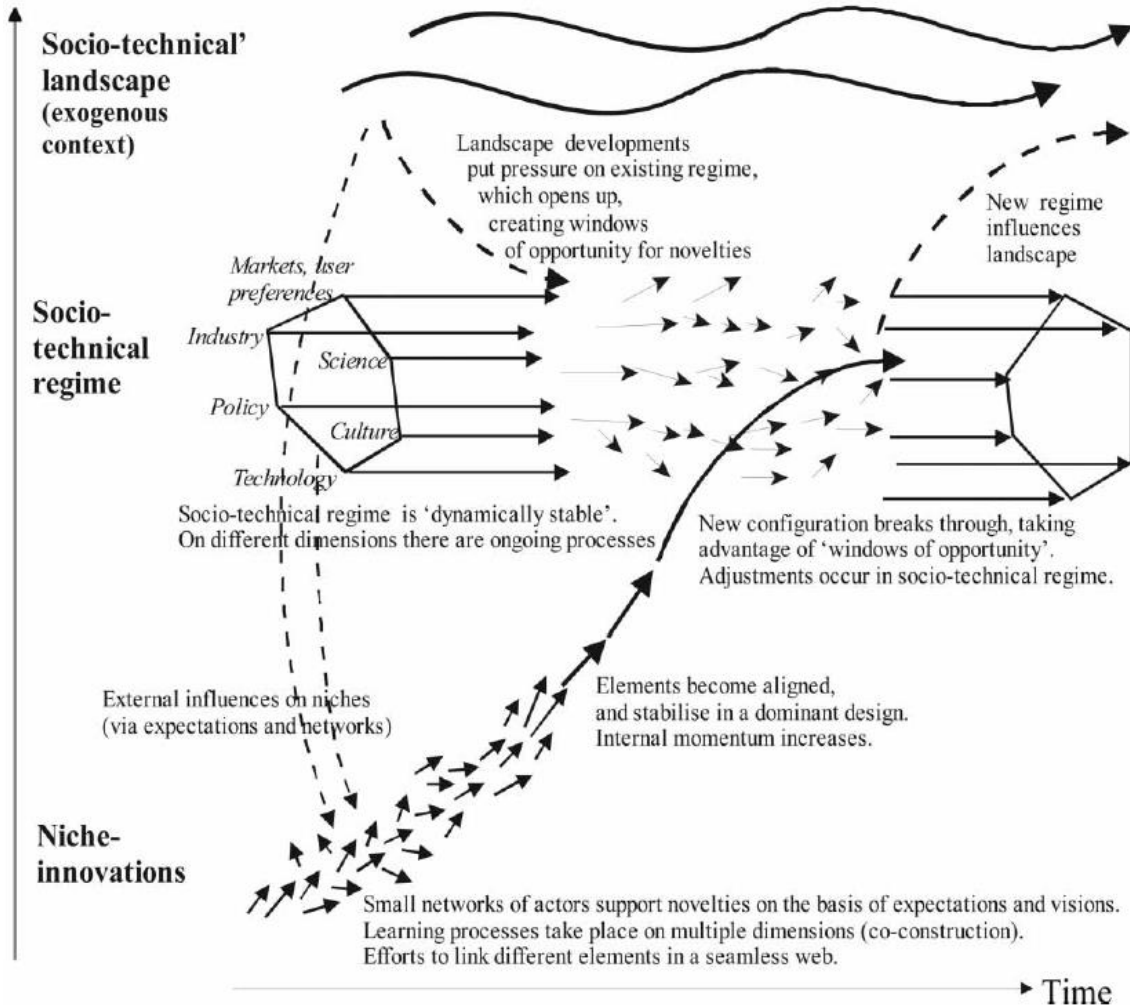
Source: Geels & Raven, 2006, p. 79.

**Figure 6. Transition levels interaction**



Source: Geels, 2002, p. 1261.

Figure 7. Multilevel perspective on transitions



Source: Schot & Geels, 2008, p. 546.

This project will investigate the conditions and forms under which local governance devices may best help frame and develop experiments and niche innovations for sustainable transitions.

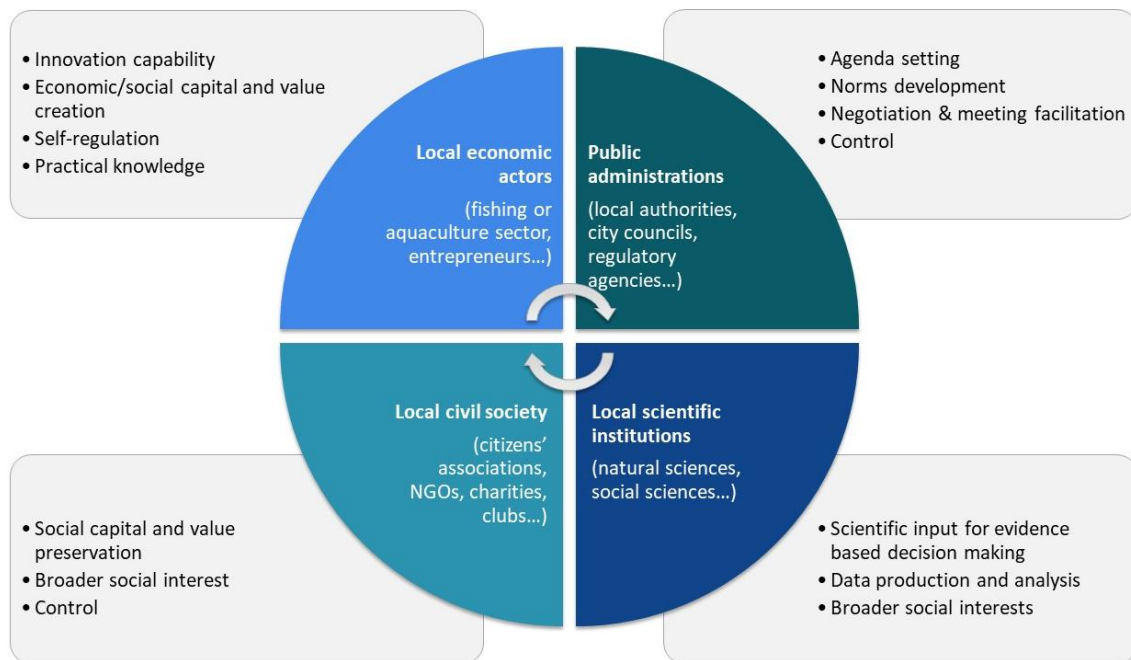
### 2.2.3. Proposition for a model of governance for sustainable innovation experiments

Based on works on transitions literature (Geels, 2002; Schot & Steinmueller, 2018), and on preliminary analysis of empirical cases (see Section III), we propose here a provisional model that will then be consolidated thanks to additional results from the survey and interviews.

The level of analysis here is the niche/local experiment. While the EU can play a role at a global level, governance also needs to be locally embedded, i.e. to take into account local or regional

specificities in terms of geography, culture, social capital, etc. (Yin, Rader Olsson, & Håkansson, in press). Figure 8 synthesizes the proposed model of locally-embedded, participatory, multi-stakeholder governance, with the contributions of each sphere (economic, public administration, science, civil society).

**Figure 8. Proposed model of locally-embedded, participatory, multi-stakeholder governance for sustainable innovation experimentation in the blue bioeconomy**



Source: The author.

The participation of local economic actors is a necessity since they are the main ones to 1) have the capability of innovation (Berkowitz, 2018), 2) create and preserve economic and social capital and shared value, and 3) be able to self-regulate (Berkowitz, 2018). Literature has shown the importance of integrating, for instance, fishermen and women in fisheries management plans to ensure their successes (Di Franco *et al.*, 2016). Practitioners are also able to co-produce very practical knowledge about resources management, based on traditions, for instance.

Next, public administrations, in their varying forms such as local or regional governments, city governments, regulatory agencies, etc., may also need to participate in order, firstly, to intermediate and transpose multi-level regulation (especially as established by the EU) (Yin *et al.*, in press) and, secondly, to develop adaptive norms. Thirdly, they also help negotiation and may act as key facilitators if conflicts arise. And, lastly, they have a monitoring and sanctioning function.

Thirdly, scientific institutions are necessary to develop evidence-based decision-making (Bailey *et al.*, 2016; Schot & Steinmueller, 2018). Especially in the context of marine sciences, ocean conservation and the climate crisis, scientific inputs, i.e. information and models about resources, dynamics, evolution and the interrelations between anthropic activities and natural ecosystems, need to be integrated to allow for an environmentally-informed governance process. More importantly, science participation helps to ensure that broader social interests are taken into account while making decisions, thus reducing the risks of a purely economic logic dominating governance and innovation development.

Finally, civil society also plays a key role, with two main functions. Firstly, one function of civil society in participatory governance consists of integrating *alterity* or *otherness* into the decision-making process (Berkowitz & Souchaud, 2019). This means that, similarly to the presence of science, civil society makes it possible to take into account broader interests than short term economic views. This may include impact on local communities or on the environment. The second function consists of a form of soft control. Civil society members, in particular NGOs, can indeed monitor the participation of other members, especially economic agents, and ensure that decisions made by the collective are compliant with the joint objectives.

To foster the development of sustainable innovation in local experimentation, this model relies on several key parameters:

- Embeddedness in local contexts (geographies, regulations, economies, cultures, organizational configuration, etc.)
- Multi-stakeholder approach (and, more precisely, quadruple helix governance, i.e. four spheres being represented: economy, science, public administration, civil society)
- Participatory governance, i.e. all actors are involved in the decision-making process
- Self-regulation by economic actors, resulting from voluntary association and voluntary compliance with and collective control of decided rules
- Bottom-up governance device, resulting from local, voluntary decision to set up governance

### 2.3. Empirical design: identifying case studies in the Med

The objective of the survey is to test and consolidate the local multi-stakeholder governance model through understanding some existing, successful initiatives in the Mediterranean Region, including but not only in Catalunya. A recent paper reviewed the literature on MPA and, based on interviews, formulated certain main attributes that can enhance the performance of small-scale fisheries in marine protected areas (Di Franco *et al.*, 2016).

The main attributes include:

- High MPA enforcement

- Presence of a management plan
- Fishermen's engagement in MPA management (to generalize to: economic actors' engagement in resource management)
- Fishermen representation on the MPA board
- Promotion of sustainable fishing

The section on governance in the survey was designed to investigate the importance of these elements for successful initiatives in the context of sustainable innovation in blue bioeconomy.

To dig deeper in the governance and co-management analysis, we decided to integrate additional questions drawing on an original organization theory approach. In particular, Ahrne and Brunsson (2011) argue that outside of organizations there exist not only networks or institutions (like regulators), but also partial organizations, which selectively combine some of the five following elements: membership, hierarchy, rules, monitoring, sanctions. Recent literature has demonstrated the analytical power of this concept for understanding the collective definition and dissemination of CSR practices (Berkowitz, Bucheli, & Dumez, 2017; Rasche, Bakker, & Moon, 2013). All forms of organizations —and this includes co-management committees— may selectively combine these elements. We want to investigate the optimal combination of organizational elements for the governance of sustainable innovation.

We propose to develop questions on these bases, seeking to enable understanding of the characteristics and effects of each element (see Annex for a final version of the section on participation).

### 3. BEST PRACTICES

This section considers a selection of best practices identified through the Panoramed survey. We include not only cases in marine industries, but also in the agro-food sector and in the clean-energy sector, because we consider that insights from other fields can be fruitful for the blue bioeconomy. The agro-food sector is particularly relevant as it also faces biomass and biodiversity conservation challenges. While the property regimes are different, governance schemes developed in that field may also, to some extent, be transposed to the ocean.

