

Blue economy potential for shaping a marine Entrepreneurship Ecosystem: the case of the Adriatic Sea

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Abstract

Purpose of the paper: This study aims at investigating the potential of the Blue Economy (BE) for facing the depletion of marine resources, and the transition towards a more sustainable development. The analysis was conducted according to an ecosystem perspective to grasp the intertwined dynamics that bond together ecological, social, and economic phenomena.

Methodology: An explorative analysis, based on the case study method, was conducted to understand if and how BE strategies can support the development and the long-term viability of a marine entrepreneurial ecosystem (MEE) in the Adriatic Sea.

Main Findings: The explorative analysis led to recognizing the positive influence that, under specific conditions, BE strategies can have on a marine entrepreneurial ecosystem. The role, the influence, and the relationships between ecosystem actors were described in the potential MEE of The Adriatic Sea.

Practical implications: The analysis offered interesting insight to policymakers and managers to reorganize marine and maritime activities following the principles of sustainable development to gain an equitable, fair, and long-lasting economic, environmental, and social growth of the Adriatic entrepreneurship ecosystem.

Originality/value: This study is one of the few or probably even the first one to investigate BE potential for the transition towards sustainability according to an ecosystem perspective. It also offers new guidelines for the sustainability-oriented development of the Adriatic Sea MEE.

Keywords: Blue economy, Sustainable Development, Ecosystem, Marine Entrepreneurship Ecosystem.

1. Introduction

It is more than three decades since the first publication of the Brundtland Report (1987), which offered one of the first definitions of sustainable development, intended as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p.37).

Over the years, sustainable development together with sustainability has been widely approached both in theory and in practice. Most of the research on the topic highlighted the inner complexity of these two essential concepts as well as the need for holistic approaches able to harmonize their three main pillars, economy, environment, and society (Espinosa et al., 2008).

In this sense, Capra – shedding further light on the limits of current globalized capitalism especially in facing environmental challenges – considered systemic approaches able to offer an alternative approach to socio-economic development (Capra, 1996). This implies a concrete paradigm

shift pointing to moving the focus from short-term and partial initiatives to the intertwined dynamics that bond together ecological, social, and economic phenomena, which cannot be analyzed and addressed in isolation (Holling 2001). Some policy initiatives tried to hit this goal, addressing basic human needs, and enhancing socio-economic welfare (Barrett and Grizzle, 1999). One of the most important initiatives was the development of the Sustainable Development Goals (SDGs), which are “a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030” (Assembly, 2005, p.20). This action can be considered one of the first responses to the complexity that affect the three main spheres of sustainable development (Espinosa et al., 2008). Dealing with this complexity, the assumption of an ecosystem approach can contribute to challenging it considering sustainable development and its issues in a harmonic way (Barile et al., 2018). Thus, flowing from the traditional biological metaphor, ecosystems put human beings at the core of the development “seeking to ensure the durability of the ecosystem of which they are an integral part”. This implies that sustainable development highly depends on holistic interventions aimed at boosting at the same time environmental conservation, economic growth, and social equity.

One of the most common definitions of ecosystems describes them as networked and interconnected systems of systems, which “become eco-systemic contexts for any entity that lives within them, influencing and being influenced by their behaviors” (Barile et al., 2018, p.1198). Therefore, the focus is on the different determinants of both the ecosystem and the actors who populate it as well as on the way they can survive reconciling their divergent interests in terms of intragenerational and intergenerational distribution of resources can boost the transition toward a more sustainable and inclusive world (Coglianese, 1999). More recently, entrepreneurial ecosystems have gained momentum among scholars and practitioners, who approached them as “complex socioeconomic structures that are brought to life by individual-level action” (Spigel, 2015, p.49). These ecosystems are made up of “interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (Stam and Spigel, 2017 2016, p.1).

Entrepreneurial Ecosystems (EE) development and management are attracting the attention of regional policymakers and leaders, who consider them particularly promising for contributing to a more sustainable growth. This has shed further light on the conceptualization of the institutions and actors that support sustainable entrepreneurship (Schaltegger and Wagner, 2011). Research on the topic argued that entrepreneurial action can contribute to addressing complex social and ecological issues also thanks to entrepreneurs’ ability in boosting industrial transformation (Cohen and Winn, 2007; Schaltegger et al., 2016). In this vein, the assumption of an ecosystem perspective can support sustainable entrepreneurship by 1) pursuing opportunities in an integrated and holistic way (Schlange, 2009), and 2) balancing economic, ecological, and social tradeoffs (DiVito and Bohnsack, 2017).

Even though further research is still needed for a better understanding of some essential issues related to EE and their sustainability, some scholars are focusing on Blue Economy (BE) potential in doing so (Senaratne et al., 2021), which is intended at making countries and/or regions able to achieve a long-term socio-economic and environmental wellbeing preserving and enhancing marine environment (Bari, 2017). Therefore, this study aims at contributing to this research line by proposing the design of marine EE applied to the real context of the Adriatic Sea. It follows that two are the inspiring questions at the core of the present analysis:

RQ1 – which are the building blocks of a marine EE?

RQ2 – which are the main interactive mechanisms that make a marine EE sustainable?

To fulfill this purpose, a tentative model has been developed and applied to the case area of the Adriatic Sea to define and analyze each actor’s contribution to the shaping and the sustainable development of a marine EE.

The study has been organized as follows. Section 2 is dedicated to outlining the theoretical background of the study, focusing on the BE’s contribution to the grand challenge of sustainable development as well as to the analysis of BE’s contribution to the development and growth of an EE.

Section 3 delves into the modeling of a general marine EE, while the following section is dedicated to the design of the Adriatic marine EE as well as to the presentation and discussion of its main characteristics. The last section offers some theoretical implications together with some final remarks.

2. Theoretical background

2.1 The Blue Economy potential for Sustainable Development

The conceptualization of the Blue Economy (BE) dates to the '90s, as further exploitation of the Green Economy, a more general approach to socio-economic activities aimed at reducing environmental degradation of land, air, and/or sea (Brand, 2012). It follows that BE, as a sustainable approach to the development of marine areas and the related socio-economic activities, is at the forefront of public opinion since the publication of Agenda 21, in which statements were reaffirmed and made ready to be implemented during the 2012 Rio+20 summit. In those days, it was established that “oceans, seas and coastal areas form an integrated and essential component of the Earth’s ecosystem and are critical to sustainable development” (United Nations General Assembly, 2012). The importance of a sustainable approach to marine resources management has been reaffirmed in the United Nations (UN) Agenda 2030, in which SDG number 14 refers to those activities concerning conservation and sustainable use of the oceans, seas, and marine resources for sustainable development (ODDS, 2015). This goal is based on seven targets and three means of implementation related to the sustainable use of the oceans and their resources.

Even though international attention is paid to marine sustainable development, it is worth noting that it is not easy to target to hit. Thus, on the one hand, policymakers and researchers are still engaged in a lively debate about how effectively ensure the reasonable use of these resources to globally prevent the production of long-term negative environmental, social, or economic externalities (Llewellyn et al., 2016; Vona, 2021). On the other, BE remains a concept not so pragmatic and with no consensus about its definition (Park et al., 2014). Scholars and practitioners offered different and sometimes opposite definitions as demonstrated by Pauli (2010), who emphasized the BE’s innovative potential for achieving a sustainable ocean development, and Visbeck et al. (2014), who maintained that “the sustainable use and development of the ocean and the coasts concern all countries, whether they are coastal states or not, due to the global nature and importance of the manifold functions and services delivered by the world’s ocean and coasts, their relevance for the human society, and the interconnectedness with human activities” (p.189). This implies that a comprehensive globally based legislation represents an essential condition for achieving a more sustainable development, also based on blue economy strategies and approaches. However, further efforts – based on the harmonization of different goals such as economic growth and long-term environmental stability – are still needed for reducing marine degradation (OECD, 2016). This is what is required for both developed and emerging countries, still too far from sustainable management of BE marine/maritime business activities (e.g., fisheries, aquaculture, transportation, and tourism) (UNEP, 2011).