We first go through the different selected cases, i.e. Sand-eel co-management, Biolab Ponent, the FishMPABlue 2 project, Ecosystemic Transition Unit, and the model developed by the Interreg Med Renewable Energy Community. We apply the general framework designed in the previous section. For each case, we study six dimensions: embeddedness in local context (geographies, regulations, economies, cultures, organizational configuration, etc.); multi-stakeholder approach (and, more precisely, quadruple-helix governance, i.e. four spheres being represented: economy, science, public administration, civil society); participatory governance, i.e. all actors are involved in the decision-making process; self-regulation by economic actors, resulting from voluntary association and voluntary compliance with and collective control of decided rules; and bottom-up governance device, resulting from local, voluntary decision to set up governance. We further identify stakeholders involved in the case study and their functions and contributions to the governance device. Finally, we also highlight additional insights generated by the cases.

Next, we generalize the findings by synthesizing key best practices and by categorizing stakeholders. A holistic approach between science, business and public policy is necessary, and this may translate into local experimentations through specific meta-organizational governance devices. Innovation capacity constitutes another key dimension. The analyses also highlight the importance of end-user awareness and willingness to 1) participate and 2) pay. Outreach strategies are therefore needed to tackle resistance to change from both economic actors (including, more generally, in the supply chain) and consumers. Finally, trust emerges as an important element for participatory governance to function. We also categorize key actors and their functions, i.e. innovation brokers, boundary organizations and institutional entrepreneurs.

#### 3.1. Qualitative case studies analysis

This section is based on online in-depth surveys conducted by Panoramed WP 10 Innovation.<sup>1</sup> To conduct our analysis, we used the framework developed in the precedent section, examining the four dimensions of participatory governance:

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<sup>1</sup> Published material is available online at: <http://catalunya2020.gencat.cat/en/projects/panoramed-wp-innovation/>



- **Embeddedness in local context**, i.e. geographies, regulations, economies, cultures, organizational configuration, etc.),
- **Multi-stakeholder approach**, more precisely quadruple-helix governance, i.e. four spheres being represented: economy, science, public administration, civil society,
- **Collective and bottom-up** decision-making process, i.e. whether or not it results from the local, voluntary decision to set up governance, and all actors are involved in the decision-making process,
- **Self-regulation** by economic actors, resulting from voluntary association and voluntary compliance with and collective control of decided rules,

### 3.1.1. Case Study 1: Sand Eel Co-Management Committee

The first case study deals with sand-eel co-management in Catalonia (see Annex B). The Sand Eel Fishery Co-Management Committee was first implemented and tested in 2012. It has recently been formally included in the framework of the Maritime Strategy of Catalonia. This fishery is located on the central and north coast of Catalonia (NW Mediterranean).

The Committee has the mission of jointly producing a management plan for this specific species. Said management plan needs to comply with several key points, i.e. biological, social, economic and environmental factors affecting the sand eel fishery. All measures decided in the Management Plan are collectively discussed through the Co-Management Committee. This device is an equal-footing decision-making structure composed of all four types of actors, namely: 1) sand eel small-scale fishing sector, 2) local and national environmental and social organizations, 3) scientific expertise on the species, and 4) regional and national administration (see Figure 9).

#### 3.1.1.1. Local embeddedness

This governance initiative includes 26 artisanal boats based in 6 fishing ports on the central and northern coast of Catalonia, which are dedicated almost exclusively to sand eel and gobid fishery.

This initiative is particularly interesting for local economies and communities because it seeks to create a new product, reaching higher values and restricting catches (avoiding the saturation of markets and subsequent falling prices). The business strategy aims to be both very local and sustainable by:

- Differentiating the price of two versions of the fishing product
- Opening up to other regions
- Increasing the value of the product by limiting the catch.

The initiative can also generate opportunities for vulnerable groups such as women who play a key role in the fish food processing business, as well as migrants, long term unemployed, young people and the elderly.

#### 3.1.1.2. Multi-stakeholder approach

The initiative is clearly quadruple helix and includes:

- Economic actors (fishing sector through *cofradías*, associations of fishing companies), who comply with collectively decided rules and develop innovative business models to increase value.
- The local public administration (Direcció General de Pesca i Afers Marítims, and Secretaria General de Pesca del Ministeri d'Agricultura), which attends meetings and develops regulations.
- Local science centre (Institut de Ciències del Mar). The centre conducts scientific monitoring thanks to this joint initiative, assessing fish stocks and habitat based on a series of indicators, such as biomass or population size, catch per unit of effort trend, fishing mortality and state of the fishery. This then enables the allocation of monthly quotas for next season in a sustainable manner.
- Civil society (local representatives of the World Wildlife Fund, WWF) who bring in a broader societal view and help control all stakeholders.

#### 3.1.1.3. Collective & bottom-up decision-making process

This initiative was launched by local governments and the fishing sector, which is why it can be considered bottom-up. At the beginning, it was implemented through Order AAM/87/2014, which detailed some key elements concerning fishing activities. The European Commission approved the document one year later. And, in 2018, Order AAM/87/2014 was confirmed and extended for an additional period of four more years.

This Co-Management Committee responds to what the literature has coined a meta-organization (Ahrne & Brunsson, 2008), i.e. an organization in which members are themselves organizations, and with little to no specific resources.

The Co-Management Committee or related public administration voluntarily conducted interesting activities of outreach, pedagogy or advocacy towards consumers, economic actors and national governments or the EU, e.g. communication videos<sup>2</sup> (see Figure 10), several conferences and talks at the Fish Forum, for instance, or visits by a group of French fishermen members of the PelaMed project. A set of training courses for a wide range of sectors interested or implied in the co-management of fisheries are expected to be conducted soon.

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<sup>2</sup> Available at: <https://vimeo.com/65907836>



**Figure 9. Stakeholders participating in the initiative and their actions**



Source: The author.

**Figure 10. Communication about the co-management**



Source: World Wildlife Fund video.

Collaboration among all participants is key in this Co-Management Committee. In addition, all the sectors involved in the Co-Management Committee have equal weight in decision-making. Members meet every month.

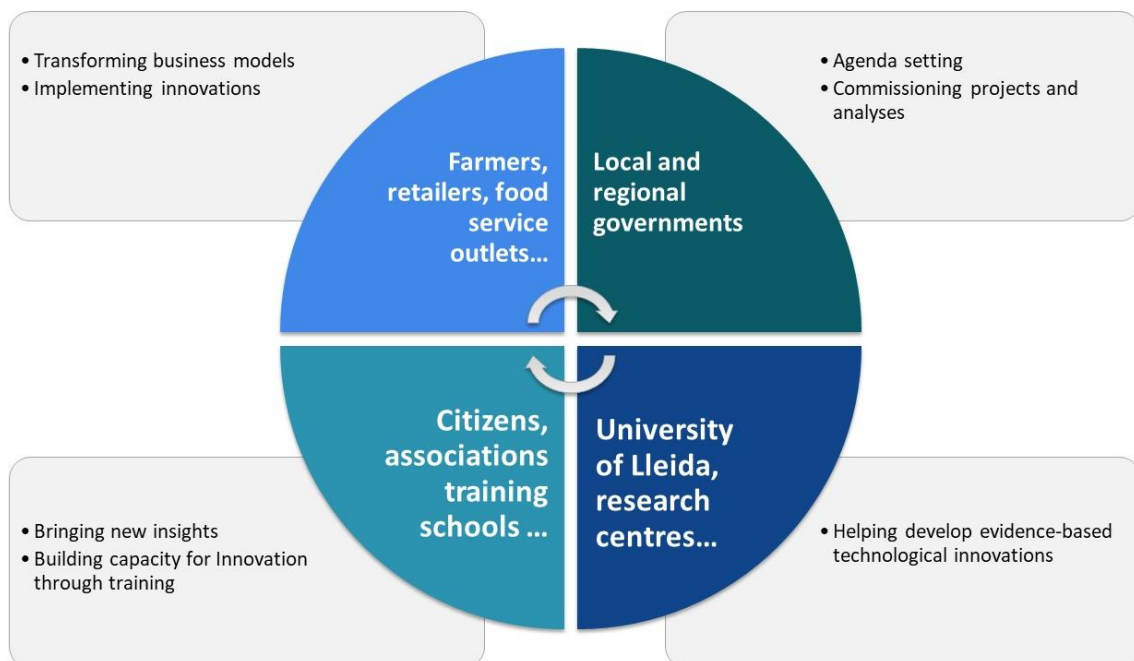
### 3.1.1.4. Self-regulation

The objective of the committee is to draw up a fishing management plan for fishing companies. The latter voluntarily chose to participate in the committee and decision-making process. Fishermen and fisherwomen also voluntarily comply with the management plan they helped to draft. There is a soft control of practices by the *cofradías* (local associations of fishing companies).

### 3.1.2. Case Study 2: Biolab Ponent emerging governance process

The first case study deals with rural innovation co-management. While it does not belong to the blue bioeconomy, the case still presents important insights that can be transferred to marine industries.

**Figure 11. Stakeholders participating in the initiative and their actions**



Source: The author.

Biolab Ponent is an ongoing initiative being implemented in the region of Lleida, in Catalonia. The objective is to completely transform rural regions by putting into place new models of production and governance in a circular approach and through small-scale co-innovation processes.

#### 3.1.2.1. Local embeddedness

Biolab Ponent seeks to implement infrastructures but also to trigger mental changes to promote deep transformations at a very local level: the objective is to co-produce bio-materials (such as bio-polymers and bio-fertilizers) in a circular configuration and through an innovative small-scale distributed biorefining system at rural community level. Bio-materials produced will help ensure the replacement of lineal-fossil based products for circular-bioproducts at local and regional level.

One of the motivations of this initiative is to reinvigorate and support the local economy:

“The good practice identified can generate opportunities for young people. Many young people in the territory have a high level of qualification that does not have a matching job offer, and, therefore, they leave the territory. The development of a productive model intensive in technology and knowledge will have an impact on the increase in the demand for this type of qualification at the territorial level, and this will help to retain young talent as well as to capture it. In the framework of the initiative, work is also being done with vocational training school, to create job opportunities also for young people with less qualified levels, but necessary to implement validated biotechnologies.” (Innovative Good Practice: Biolab Ponent, p. 7).

This is one of the main reasons why the initiative emerged locally, in the rural region of Lleida. Some important features further help trigger and develop the initiative, for instance the homogeneity of the final product (bio-materials from common chemical components).

#### 3.1.2.2. Multi-stakeholder approach

The initiative involves a wide range of stakeholders that are necessary to trigger the deep transformation of this rural region: not only regional and local governments (i.e. municipalities, Catalan government, etc.), but also universities and research centres, technology centres, SMEs and NGOs, as well as individual citizens, associations and vocational training schools.

#### 3.1.2.3. Collective & bottom-up decision-making process

This initiative involves the afore-mentioned stakeholders in the processes of identifying, developing and implementing sustainable innovation in the agri-food business. This occurs through regular, collaborative meetings.

#### 3.1.2.4. Self-regulation

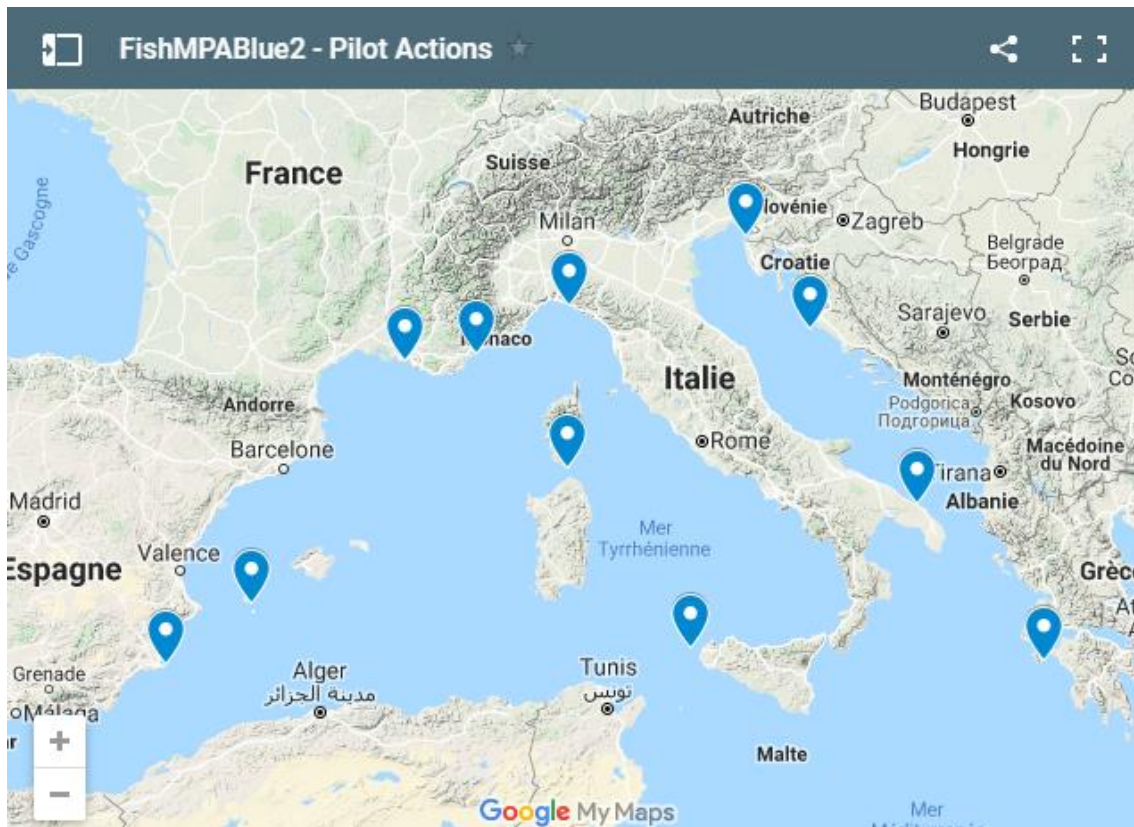
By collectively deciding what a sustainable innovation is and how to implement it to deeply transform the local systems, a form of self-regulation is implemented.

### 3.1.3. Case Study 3: FishMPABlue 2 project

The next initiative we propose to study is the governance toolkit developed by the Mediterranean project of small scale fisheries in Marine Protected Areas (MPAs), called FishMPABlue 2.<sup>3</sup> The FishMPABlue 2 project follows up on a project developed from 2014 to 2015, called FishMPABlue,<sup>4</sup> and funded by the Interreg MED Programme.

The first project enabled participants to conduct an analysis of the management of small scale fishery (SSF) within and around a set of Mediterranean MPAs. On this basis, participants developed a *regional-based governance toolkit* to strengthen MPA management capacity of small-scale fisheries in the Mediterranean Region and abroad.

**Figure 12. Mapping of fisheries included in FishMPABlue 2 project**



Source: MED Programme.<sup>5</sup>

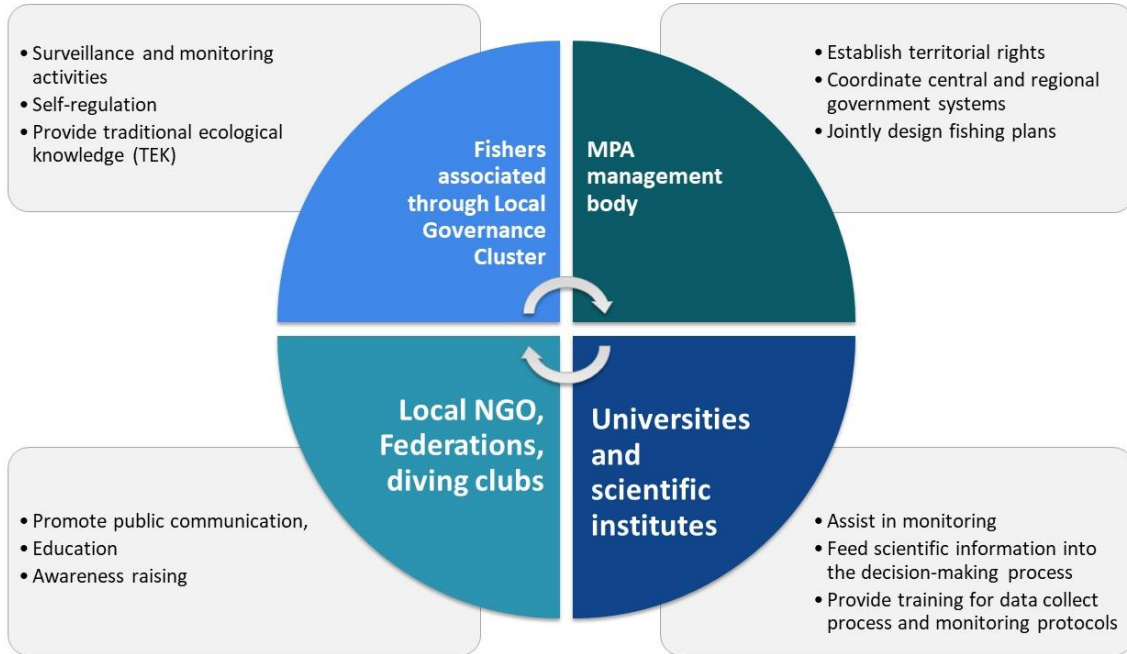
<sup>3</sup> Website of the project available at: <https://fishmpablue-2.interreg-med.eu/>

<sup>4</sup> Website of the project available at: <http://www.medmaritimeprojects.eu/section/fishmpablue>

<sup>5</sup> Available at: [http://medpan.org/main\\_activities/FishMPABlue\\_2-project/](http://medpan.org/main_activities/FishMPABlue_2-project/)



**Figure 13. Stakeholders participating in the initiative and their actions**



Source: The author.

The second part of the project, FishMPABlue 2, seeks to test the governance toolkit on the eleven pilot MPAs that were selected for the first project. In this phase, scientific monitoring will be carried out both before and after the implementation of the tools. The objective is to assess the effects of the governance tools on the ecological, economic and social status of the MPA.

In a last phase, testing results will be transferred and discussed among all the stakeholders, to enable improvement of the governance toolkit. The objectives are to develop an updated version of the *governance toolkit* based on results and joint discussions, and to disseminate it to other MPAs in the Mediterranean.

At this stage, the governance toolkit includes twelve tools organized in five themes (see Hogg *et al.*, 2019 p. 14 and Annex C of the present report). Theme A, involvement in decision-making, covers tool 1) Create Collaborative platforms to engage fishers in decision-making. Theme B, enforcement strengthening, covers tools; 2) Increase surveillance by MPA staff and improved infrastructure; 3) Increase surveillance through fishers' direct involvement; 4) increase surveillance through the cooperation with relevant authorities. Next, theme C, knowledge and ownership; 5) engage fishers in monitoring activities; 6) Raise the awareness of fishers, MPA managers and the local community. Theme D, improve small-scale fisheries' environmental sustainability; 7) Reduce fishing effort; 8) Modify/substitute fishing gear; 9) Set-up SSF Code of conduct. Theme E improvement of small-scale fisheries' profitability,

tool; 10) Add value to local fisheries, products; 11) Promote new commercial species; 12) Support Pescatourism.

Ultimately, the objective of this project and toolkit is to improve the environmental sustainability of small-scale fisheries as well as their profitability, i.e. create social and economic value, for instance by the diversification of activities through pescatourism development (Hogg *et al.*, 2019).

### 3.1.3.1. Local embeddedness

From the beginning, the project (whether FishMPABlue or FishMPABlue 2) sought to involve local communities by engaging both local MPA management bodies and local small scale fishers. While the initiative covers the Western and Northern Mediterranean Region and includes six different countries, the pilots themselves are extremely well localized, i.e. very specific local Marine Protected Areas, i.e.:

- Es Freus Marine Reserve, Spain (coordination WWF Mediterranean)
- Cabo de Palos Marine Reserve, Spain (coordination WWF Mediterranean)
- Cap Roux Fisheries Reserve, France (coordination UNS)
- Côte Bleue Marine Park, France (coordination MedPAN)
- Bonifacio Nature Reserve, France (coordination MedPAN)
- Torre Guaceto MPA, Italy (coordination Federparchi/Conisma)
- Egadi islands MPA, Italy (coordination Federparchi/Conisma)
- Portofino MPA, Italy (coordination Federparchi/Conisma)
- Telascica Natural Park, Croatia (coordination WWF Adria)
- Strunjan Landscape Park, Slovenia (coordination WWF Adria)
- Zakynthos Marine National Park, Greece (coordination UNS)

The local embeddedness dimension is also extremely important in the objectives as well as in the management rules that are defined.

For instance, the Torre Guaceto MPA has an agreement “with fishers specifying that they may only enter the MPA once a week to fish, that they fish on different days and that they deploy only up to 1 km of net per fishing operation. As part of the FishMPABlue 2 project, these fishers agreed to an experimental period where they further reduced fishing effort by approximately 40% and therefore only fished about once a fortnight. A web application was designed and implemented to allow fishers to register the days of voluntary stops. Fishers were ‘compensated’ for loss of earnings through an agreement to undertake compensated monitoring activities in the MPA” (Hogg *et al.*, 2019, p. 33).

### 3.1.3.2. Multi-stakeholder approach

The project strongly highlights the importance of including broad interests in the decision-making process. The different stakeholders included vary across the eleven pilot cases but include all four spheres defined earlier. Businesses are represented by local fishers who help implement decisions, especially those on monitoring. The public authority is embodied in the Marine Protected Area management body, which has the power to establish territorial rights for local fishers, but also help to coordinate central and regional government systems, and jointly design fishing plans with other stakeholders. Scientists are involved through different tasks. First of all they feed the management process with scientific information about fish stocks. Interestingly enough, and this is a particularity in comparison with the other cases studied in the present report, scientists also provide training to fishers for data gathering processes and monitoring protocols. Lastly, civil society is widely involved, either in the form of NGOs, federations, or diving clubs, for instance (which may, however, also be counted as business interests). They help promote public communication, education and awareness raising. Similarly to the Sand Eel Co-Management Committee case, for instance, a promotional video<sup>6</sup> was created for the Strunjan Landscape Park.

### 3.1.3.3. Collective & bottom-up decision-making process

Another key feature of the project is the direct involvement of these stakeholders into the decision-making process. In particular, this implies the establishment of a Local Governance Cluster (LGC) that represents local fishers and allows them to jointly take decisions with stakeholders, including with regard to the selection of the set of governance tools to be implemented in each Pilot MPA. With that regard, the project highlights the importance of transparency.

“The final results of the monitoring should also be regularly reported back to the fishers and to the local community. Following these steps will ensure there is increased confidence in the information gathered, and will also reinforce the necessity to report the data accurately as the management decisions taken based on the data will affect future fishing activities.”  
(Hogg *et al.*, 2019, p. 31)

What is interesting about the design of this governance toolkit is that the project started from the specificities of each pilot and its local context. By then going back and forth between the stakeholders and the toolkit, and then finally generalizing to the Mediterranean Region, the FishMPABlue 2 project developed a methodology that is both very adaptive to local specificities and needs and robust at the same time.