Even though BE has been differently approached and its inner significance has gradually changed over time, it maintains its strict relationship with the main paradigm of sustainable development. Thus, “starting out as an environmentalist concept of innovation, it became employed as a primarily economic term, and later was used as a security concept and a diplomatic tool” (Bueger, 2017, p.6), the UN Environmental Program approached BE as a business model. This it was considered able to build on “a systemic approach and combines seemingly disparate environmental questions with scientific innovations to develop business plans which are beneficial to the environment, create wider social benefits, as well as promise financial revenues” (Burger, 2017, p.4).

2.2 Blue Economy for sustainable Entrepreneurial Ecosystems

Ecosystem is at the core of scientific disciplines such as biology and ecology and is intended as a biotic community, encompassing all the organisms or living and nonliving components that mutually interact in their surrounding environment (Peltoniemi and Vuori, 2004). Starting from the original

biological metaphor, organization and managerial research approached ecosystems (Autio and Thomas, 2014; Acs et al., 2017) considering them able to offer a broader perspective on resource management. Moreover, managerial research on the topic considers organizations and their related environment as open boundaries' socio-economic systems, which can include always new actors (Santos and Eisenhardt, 2005; Autio and Thomas, 2014). These actors tend to be interdependent and to co-evolve performing nonlinear behaviors that can cause opportunities and challenges (Phillips and Ritala, 2019).

Ecosystems are also approached as complex adaptive systems inherently fuzzy, which complexity is due to the number of components (e.g., entities or actors) and the interactions occurring between them (Levin et al., 2013). Scott and Davis (2007) recognized three main ecosystem constituent characteristics 1) actors, 2) social relations, and 3) activities or processes.

In recent times, governments, national and international institutions as well as companies have implemented the ecosystem approach for creating a favorable context for entrepreneurship and innovation. This led to the conceptualization of the entrepreneurial ecosystem, which Moore (1993) anticipated by proposing the so-called business ecosystems that shift the focus from the traditional value chain (Porter, 1985) to those interdependencies and the co-evolution mechanisms occurring between networked actors (Adner, 2017).

The exploitation of this concept led to the definition of the entrepreneurial ecosystem (EE), which stemmed from strategy and regional development research. The conceptualization of EE pointed out actors' interdependence "in a particular community to create new value and have developed a novel approach to the industrial organization over the last decades" (Acs et al., 2017, p.3). In a similar vein, Stam and Spiegel (2017) defined EE as "a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory" (p.407). Research on the topic (Malecki, 2018; Senaratne et al., 2021) also identified some essential resources for shaping an EE. It is worth noting that some scholars criticize this concept because they considered it too focused on a national-level analysis as well as on regional communities with an entrepreneurship-related vocation (Stam, 2015; Brown and Mason, 2017). Other scholars criticized EE because too actor-centered and unable to grasp "the potential of developmental, evolutionary, and longitudinal perspectives that adequately account for the variety of potential outputs" (Kuckertz et al., 2019, p.2).

Assuming a more holistic approach these ecosystems should be able to merge two different orientations – business and sustainability – to perform pursuing not only entrepreneurial but also social and environmental opportunities (DiVito and Bohnsack, 2017). However, in doing so the contribution of public and private networked actors remains essential for ensuring an EE and their actors' long-lasting viability, and sustainability (Roundy et al., 2017).