### 3.1.3.4. Self-regulation

Several co-management activities conducted through the pilots involve forms of self-regulation. First of all, monitoring and surveillance are conducted by fishers themselves.

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<sup>6</sup> Video available at: <https://www.youtube.com/watch?v=KIVuDmuL67k&feature=youtu.be>

Second, the governance toolkit also includes the joint-development of a Code of conduct for fishers.

“Egadi Islands MPA decided to develop a Code of Conduct. The purpose of the Code was to ensure the commitment of fishers to fish in a sustainable manner, to cooperate with the MPA through monitoring and surveillance and to participate in programmes related to marine litter collection and sea turtle conservation. More than half of the local fishers (31 in total) signed the Code of Conduct committing to respect this Code. After the Code was signed in a public event, a 6-month period was scheduled to check fishers’ participation and possible violation of the Code; during this period, no violation of the Code was registered.” (Hogg *et al.*, 2019, p. 36)

Self-regulation also goes through the various knowledge exchanges that occur among stakeholders (civil society, scientists and fishers) and the capacity building that these facilitate.

#### 3.1.4. Case Study 4: Interreg Med Renewable Energy Community

The last case study we focus on does not consist of a governance device implemented per se. Rather, we look at the experience of an Interreg horizontal project, Med Renewable Energy, to derive insights from the governance challenges that participants and coordinators faced and how they solved these challenges.

##### 3.1.4.1. Local embeddedness

The Ecosystemic Transition Unit model takes into account the necessity of connecting local urban planning, territorial planning and clean-energy transition. The model is developed at the level of territories, especially vulnerable ones, to help them become more resilient. From this perspective, the main targets of the project are rural, island and coastal areas.

##### 3.1.4.2. Multi-stakeholder approach

The initiative involves the following stakeholders: governments (local, regional and national), universities, research centres, technology centres, social enterprises, clusters, NGOs and associations.

##### 3.1.4.3. Collective & bottom-up decision-making process

The governance presents an interesting (projected) structure. Before the end of the project in October 2019, anyone will be able to sign the project's manifesto. Then, for the next generation of the project, there will be three levels of engagement:

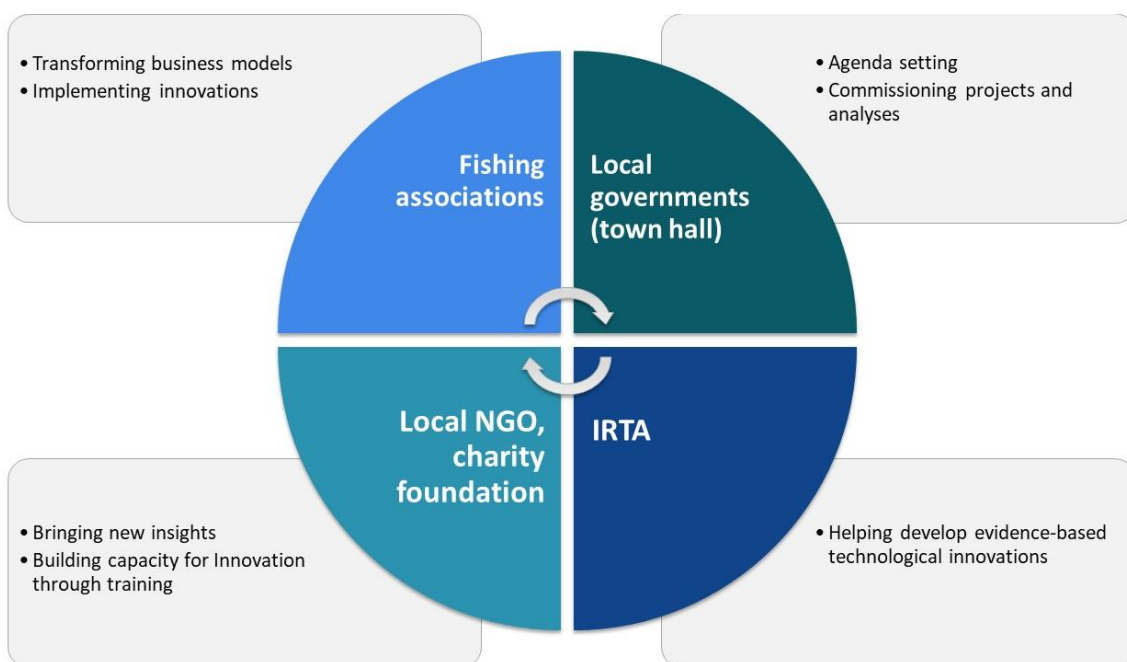
- Project Partner
- Associated Partner, through four types of committees: Flagship Committee, Scientific Committee, Lobbying Committee and Civil Society Committee.



- Charter of Commitment adhesion, established in order to engage as many territories, entities and citizens as possible.

Human and financial resources of the governance initiative come from members, through fees or other participation, and external resources such as grants. BCNecologia is coordinating the ETU model initiative with the participation of Greencap Partners within the framework of the Interreg Med Programme and collaboration of Modular Projects from the Renewable Energy Community, all projects co-funded by the European Regional Development Fund.

**Figure 14. Stakeholders participating in the initiative and their actions**



Source: The author.

#### 3.1.4.4. Self-regulation

This model of governance supposes some benefits for participants, which produce forms of self-regulation. First, information exchanges among economic actors and scientists, including traditional environmental knowledge (TEK), allow capacity building and thus shaping and controlling practices. All participants involved from Project Partners and Associated Partners will enrich the exchanges, becoming part of the key actors in the ETU transferring and mainstreaming process. Related to this, self-regulation also occurs through knowledge creation and dissemination, as participants will have the opportunity to access a platform to include their energy efficiency innovations and facilitate their dissemination. More generally, the project helps transform operations and business practices. For instance, microgrids require new types of business practices, the ETU model initiative will contribute to think how to address this topic in remote areas through one of the flagship cases. Finally, there is

a collective definition of a management plan. Again, this will depend on the evolution and success of the flagship cases, but the ETU model seeks to become a management unit for clean-energy transition.

The governance initiative is investigating how to develop performance or governance indicators, but the indicators are not defined yet.

Members' activity is auto-controlled by the project partners, which have to follow the transferring and mainstreaming process. Members that behave poorly may be expelled, and this threat can be a deterrent.

Only members involved in the flagship cases need to report their activities to the initiative, but in a simple way, just to maintain basic monitoring.

## 3.2. Key findings

From these very different cases, we propose to synthesize the main dimensions of governance of the blue bioeconomy.

### 3.2.1. Synthesizing central parameters

One of the most central results of the surveys is first the need for a **holistic approach** and how this translates into local experimentations. In all three cases, stakeholders take not only into account environment or economy as differentiated silos, but seek to develop an integrative approach. This is particularly visible in the Biolab Ponent case, which is probably the most holistic one. It is also the most ambitious one as it seeks to transition a whole region and several intertwined sectors towards sustainability.

**Innovation capacity** constitutes another key dimension, but, as we mentioned in the previous sections, innovation has to be sustainable and responsible. In the case of Biolab Ponent, collective, sustainable innovation development is the central objective.

This shows, however, the importance of **end user awareness and willingness to 1) participate and 2) pay**. The cases of sand-eel management and Biolab Ponent particularly help us understand the importance of taking a wide supply chain view, even to analyse governance. In the case of sand-eel management, end users are both fishermen and women, as well as consumers. Fishing companies and fishing associations need to be willing to participate in this governance scheme. Therefore, they need to understand the urgency surrounding overfishing and climate change, as well as their own interest in collaborating with multiple stakeholders to self-regulate. This is also what the FishMPABlue 2 project seeks to do: raise awareness in the sectors about the need to collaborate and to sustainably innovate. This implies restricting fishing extraction while increasing prices (see the sand-eel management case), which directly affects consumers who will themselves need to agree to pay more. **Outreach strategies** are therefore needed to tackle resistance to change from both economic actors (including, more

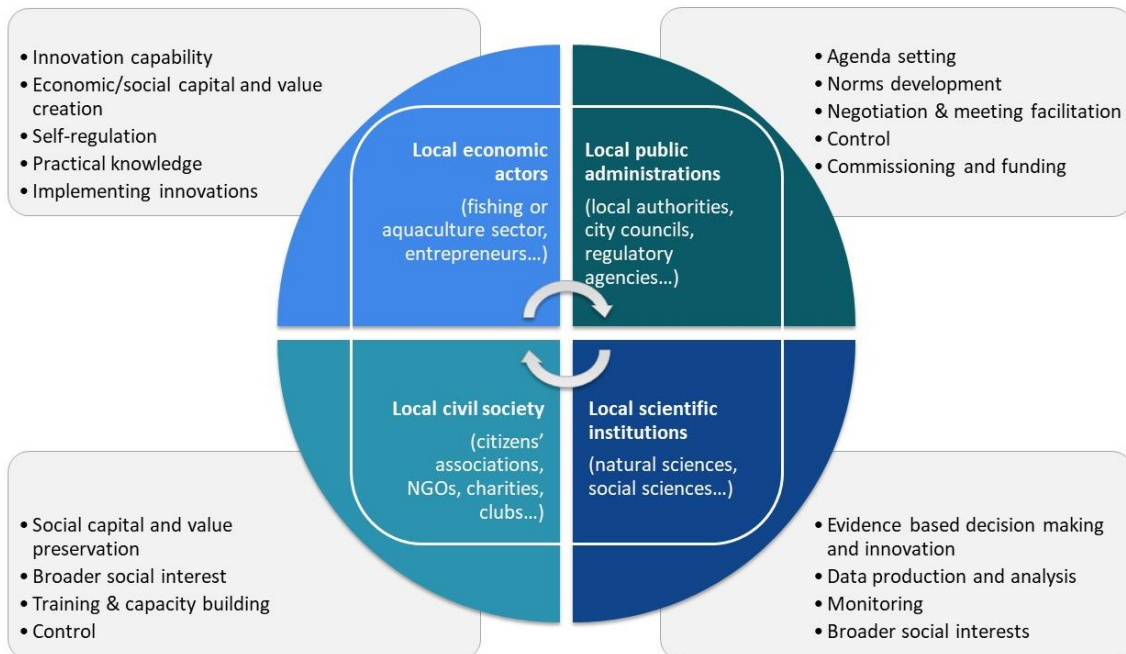
generally, in the supply chain) and consumers. This may include communication, as in the case of Sand-Eel management, or training, as in the case of Biolab Ponent.

**Trust** also appears as an important element for the participatory governance to function. The case studies are the results of either stable collaborations that have been formalized, or of existing informal networks among actors (see the FLAG for instance). Building trust among stakeholders might be a necessary pre-condition before the establishment of a participatory governance device and therefore, all the more, of an innovation experimentation.

### 3.2.2. Identifying and categorizing stakeholders

From these relatively advanced cases, we may observe that participatory governance devices like the Co-Management Committee or the FLAG act as “boundary organizations” (O’Mahony & Bechky, 2008; Parker & Crona, 2012). These boundary organizations make it possible to bring together very different actors with potentially diverging interests.

**Figure 15. Updated model of locally-embedded, participatory, multi-stakeholder governance for sustainable innovation experimentation in the blue bioeconomy**



Source: The author.

This is often the case of NGOs and businesses. Boundary organizations are necessary to allow consensus to emerge, but also to create shared understanding of a problem like overfishing, to define shared norms and to co-design solutions and technological innovations. More university-based boundary organizations as described by Parker & Crona (2012) could be

helpful in those perspectives. As we see in Figure 6, each part of the model contributes differently to the joint collective action.

All four types of actors play a central role in the governance of these experimentations.

Local economic actors, in our cases from fishing, entrepreneurs, agro-food industry, etc., need to be involved in the participatory governance because they are the ones that possess the innovation capability, in terms of both business models and new technology implementation. Local economic actors create shared value through economic, environmental or social capital preservation or development. Economic actors also need to be actively involved in the governance device because if they decide upon certain rules for their business practices they are much more likely to actually comply with these collectively decided rules and therefore to self-regulate (Berkowitz *et al.*, 2017; Berkowitz & Souchaud, 2019). They also often possess very practical knowledge of their field (like fishing or agriculture), like traditional environmental knowledge (TEK) which can be helpful in enhancing decision-making and management plans (Bjørkan, Company, Gorelli, Sardà, & Massaguer, 2019). In that perspective, there is a shift of perspective, where science is no longer restricted to one type of actors (universities, centres) but is the result of open co-construction. We can therefore talk more generally of open science, citizen science or crowd science (Franzoni & Sauermann, 2014).

Local public administrations, whether they are local authorities or city councils, play different important roles. They contribute to agenda setting and norms development, often either in response to or in relation with the EU, but sometimes also anticipating and shaping EU legislation. They can be an important actor helping negotiating and facilitating meetings among the different stakeholders, especially in situations of conflict. One of their main tasks, however, remains control and audit of practices. This may prove difficult as public administrations often possess little resources, but controlling practices is essential for the transition towards sustainability. Finally, as the Biolab Ponent case showed, public administrations also play an important role in commissioning and funding transition projects.

Science also needs to be involved in the governance process, whether in the form of natural sciences or —as sometimes occurs, also— through social sciences. The most important task of participating scientific institutions in the governance of local experimentation is to enable evidence-based decision-making and innovation. This is very visible not only in the case of the Co-Management Committee where local experts in marine biology participate in designing management plan, as well as monitoring biomass evolution, but also in the case of Biolab Ponent where universities and engineering centres help co-design technological innovations. We cannot stress enough how important this is for the sustainability transition of the blue bioeconomy. Marine ecosystems are indeed extremely complex, interdependent and fragile ecosystems (Norse & Crowder, 2005). This is also a win-win situation for scientists as they get access to direct data, in the case for instance of the sand-eel management. All in all, science may also help integrate a more long term view of objectives.

Lastly, local civil society representation takes very different forms. It can be local branches of international NGOs, as in the case of the sand-eel management project, or charities and foundations in the case of Biolab, or even directly concerned citizens. Involving civil society has several important effects, first of all preserving local social capital and social values, but also facilitating training and capacity building. Civil society can also control other stakeholders and act as safeguards. All in all, civil society representation makes it possible to integrate broader social interest in the governance process. As such, the participatory multi-stakeholder governance devices that we study here also constitute hybrid organizations (Battilana & Dorado, 2010; Pache & Santos, 2013), where very different logics (economic, scientific, social, etc.) meet.

Besides these categories of actors, the cases show the importance of certain individuals taking over leadership or acting as knowledge brokers among the different members (Fleming & Waguespack, 2007), to facilitate crowd science as well as control and co-management, and certain organizations becoming institutional entrepreneurs, i.e. those that affect norms and the way institutions function (Canales, 2016).

It can be argued that these specific types of actors are needed to coordinate collective action among heterogeneous stakeholders. This leads us to propose the following classification of actors:

- **Knowledge brokers or innovation brokers:** individuals that play a key role in provoking and steering collective action. They act as knowledge brokers or boundary spanners because they navigate the field and facilitate the empowerment of local actors, while building trust and enabling knowledge exchanges. This is very similar to what happens in open innovation communities (Fleming & Waguespack, 2007). They may also act as accelerators of innovation dissemination and sustainability transition. This position and type of actor seems extremely important to the proper functioning of the experimentation's governance.
- **Boundary organization:** governance of local experimentations takes the form of boundary organizations, "intermediary organizations that align the divergent interests of science and politics" (O'Mahony & Bechky, 2008, p. 426). Here, the boundary organization aligns not only interests from science and politics, but also from science, politics, businesses and civil society. It usually is a meta-organization, an organization that is made of other organizations (Ahrne & Brunsson, 2008), e.g., the Co-Management Committee. Meta-organizations are associative devices, i.e. members voluntarily gather in a meta-organization (Ahrne & Brunsson, 2008). This is important for the impact of decisions taken and the ability of the meta-organization to actually implement actions. By nature, it is also a hybrid organization that embraces the tensions of combining very different logics, i.e. utilitarian logic for businesses, vs more social entrepreneurship logic for civil society (Battilana & Dorado, 2010; Pache & Santos, 2013).

- **Institutional entrepreneurs:** local experimentations not only encourage sustainability transitions but also produce multi-level institutional changes, not only in local institutions, but also in national and European bodies.



## 4. PANORAMED GOVERNANCE MODEL: HOW TO SCALE UP?

This section focuses on how to scale up the model. We identify conditions of success and transferability as well as obstacles and solutions. In particular, the success and transferability of sustainable quadruple-helix experimentations relies on:

- The creation of a shared goal among participants to ensure commitment
- Actionability of the governance model
- Joint actorhood and joint responsibility

### 4.1. Conditions for success, scaling up and dissemination of best practices

Certain conditions may be necessary to facilitate the success, the scaling up and dissemination of these best practices and of these categories of actors.

For instance, at rural community level, the **committed involvement of local and regional administrations** is crucial. These local authorities are responsible for commissioning the analysis of the potential resources of each one of its municipalities, taking into account their economic activities and their natural capital. This knowledge is the basis to start the entrepreneurial discovery process that will make it possible to identify and validate new business models.

It is necessary to improve the capabilities of the participants in governance, fostering such values as trust, transparency, honesty, transversality, empathy, community benefit, thinking of the key to territory, avoiding exclusively personal interests, thinking globally and acting locally, in an inclusive manner. According to one respondent: *Not everybody could be part of this initiative.*

These types of initiatives are very slow, which is something projects participants or stakeholders may find difficult to accept. A large part of the chance of success depends on such factors as cohesiveness of people, economies, environments and territories, in other words, having a **shared goal**. Furthermore, a new management model must, as much as possible, be **applicable quickly and easily**. All participants must be involved, which requires developing **buy-in** or **commitment** for everyone, and ensuring that the responsibility does not fall on a single person, which is usually the manager, who must deal with everyone. However, as Grothe-Hammer (2019) recently showed, certain forms of collective action appear to lack collective actorhood. In other words, they cannot be addressed as a collective, and members may therefore hide behind the governance device to avoid responsibility. This raises issues of accountability over governance of the innovative experimentation. The governance model needs to find a balance between too much responsibility falling upon one participant and their escaping responsibility completely. This can be developed through clearly defining decision-making processes, but also through implementing reporting mechanisms and through transparency of meetings and actions. **Actionability** of the governance model, **joint actorhood**

and **joint responsibility** are key conditions for ensuring, not only the implementation of the model, but also the accountability of participants.

Next, according to the best practices studied in Panoramed, it seems that one individual actor in particular, a manager, acting as the innovation spanner identified earlier, has a central role in mediation. Conditions for acting as a mediator may include having good technical knowledge of all sectors involved, as well as knowing the territory and, potentially, speaking several languages. Furthermore, it appears important to provide a good structure to the entity that takes the function of governance to assume all the challenges that maritime and coastal areas of the Mediterranean may face in the future.

The ETU case shows that the conditions include, among others, funding, social capital, involvement of stakeholders in the decision-making process and consumers' or end users' change in attitudes, preferences or mental models, which may hamper the development of new business models. According to the respondent, the following mechanisms or instruments could accelerate the transfer of innovative good practices to other territories of the Mediterranean: lobbying actions at national and international level to encourage private and public investment through tax bonuses in order to provide adequate financing; and building a network of ambassadors and supporters of the initiative in order to incentivize stakeholders' engagement. In addition, encouraging green fiscal policies in energy transition processes is necessary to accelerate the transfer of the ETU model or other similar innovative good practices to other territories of the Mediterranean.

Continuing with the ETU case study, some measures are necessary to improve, scale up and disseminate the governance of the ETU model, such as a system of incentives and rewards. Indeed, a huge amount of work is needed to engage and maintain the interest and commitment of participants. This is also a diagnosis made by Biolab Ponent. The challenge is to find ways to drive stakeholders' concerns and interests, by concretely showing them how projects can shape solutions through multilevel, multi-stakeholder collaborations. This relates to a condition mentioned earlier, i.e. having a shared goal that fosters cooperation.

**Timeline** was also identified as a crucial factor for initiatives, because many of them are actually co-funded projects. They therefore have a short time to bring out flagship cases. The **effectiveness of coordination** is thus important to be able to scale up and disseminate experimentation projects with this type of funding and timeline.

All the good practices are located in the Northern Mediterranean Region, but they have potential to be transferred to the South. The sonsera fishery, for instance, is located in a specific area along the Catalan coast (Northern region) due to both the presence of those species and the right grain size sediment, which enables the existence of this fishery. There are therefore very constraining geographical conditions. However, the model of governance can be disseminated to other fisheries with similar characteristics, i.e. small-scale, non-migratory fish, low impact gear, etc. The governance model could serve as a baseline for other regions in the Southern Mediterranean. There are several mechanisms that could help to increase the transfer and impact of innovative good practices in the Northern Mediterranean to the



Southern Mediterranean, like training or cooperation programmes, joint initiatives or projects to tackle common challenges, and platforms to share current and potential solutions to common challenges. In the next section, we take a closer look at the obstacles to the transfer to the rest of the Mediterranean Region and their solutions.

## 4.2. Obstacles in the Mediterranean Region

We developed a locally-embedded, participatory, multi-stakeholder governance model for sustainable innovation experimentation in the blue bioeconomy based on the literature and on best practices identified in several success cases. These cases, however, are all very specific to 1) their sector, 2) their institutional, economic, environmental and cultural context. One major challenge that faces Panoramed is to find ways to scale up and disseminate innovative projects.

The cases have enabled us to identify obstacles to scaling up and disseminating these practices. For instance, financing and the lack of a multi-stakeholder governance structure may hamper the scaling-up of an innovative project. Table 2 synthesizes these obstacles and proposes solutions to bypass them.

**Table 2. Obstacles and solutions to the scaling up of the governance model**

Obstacles to scaling up in the MED	Solutions or opportunities
<b>Regulatory inconsistencies in the region:</b> multi-layered and multi-level governance instruments that sometimes clash with each other or cancel out the efforts of others.	Regulatory framework needs to leave enough operating space for the adaptive bottom-up governance model
<b>Variability</b> in cultures, geographies, climates, etc.	No one-size-fits-all solution: adaptive governance needs to fit each specific context (i.e. local embeddedness)
<b>Lack of local collective action:</b> not all countries have a tradition of autonomous, self-organization like the Spanish regions	Encouraging the development of local and regional collective action.  Necessity to build capacity in the subject through workshops, knowledge sharing, etc.
<b>Geopolitical tensions</b>	Current diplomatic efforts and existing Mediterranean economic collaborations are already seeking to reduce these tensions. Further cooperation, including through Panoramed, could help reduce these risks even more.
<b>Migratory risks</b> , i.e. the loss of inhabitants in local communities	Developing sustainable local experimentations will trigger a virtuous circle of sustainable and economic attractively fair employment creation, reducing migratory risks.