When shaped in marine contexts, EE is aimed at boosting a more conscious use of marine resources to reduce or avoid negative long-term environmental, social, and economic externalities (Llewellyn et al., 2016). This also implies the rising of a new and more sustainable orientation to the management of seas, oceans, and their resources, pointing to balance and harmonizing the competing interest of different socio-economic actors (e.g., national/international institutions, business organizations, non-profit organizations, individuals), belonging to different "blue sectors" such as fisheries and aquaculture, marine resource extraction (e.g., oil, gas, and minerals), goods' shipping and transportation, people transportation, leisure, and tourism (Senaratne et al., 2021). In a marine EE, all these sectors as well as the related actors and resources should coexist and tend to co-evolve (Erina et al., 2017) for the common purpose of creating a long-lasting value.

Like other EE, marine EE is built upon dynamic, institutionally embedded interactions between human actors' entrepreneurial attitudes, abilities, and aspirations, which drive resource sharing and allocation mainly through the creation of new marine-related ventures (Acs et al., 2014). In this sense, the assumption of an institutional approach (Hamilton, 1919; Ménard, 2008) led to a better understanding of how a marine EE can gain sustainability, especially in developing and enacting "joint institutional alignment processes on which balance the adaptive tensions between social mission, environmental stewardship, and economic growth" (Fehrer and Wieland, 2021, p.611). This

is possible because institutional theory led to a better understanding of “how the economic, social, and political aspects can be used to address the ‘resource curse’ problem”. In doing so and according to Akaka et al. (2019) BE can be considered as an institution – or “relatively isolatable, individual ‘rule’ (e.g., norm, meaning, symbol, law)” (p.643) – pointing to balance economic benefits, long-term ecosystem actors’ wellbeing, and the conservation of ecosystem resource to ensure both intra- and inter-generational equity (Kee et al., 2018). It follows that BE, its strategies, and practices can act as a driver or as the “glue” that contributes to holding together the actors who populate a marine EE (Wieland et al., 2016; Ciasullo et al., 2017). They also pave the way for a broader institutional change essential to solving – through orchestrating strategies and measures – those problems or frictions often occurring between EE actors with divergent goals (Fehrer & Wieland, 2021). This is in line with the OECD’s approach (2016), according to which the enactment of BE strategies and policies will promote the achievement of long-term environmental and social stability, not prioritizing the growth of just one ecosystem actor and in doing so adversely affecting others.

3. Modeling a Marine Sustainable Entrepreneurship Ecosystem

Drawing on Stam and Spiegel’s definition of EE, which is “a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (2017, p.407) and on the World Economic Forum (2013) (research, a brief taxonomy of EE’s constitutive pillars, outputs, and outcomes is proposed (Tab.1).

Table 1: EE main pillars.

Pillars	Brief description
<i>Accessible markets</i>	Domestic market: Large/medium/small companies as customers, governments as customer Foreign market: Large/medium/small companies as customers, governments as customer.
<i>Human capital/workforce</i>	Management talent, technical talent, entrepreneurial company experience, outsourcing availability, access to immigrant workforce.
<i>Funding & finance</i>	Friends and family, angel investors, private equity, venture capital, access to debt.
<i>Support systems / mentors</i>	Mentors/advisors, professional services, incubators/accelerators, networks of entrepreneurial peers.
<i>Government & regulatory framework</i>	Ease of starting a business, tax incentives, business- friendly legislation/policies, access to basic infrastructure, access to telecommunications/broadband, access to transport.
<i>Education & training</i>	Available workforce with pre-university education, available workforce with university education, entrepreneur-specific training.
<i>Major universities as catalysts</i>	Promoting a culture of respect for entrepreneurship, playing a key role in idea-formation for new companies, playing a key role in providing graduates to new companies,
<i>Cultural support</i>	Tolerance for risk and failure, preference for self- employment, success stories/role models, research culture, positive image of entrepreneurship, celebration of innovation.

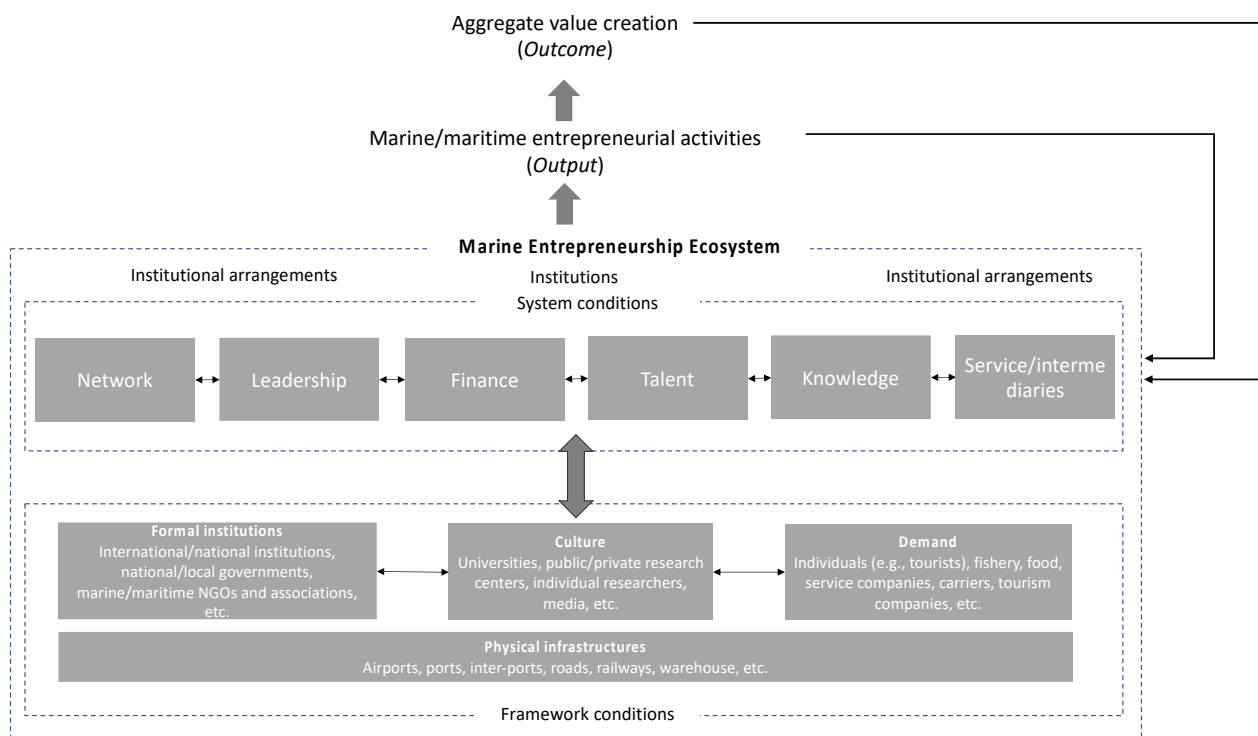
Source: World Economic Forum, 2013.

These pillars together with possible EE outputs and outcomes have been clarified and depicted in Stam’s (2015) model, which inspired the definition of a general marine EE (Fig.1). These elements contribute to the design and EE passing through different steps and the related activities (Vink et al., 2021). The first one is actors’ involvement in the definition of those processes essential for ecosystem functioning and which are based on a feedback loop able to create and/or recreate ecosystem dynamics. In particular, “Upward causation reveals how the fundamental causes of new value creation are mediated by intermediate causes, while downward causation shows how outcomes and outputs of

the system over time also feed back into the system conditions. Intra-layer causal relations refer to the interaction of the different elements within the ecosystem, and how the different outputs and outcomes of the ecosystem might interact” (Stam, 2015, p.1763). The second one is the design material and system conditions essential for shaping the ecosystem itself and defining and regulating its functioning is made up of institutions, the related institutional arrangements, and their enactment. Finally, the purpose is what inspires the way value is collectively created, passing from the output creation to outcome achievement (Ciasullo et al., 2017).

The proposed marine EE model is built upon the intertwining of four different layers 1) framework conditions, 2) systemic conditions, 3) outputs, and 4) outcomes, possible thanks to upward and downward causation, and intra-layer causal relations.

Figure 1: modeling a marine EE.