Obstacles to scaling up in the MED	Solutions or opportunities
<b>Lack of resources:</b> financial and human resources and social capital are needed for these experimentations and their governance models to be developed and scaled up	Specific funding should be targeted at European and national levels to develop experimentations for transition in the MED.
<b>Lack of trust,</b> a long term, fragile construction	Formal and informal networks, repeated contacts through workshops, participatory governance events to frame local strategies and build shared understandings of sustainability goals are needed to build trust among stakeholders.
<b>Lack of commitment of all stakeholders:</b> public administrations, businesses, scientists, civil society	If the urgency of the climate crisis, fish stock and habitat destruction, plastic pollution and so on are not enough to trigger stakeholder commitment, facilitation mechanisms need to be implemented to palliate this.
<b>Immaturity of business models in emerging sectors:</b> certain sectors (see below) might be too new to have stabilized business models	Experimentation is precisely geared towards testing new business models and offer a space, a sort of sandbox, to tinker and enhance business models
<b>Resistance to change</b> of established actors	Finding positive and negative sanctions to change behaviours
<b>Lack of entrepreneurial skills</b> in lagging regions	Building on RIS3 framework and Panoraméd, future frameworks should encourage the dissemination of business school courses locally, either through open online courses, through summer schools or through local branches (see EM Lyon in Casablanca for instance).
<b>Lack of general capabilities needed for governance:</b> either in business, science, policy or civil society, or at the level of the boundary meta-organization or the innovation brokers	<p>Here again, dissemination and training tools will need to be developed: workshops, knowledge platforms, exchange programmes.</p> <p>Facilitating and encouraging the creation of boundary meta-organizations and innovation brokers.</p> <p>A European or Mediterranean for innovation broker training could be imagined.</p>

Source: The author.

## 5. RECOMMENDATIONS FOR PUBLIC POLICY

In this section, we make several recommendations for public policy. In particular, we suggest a North-South twinning strategy, and the creation of a European status of “Experimenting Meta-Organization” (EMO) to facilitate the dissemination of this governance model, and of a Transition Experimentation Open Data Platform to give projects visibility, encourage collaboration and knowledge dissemination and project cross-fertilization. Lastly, we recommend the use of a checklist to select projects for funding, based on KPIs and organized in three parts: sustainable innovation, participatory governance and effectiveness of coordination.

### 5.1. Systemically integrating sustainability and governance to the blue bioeconomy approach

The blue bioeconomy is concerned with all marine industries, whether they are established or emerging, direct or indirect (see Table 3).

A first recommendation would consist in integrating into any of these sectors the sustainable innovation definition in all European frameworks and calls for projects: anticipation, resilience, reflexivity, responsiveness, inclusion, accountability (see Table 1).

**Table 3. Established vs emerging, direct vs indirect stakeholders**

Direct business stakeholders	Indirect business stakeholders
Established industries: Maritime transport Mining, oil and gas Aquaculture Commercial fisheries Fish processing industry Shipbuilding and repair Ports, warehousing and water projects Tourism and leisure activities Observation and underwater technologies and robotics	Chemical industry (Bell <i>et al.</i> , 2018) Pharmaceuticals, industrial enzymes and processes Funding mechanisms and investors
Emerging industries: Desalinization Renewable energies, including off-shore wind, ocean energy or bio-fuel from seafood waste or algae Marine biotechnologies (products based on marine organisms)	

Source: European Commission (2018).

The variety of sectors and their interdependences highlights the Importance of taking into account the potential competition for space and resources by different sectors (Garland, Axon, Graziano, Morrissey, & Heidkamp, 2019), as well as the potential synergies and cross-sectoral innovations, for instance between tourism and renewable energies on islands (Michalena, Hills, & Amat, 2009). The intertwining of industries and the need to reduce resource extraction call for the development of multi-use platforms, which could be put more systemically onto the EU and Panoramed agenda.

Principles of sustainability but also environmental justice and fairness should inform policy making. According to Garland *et al.*, (2019), both the “EU and US perspective of the BE [Blue economy] are therefore characterized by a lack of an integration of the sustainability and social justice principles”, (p. 11). In that perspective, “cross-sectoral, cross-regional, macro-regional cooperation is also of paramount importance” (Bell *et al.*, 2018, p. 29).

## 5.2. Developing tools for the blue bioeconomy in the Mediterranean and beyond

The questionnaire created in Panoramed WP 10 Innovation constitutes in itself a useful tool that can be generalized to identify keystone projects. The methodology was developed through an iterative process involving many international experts, practitioners and direct stakeholders over several months, and it can produce actionable knowledge. It also help respondents reflect upon their own practices and potentially enhance them.

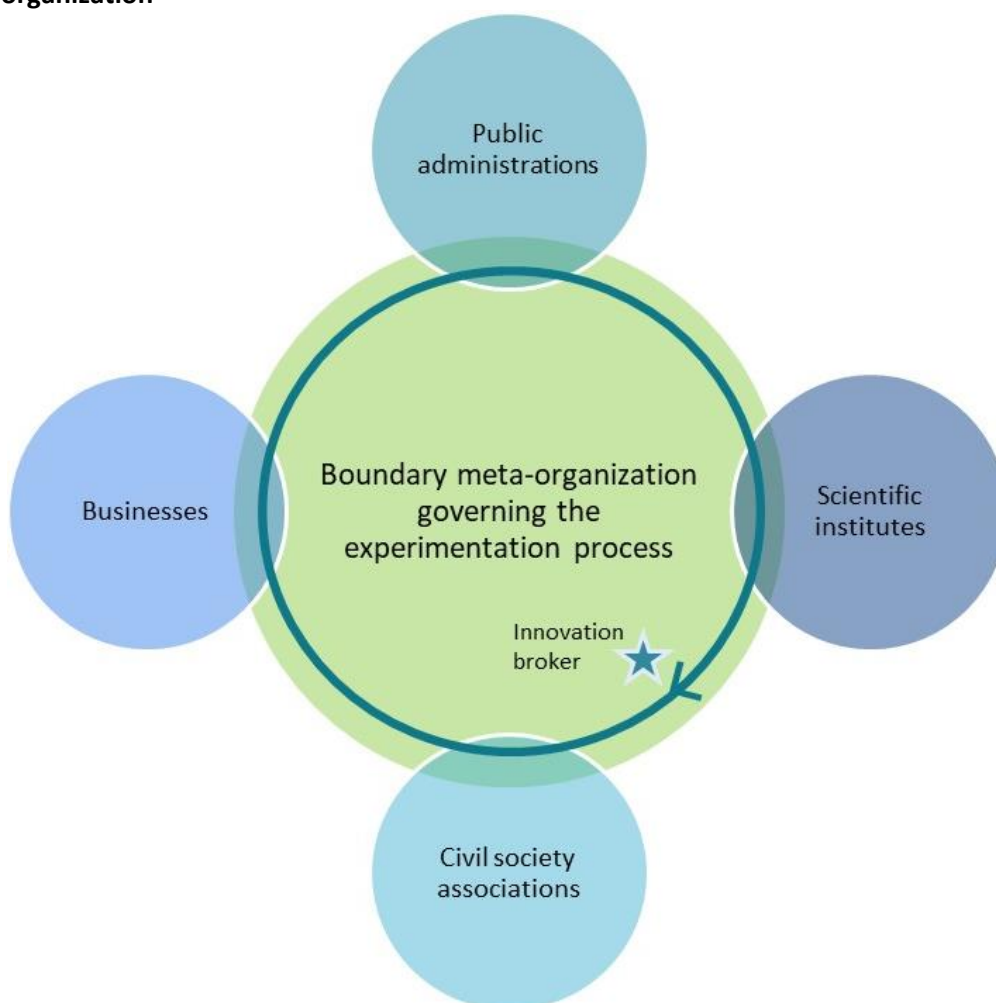
**A twinning strategy** between a northern region and a southern region or between a lagging region and a more advanced region could be implemented. This could facilitate the development of joint projects or simply enable knowledge transfers through workshops and exchange programmes. In that perspective, a specific call for projects with “twinning projects” could be designed, i.e. with partners from the North and the South, with a double development path. Alternatively, a “Southern referent”, i.e. a partner in the South, could be required in each project to ensure knowledge exchanges between North and South in the Mediterranean Region, especially as regards governance. This would mean having a dedicated person from a South region in each project who would be in charge in of finding or organizing synergies and knowledge transfers between North and South.

Facilitating and encouraging the development of **blue bioeconomy innovation brokers** may constitute a crucial vector of experimentation emergence in territories. This, however, requires capacity building. **Training workshops** could be designed and implemented in the Mediterranean Region, drawing on existing brokers' experience.

Finally, it could be fruitful to facilitate and encourage the development of **boundary meta-organizations** with responsibility for the multi-stakeholder governance of experimentations, and accountable for decisions made (Figure 16). This could be facilitated through the creation of a European status, like the one of Producers Organization, which would enable local experimentation in sustainable innovation for transition and its governance. One could imagine a **status of “Experimenting Meta-Organization”**, which would allow members to

request and manage funding. Such a status would concretely enable member organizations to have joint actorhood (Grothe-Hammer, 2019) and to share responsibility for decisions. Such a status would also imply reporting mechanisms, transparency and, therefore, accountability.

**Figure 16. Boundary meta-organization and innovation broker in an “experimenting meta-organization”**



Source: The author.

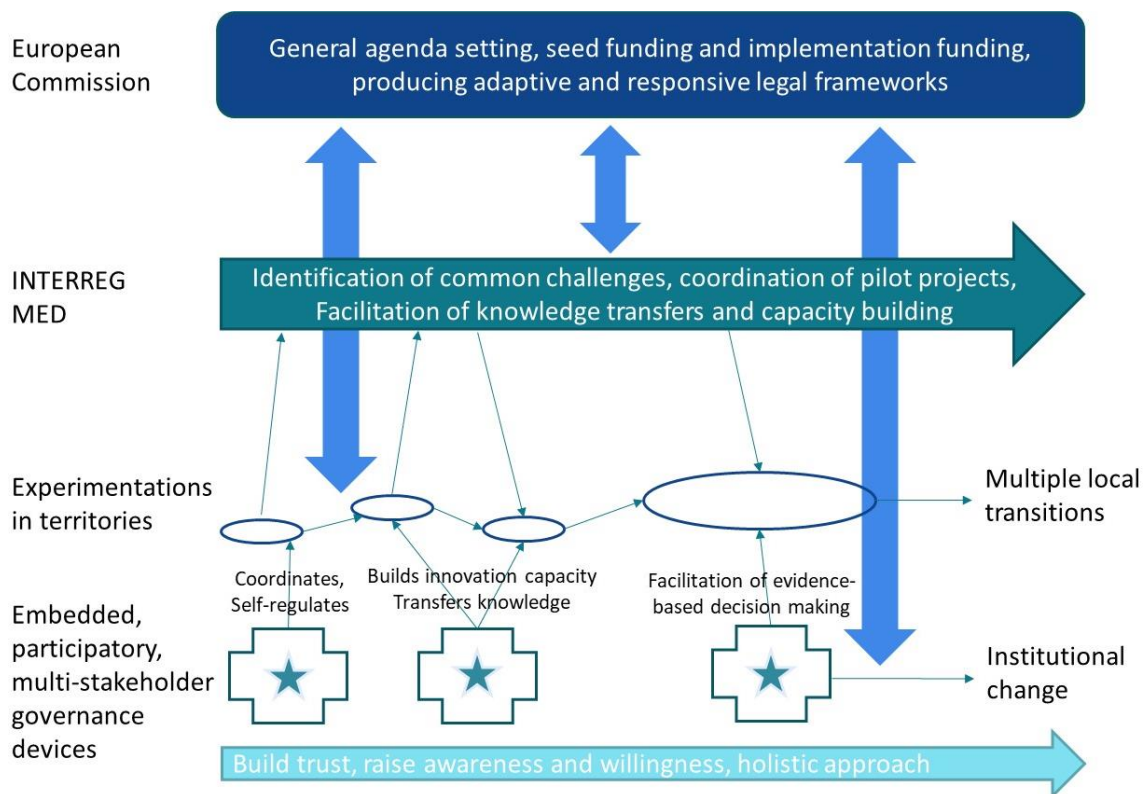
In that perspective, decisions, minutes of meetings, annual reports for progress and so on should be made as accessible as possible to the citizens to ensure wide accountability. This could be achieved systemically through a European **governance platform**, similar to the Catalan Participa Platform.<sup>7</sup>

<sup>7</sup> Available at: <https://participa.gencat.cat/>

Another type of platform would also be needed, one that would give visibility to the projects themselves in order to 1) enable knowledge transfers and 2) facilitate further collaborations on given topics. This could, for instance, build on the existing platform developed in Catalonia for RIS3 projects.<sup>8</sup> It could also draw on the Emilia-Romagna Open Innovation Platform (EROI project),<sup>9</sup> one of the case studies in Panoramed WP 10.

We could imagine the combination of both objectives in one platform, which would also be a gateway to access scientific publications, patents, etc., developed thanks to the experimentations. We will name this the **Transition Experimentation Open Data Platform**. The aims of such a platform would be to give projects visibility, to encourage multi-stakeholder transnational collaborations, and to enable knowledge dissemination and project cross-fertilization. From this perspective, we see Panoramed playing a long-term role in coordinating local experimentations (see Figure 17).

**Figure 17. Multi-level governance scheme of local experimentations for transition**



Source: The Author, based on Geels & Raven, 2006, p. 379.

<sup>8</sup> Available at: <http://catalunya2020.gencat.cat/en/plataforma-ris3-mcat/>

<sup>9</sup> Available at: <http://www.emiliaromagnastartup.it/en/taxonomy/term/6651>



In this multi-level governance scheme, local experimentations for transition are anchored in local territories. They are coordinated by governance devices that take an embedded, participatory, multi-stakeholder, meta-organizational form. These devices also enable members to self-regulate, to jointly build sustainable innovation capacity and to transfer knowledge, from scientists to businesses but also from businesses to scientists (TEK). Overall, this device facilitates evidence-based collective decision-making and therefore produces institutional change at local or national level.

In this model, Panoramed plays a key coordinating role at a more macro level. Panoramed, as a platform, may help identify best practices, coordinate pilot projects, and facilitate dissemination, knowledge transfers and capacity building across projects and across regions. We could also conceive Panoramed as managing the Transition Experimentation Open Data Platform.

Finally, the European Commission interacts both with Panoramed and with the local projects through Panoramed. The EC's crucial multiple functions include general agenda setting through abductive loops between the EU level and local levels, but also strategic seed funding and implementation funding and, finally, producing adaptive and responsive legal frameworks.

### 5.3. Rethinking narratives of the blue bioeconomy

Current approaches to the blue bioeconomy, as developed by the EU or the UN for instance, incorporate space only as a limited, one-dimensional principle for ocean management (Garland *et al.*, 2019). These approaches thus neglect the existing interdependencies and temporalities of multi-use, multi-level spaces in the oceans (Doloreux, 2017).

These approaches do not account, either, for the potential resistance of the ocean towards the blue bioeconomy through not only storms, but also erosion, or even algal blooms that can destroy whole habitats and also make them unfit for human activities.

There is a visible similarity between the green economy and the blue bioeconomy, disguised as a promise of “collective prosperity” (Brewer, 2017 p. 45) but that actually constitutes a “land-grabbing, complex governmental project aimed at controlling the ocean and its resources” (Garland *et al.*, 2019, p. 12).

From this perspective, it is necessary to rethink EU narratives of the blue bioeconomy so as to include not only principles of sustainability but also environmental justice and fairness. Panoramed projects should be conceived to achieve this goal.

Building on this diagnosis, a final recommendation would be to use the following checklist to assess projects in competitive funding schemes, for instance, at the selection stage but also at the feedback stage. These criteria, which can act as key performance indicators (KPIs), are organized in three themes: sustainable innovation, participatory governance, and effectiveness of coordination, as summarized in Table 4.

**Table 4. Governance for sustainable innovation in the blue bioeconomy checklist**

Theme	Criteria	Check
<b>Sustainable innovation</b>	1) Anticipation: questioning potential impact	
	2) Resilience: resisting to crises	
	3) Reflexivity: reflecting about the limitations	
	4) Responsiveness: adaptability to shocks and change	
	5) Inclusion of stakeholders and minorities	
	6) Accountability: transparency, creation of reporting mechanisms	
<b>Participatory governance</b>	1) Local embeddedness: local context and geographies, etc.	
	2) Multi-stakeholder engagement: quadruple helix, commitment and buy-in from all actors including local administrations	
	3) Collective and bottom decision-making process: legal framework, collective action devices, etc.	
	4) Self-regulation mechanisms: codes of conduct, self-monitoring, management plan, etc.	
<b>Effectiveness of coordination</b>	1) Building trust among participants	
	2) Having a shared goal	
	3) Ensuring joint actorhood and joint responsibility	

Source: The author.

## 6. CONCLUSIONS

While there is no single best pathway to sustainability, this report has sought to review the fundamental elements to take into account when investigating and promoting sustainability transitions in the blue bioeconomy. Socio-technical system transformation implies the co-production of social, behavioural and technological change in an interrelated way. System transformation always involves multiple actors, including civil society and users. One particular level of action is increasingly pointed out as the crucial one: the niche level, through local experimentation in innovation. But innovation must be sustainable, otherwise it can have severe negative impacts on societies and natural environments.

Sustainable innovation means a socially desirable change that draws on six capabilities: anticipation, resilience, reflexivity, responsiveness, inclusion and accountability. Anticipation consists in a systematic questioning of emerging technologies' potential impacts on environment and society, to increase resilience and shape the evolution and regimes of innovation. Resilience means sustainability to crises, i.e. the ability to resist over the long run, especially to deal with system risks. To achieve these two first capabilities, reflexivity is required, i.e. the ability to examine an innovation's impacts on environment and society, and therefore its own limitations. Responsiveness constitutes another important capability necessary for sustainable innovation, that is to say, the capacity to adapt to unforeseen exogenous shocks, to stakeholders and public demands, and to changing circumstances. Inclusion describes the necessary engagement of not only core stakeholders but also members of the wider public (civil society at large) in the governance or decision-making process related to the emergence, dissemination and control of sustainable innovations. Finally, sustainable innovation requires taking responsibility for decisions made, explaining them, and being transparent about them, i.e. accountability. Such capabilities are needed to develop sustainable innovation, especially in the perspective of local experiments for sustainability transitions in the blue bioeconomy.

To foster the development of sustainable innovation in local experimentations, specific local governance mechanisms are also needed, in order, firstly, to enable the emergence of said experimentations and, secondly, to monitor their sustainability and provide for their dissemination. This report first developed a conceptual model of governance for sustainable local experimentation that relies on four key parameters: local embeddedness, multi-stakeholder engagement, collective & bottom-up decision-making process, and self-regulation mechanisms. We propose a theoretical model of locally-embedded, participatory, multi-stakeholder governance for sustainable innovation experimentation in the context of the blue bioeconomy. The Panoramed Survey and case studies then helped to consolidate and enrich this framework and to suggest guidelines and best practices in the EU.

Moving beyond the conceptualization of sustainable innovation, the report focused on successful cases of local experimentations that meet certain criteria (sustainable innovation, multi-stakeholder governance, local embeddedness) in the blue bioeconomy or in sectors that could suggest fruitful insights (i.e. agro-food) for marine industries. Based on online in-depth

questionnaires, we analyse each case and generate key parameters for the participatory governance of local experimentations for sustainability transitions in the blue bioeconomy.

We studied four different cases, i.e. sand-eel co-management, Biolab Ponent, the Interreg Med FishMPABlue 2 project, and the Interreg Med Renewable Energy Community – Ecosystemic Transition Unit (ETU). We applied the general framework, i.e. embeddedness in the local context (geographies, regulations, economies, cultures, organizational configuration, etc.), multi-stakeholder approach (and more precisely quadruple helix governance, i.e. four spheres represented: economy, science, public administration, civil society), collective and bottom-up decision-making process, i.e. all actors are involved in the decision-making process, which results from local voluntary involvement, self-regulation by economic actors, resulting from voluntary association, and voluntary compliance with and collective control of the rules decided.

Next, we derived some general insights for the blue bioeconomy. One of the most central aspects is, firstly, the need for a holistic approach between science, policy, businesses and civil society. Participants' innovation capacity building constitutes another key parameter. Our analysis also highlighted the importance of raising end user awareness and willingness to 1) participate and 2) pay through outreach strategies. These strategies can help reduce resistance to change from both economic actors (including, more generally, in the supply chain) and consumers. Trust emerges as an important element for participatory governance to function.

To facilitate these elements, that is, the holistic approach, innovation capacity building, outreach strategies and trust development, we identified key category actors and their functions, i.e. innovation brokers, boundary organizations in the form of multi-stakeholder meta-organizations, and institutional entrepreneurs. These seem to play a crucial role in coordinating collective actions, in building collective capacities and in disseminating knowledge, i.e. in developing blue sustainability.

The report identifies several conditions, obstacles and solutions with regard to scaling up and transferring such a model to the Mediterranean regions. Most notably, we argued that key conditions of success include the establishment of a shared goal among participants to secure their commitment, and ensuring the actionability of the governance model to enable its implementation and dissemination, based on joint actorhood and joint responsibility so as to provide accountability. In this perspective, we suggested that creating a European status of "Experimenting Meta-Organization" (EMO) and a "Transition Experimentation Open Data Platform" would not only help govern local experimentations through a quadruple-helix approach, but would also facilitate collaborations across the Mediterranean Region as well as ensuring the transparency and visibility of transition projects.

One final recommendation was to systemically integrate governance as a criterion for the development and selection of pilot projects. All too often, decision-makers focus on technology only as a source of growth and employment. However, as we showed earlier, unchecked technology and, more generally, unchecked innovation can have severe negative

externalities. Technology development per se cannot be the sole objective that pilot projects pursue. To ensure blue sustainability, projects need to also reflect on and implement governance mechanisms that integrate stakeholders and permit the development of sustainable innovation capabilities. We suggest a provisional checklist to ensure that funded projects effectively take governance and sustainability into account. Hopefully, future funding programmes will not neglect this important dimension.

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## ANNEX A. Final version of the survey as presented online

### SPECIFIC ISSUES RELATED TO THE INNOVATIVE GOOD PRACTICE.

#### Participatory governance and co-management

Please fill out this section if you have identified an innovative multi-stakeholder governance case study, i.e. a formal association or an ad-hoc group of different actors (economic, administration, science, civil society) that innovatively and sustainably manage uses of natural resources in an approach involving co-management or participatory governance.

We **recommend downloading the template and working on it off-line**, since it is not possible to save copies online (that is, once you start each part of the template online you must finish and send it during the same Internet session).

Each part and section must be sent once finished. For this reason, is very important that the **acronym** of the initiative and the **email address** of the contact person are the same for all parts of the questionnaire sent.

Please **provide as much information as possible**, in order to enrich the analysis and its results.

#### Acronym of the good practice

#### Name and surname of the contact person

#### Email address

When was the governance initiative set up?

Why was it created? Was there any specific problem, event or crisis that triggered the setting up of the initiative?

Which actors were specifically involved in the creation of the initiative?

- Economic actor(s)
- Government
- Civil society
- Scientific institution
- European Union
- Other, specify

What is the level of governance of the initiative?