Source: adapted from Stam, 2015.

In Figure 1, framework conditions represent the basis on which a marine EE is built. They are made up of formal institutions, (e.g., international/national institutions, national/local governments, marine NGOs, and associations), which cooperate with other actors, those who 1) represent the academia (e.g., universities, marine public/private research centers, individual researchers, media, etc.), and 2) demand of specific marine services coming from different business and/or social actors (e.g., individuals, tourists, food companies, commercial companies, etc.). The interactions between these actors are facilitated by the physical infrastructures (e.g., ports, airports, road, and railway transportations, etc.) they develop, manage, and use.

Framework conditions are supported by some system conditions, which represent the “engine” of the ecosystem; thus, they are set by the action and the networked interactions of (Kerr and Nanda, 2009; Stam, 2018): 1) marine entrepreneurs who provide information essential for starting creative processes, 2) (business and/or politics) leaders who model the EE and set its rules, 3) the access to finance, essential for ecosystem long-term viability, 4) talent and knowledge sharing, which stem from skilled ecosystem actors, and 5) specific marine and non-marine services, provided by different intermediaries that can support new actors (e.g., entrepreneurs) to overcome entry barriers, and reduce the time-to-market of innovations. At this layer are also set some specific institutions – or “relatively

isolatable, individual ‘rule’ (e.g., norm, meaning, symbol, law)” (Vargo and Lush, 2016, p.8) – and the related institutional arrangements – or “a relatively coherent assemblage of institutions” (Vargo and Lush, 2016, p.8) – which facilitates ecosystem coordination and functioning.

It follows that institutional arrangements also regulate the con-joint action of framework and systemic condition and their ability to gain short-term results (outputs) and long-term ones (outcomes) because they shape marine/maritime decision-making and the related policies. Drawing on these considerations, BE is intended as an institution that can contribute, through the action of its institutional arrangements (e.g., marine/maritime policies, strategies, plans, practices, and actions) to facilitate resource integration for the new or further development of marine entrepreneurial activities as well as for creating a long-lasting aggregate value.

The model also shows a circular logic that led framework and systemic conditions to create and distribute the output (e.g., marine entrepreneurship activities, innovations) (upward causation) and the outcome of their interaction, and, at the same time, the influence that both have on systemic conditions over the time (new value creation) (Stam, 2015). Moreover, the achieved outputs and the subsequent outcomes can stimulate a change and/or exploitation of those elements and resources critical for marine ecosystem functioning, competitiveness, and viability. This is possible also thanks to the intra-layer causal relations, which “refer to the interaction of the different elements within the ecosystem, and how the different outputs and outcomes of the ecosystem might interact” (Stam, 2015, p.7).