- Local
- Regional
- National
- Transnational
- International

If the initiative is backed by a legal framework, explain it.

Does the initiative possess a formal status (association, etc.)?

Where do the financial and human resources of the governance initiative come from?

- The initiative has no specific resources
- Resources come from members (through fees or other participation). If you answered YES, specify
- External resources (such as grant applications or others). If you answered YES, specify

What is the mechanism to become a member of the initiative? Are there different types of membership? Explain

Has the membership evolved over time? (Multiple choice)

- New members have joined
- Members have left
- No changes in membership

How often do members of the initiative meet?

- Once a year
- Twice a year
- Three to four times a year
- Every month
- More often

What is the decision-making process?

- No decisions are made
- Decisions are made collectively, only through consensus
- Decisions are made collectively, but consensus is not needed
- Decisions are made through a voting system
- One member has the power of decision over the others
- Other, specify

If one member has the power of decision over the others, explain who

What are the different benefits of the initiative for participants? (Multiple choice)

- Information exchanges among economic actors and scientists, including benefitting from traditional environmental knowledge (TEK)
- Knowledge creation and dissemination
- Transformation of operations and business practices (fishing strategy, control, sustainable innovation...)

- Collective definition of a management plan
- Other, specify

Explain the benefits identified in the previous question

Has the governance initiative collectively designed performance or governance indicators?  
YES/NO

If YES, specify on what and the design process

Is there any control of what members do?

- No control
- Collective control among and by members
- Auto-control by one type of members. If you answered YES, specify
- Control by external party. If you answered YES, specify

If there are incentives, sanctions or rewards for good or bad behaviours, specify them

Can a member be expelled?

- No
- Yes, in principle, if the member behaves poorly
- Yes, in principle, if the member is no longer sufficiently involved

If members can be expelled as a sanction, how important do you think this threat is as a deterrent?

- Not important at all
- Somewhat important
- Important
- Very important

Have you witnessed any conflict situations? Explain on what, and how they were managed

Do members need to report their activities to the initiative? If yes, specify procedure and frequency

Does the initiative report its activities? If yes, specify to whom and how

Is the initiative held accountable for its decisions, and the impacts of its decisions? In other words, who takes responsibility?

- No accountability mechanisms
- Internal accountability, among participants
- External accountability, to other actors

If there is internal or external accountability, specify to whom and how

Have there been activities of outreach, pedagogy or advocacy towards external actors?  
(Multiple choice)

- No
- Yes, towards consumers
- Yes, towards economic actors
- Yes, towards national governments or the EU
- Others

Specify the activities of outreach, pedagogy or advocacy

How important are the following elements for the proper functioning of the governance initiative? Grade their importance from 0 to 5

- Adaptation to local realities
- Pre-existing trust among members
- Involvement of all participants in the decision-making process
- Diversity of participants (economic actors, scientists, civil society, government...)
- Natural sciences participation (biology, oceanography, physics...)
- Social sciences participation (management, economy, sociology...)
- Ability of members to self-regulate
- Control of members' practices or compliance with decided rules
- Use of incentives
- Use of sanctions
- Use of rewards
- Possibility of excluding a member
- Outreach activities (raising awareness among consumers, economic actors...)
- Financial autonomy of the initiative
- Bottom-up initiative
- Top-down initiative
- Accountability for decisions
- Reporting/transparency
- Other, specify

In your experience, what measures are necessary to improve the governance initiative you describe? Explain why

Are there other elements that you want to bring to our attention regarding the multi-stakeholder governance initiative?



## ANNEX B. Selected case studies

Case Study 1: Sand Eel Co-Management Committee
<b>Project name:</b> Co-Management Committee for the Sonsera (CCMS)
<b>Institution:</b> Ministry of Agriculture, Livestock, Fisheries and Food of Catalan Government
<b>Objectives:</b> <ul style="list-style-type: none"> <li>- Promote a long-term conservation and sustainable sand eel fishery by the enforcement of measures for preserving fishing resource and ecosystems as well as improving the socio-economic conditions of the fishing sector.</li> <li>- This is achieved through an equal footing decision-making committee composed by fishermen, scientists, social and environmental organizations and public administration</li> </ul>
<b>Web page:</b> <a href="http://agricultura.gencat.cat/ca/ambits/pesca/dar_especies_calador_mediterrani/plans-gestio-cogestio/pla-gestio-sonsera/">http://agricultura.gencat.cat/ca/ambits/pesca/dar_especies_calador_mediterrani/plans-gestio-cogestio/pla-gestio-sonsera/</a>
<b>Programme and call:</b> Not included in any programme or call
<b>Strategy:</b> Regional as it includes both Girona and Barcelona provinces (from Estartit to Barcelona). Innovation of this good practice relies on the Co-Management Committee as decision tool.

Case Study 2: Biolab Ponent Emerging Governance process
<b>Project name:</b> Biolab Ponent
<b>Brief description:</b> BIOLAB PONENT is a specific model of Rural Innovation Living Lab that aims to support the entire process of rural bio-business development, innovation and acceleration, by means of a set of well-structured and place-based socioecological spaces, where all actors and stakeholders together can develop open innovation practices under a quintuple helix vision. The methodological framework covers from awareness and vision formulation to prototyping and experimentation.
<b>Objectives:</b> Co-create, co-develop and test local-based business models, their associated innovations and the supportive policies that rural areas need to capture the added economic, social and environmental value of the sustainable and circular Bioeconomy model.
<b>Programme and call:</b> Programme: Catalunya ERDF 2014-20 OP
<b>Strategy:</b> Local strategy

### Case Study 3: FishMPABlue 2 project

**Project name:** FishMPABlue 2

**Consortium:**

Leader: Federparchi (Italy)

Partners: MedPAN, CONISMA, WWF Adria, Nice Sophia Antipolis University, WWF Mediterranean, IUCN, APAM in France.

Associated partners: GFCM, MedWet, AAMP, RAC/SPA, Institute of the Republic of Slovenia for Nature Conservation, Ministry of Agriculture, Food and Environment in Spain

**Brief description:** The FishMPABlue 2 project investigates best management practices in 11 pilot MPAs. It provides guidance on how to better involve fishers in the process of helping MPAs shift towards SSF co-management, in a more participatory governance process.

**Objectives:**

- Follow-up on the FishMPABlue project (2014-2015) funded by Interreg MED Programme.
- Test the governance toolkit to demonstrate its effectiveness

**Web page:** <https://fishmpablue-2.interreg-med.eu/>

**Programme and call:** Programme Med (2016-19) (budget: 3.5 MEUR funded at 85%)

**Strategy:** The toolkit is conceived as a decision-making instrument that may help Marine Protected Areas develop partnerships with local communities, fishers and other stakeholders to engage in participatory governance.

### Case Study 4: Interreg Med Renewable Energy Community

**Project name:** Interreg Med Renewable Energy Community – Ecosystemic Transition Unit (ETU)

**Institution:** Agència d'Ecologia Urbana de Barcelona (BCNecologia)

**Brief description:** An Ecosystemic Transition Unit (ETU) is fruit of mainstreaming the outcomes of the projects within the Interreg Med Renewable Energy Community through their contribution to: climate change, energy transition, land use planning, and circular economy. The ETU brings an alternative governance model to rural and islands areas in Mediterranean Region, which helps local and regional authorities to drive their energy transition road map of their territories based on innovation, engagement and empowerment. An ETU refers to:

- A territory committed to its energy transition process.
- A new organizational unit to engage all stakeholders to territorial planning and management at local level.
- A methodological toolkit of technical and governance strategies based in an ecosystemic approach.
- A denomination to identify empowered communities, in order to help them to accelerate their energy transition implementation process.

#### Case Study 4: Interreg Med Renewable Energy Community

**Objectives:** ETU model aims to boost resilient territories in the MED area taking energy transition as a starting point for sustainable development of vulnerable settlements, such as rural and islands areas. The main objectives are:

- Define a governance model based on multi-level coordination linking energy transition to sustainable territorial development
- Promote rural and islands energy transition through social innovation and a bottom-up position, putting communities and civil society at the centre of the strategy.
- Engage national and international existing initiatives to mainstream ETU model in their strategical implementation framework.

**Web page:** <https://renewable-energies.interreg-med.eu/>

**Programme and call:** Interreg Med Programme Period 2014 - 2020

**Strategy:** ETU model is conceived as a local development strategy. However, the model can point strategies at regional level, depending on the governance organization of each country and their role in decision-making, or by the logic and capacity of territories in terms of renewable energy sources, natural resources and geographical conditions.

## 8. ANNEX C. Overview of toolkit tested tools. FishMPABlue 2 governance toolkit for managing SSF in Mediterranean MPAs

THEME	TOOL	MPAs THAT IMPLEMENTED THE TOOL
<b>a</b> INVOLVEMENT IN DECISION MAKING	<b>TOOL 1:</b> Create collaborative platforms to engage fishers in decision making	<b>11</b> Bonifacio Strait Natural Reserve, Cabo de Palos Marine Reserve, Cap Roux Fisheries Reserve, Côte Bleue Marine Park, Egadi Islands MPA, Portofino MPA, Es Freus Marine Reserve, Strunjan Landscape Park, Telašćica Nature Reserve, Torre Guaceto MPA and Zakynthos National Marine Park
<b>b</b> ENFORCEMENT STRENGTHENING	<b>TOOL 2:</b> Increase surveillance by MPA staff and improved infrastructure	<b>5</b> Côte Bleue Marine Park, Es Freus Marine Reserve, Strunjan Landscape Park, Telašćica Nature Reserve, Zakynthos National Marine Park
	<b>TOOL 3:</b> Increase surveillance through fishers' direct involvement	<b>6</b> Cabo de Palos Marine Reserve, Egadi Islands MPA, Portofino MPA, Strunjan Landscape Park, Telašćica Nature Reserve, Zakynthos National Marine Park
	<b>TOOL 4:</b> Increase surveillance through the cooperation with relevant authorities	<b>4</b> Cap Roux Fisheries Reserve, Côte Bleue Marine Park, Telašćica Nature Reserve, Torre Guaceto MPA
<b>c</b> KNOWLEDGE & OWNERSHIP	<b>TOOL 5:</b> Engage fishers in monitoring activities	<b>5</b> Bonifacio Strait Natural Reserve, Egadi Islands MPA, Portofino MPA, Strunjan Landscape Park, Torre Guaceto MPA
	<b>TOOL 6:</b> Raise the awareness of fishers, MPA managers and the local community	<b>5</b> Egadi Islands MPA, Zakynthos National Marine Park, Cabo de Palos Marine Reserve, Strunjan Landscape Park, Cap Roux Fisheries Reserve
<b>d</b> IMPROVE SSF ENVIRONMENTAL SUSTAINABILITY	<b>TOOL 7:</b> Reduce fishing effort	<b>3</b> Portofino MPA, Torre Guaceto MPA, Zakynthos National Marine Park
	<b>TOOL 8:</b> Modify/substitute fishing gear	<b>3</b> Bonifacio Strait Natural Reserve, Strunjan Landscape Park, Telašćica Nature Reserve
	<b>TOOL 9:</b> Set-up SSF Code of conduct	<b>1</b> Egadi Islands MPA
<b>e</b> IMPROVEMENT OF SSF PROFITABILITY	<b>TOOL 10:</b> Add value to local fisheries products	<b>1</b> Côte Bleue Marine Park
	<b>TOOL 11:</b> Promote new commercial species	<b>1</b> Zakynthos National Marine Park
	<b>TOOL 12:</b> Support Pescatourism	<b>1</b> Telašćica Nature Reserve

Source: Hogg *et al.*, 2019 p. 14.