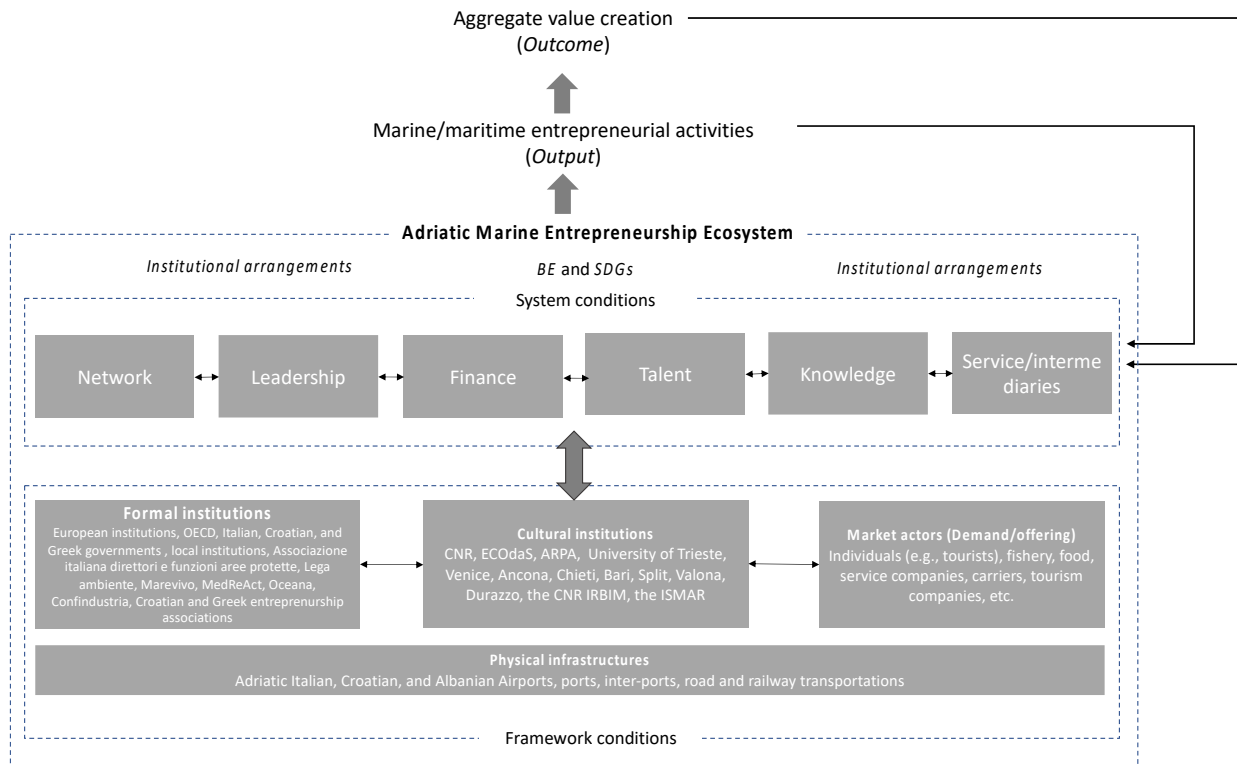
4. Methodology

The empirical analysis, based on the concrete application of the proposed model, has been conducted by embracing an exploratory approach, which is particularly suitable to define, describe, and analyze a not well-established phenomenon/problem and its related issues (Kvale and Brinkmann, 2007). According to Stebbins (2001), an exploratory analysis mainly points to defining new “dimensions” and/or characteristics of the selected unit of analysis. It follows that this approach is in line with the aim of this study, which is a better understanding of BE’s strategic contribution to shaping a marine SEE and in setting specific mechanisms for creating aggregate (economic, environmental, and social) value. The assumption of an exploratory approach has led to defining opportunities and threats typical of the domain under investigation, highlighting its main peculiarities (Van Wyk, 2012). In doing so, the model developed according to the results of the theoretical analysis and presented in the previous section has been applied to the Adriatic Sea to shape and describe a possible marine EE. The presentation of the Adriatic EE has been mainly based on the analysis of secondary data (Yin, 2013), retrieved from some official national and international reports, websites, and databases.

5. The Adriatic marine EE: a case application and findings discussion

The assumption of an ecosystem approach to marine resource management has led to recognizing the existence of some formal and informal mechanisms for coordinating not only the different actors who interact in a marine EE but also the activities and the resource they use in the related socio-economic and biophysical environment. In doing so, the proposed model (see Fig.1) has been applied to the Adriatic Sea and, consequently, framework and system conditions have been further described according to the peculiarities of the domain under investigation (Fig.2).

Figure 2: modelling the Adriatic marine EE.



Source: adapted from Stam, 2015.

To better understand the design of the Adriatic marine EE some building blocks have been identified and presented (Tab.2).

Table 2: The building blocks for designing the Adriatic marine EE. Source: authors' elaboration.

As stated, an EE lies its foundations on specific framework conditions, made up of the actions and the interactions occurring between the involved ecosystem actors – formal institutions, cultural institutions, and market actors – and the physical infrastructures (that in the Adriatic marine EE are Adriatic Italian, Croatian, and Albanian Airports, ports, inter-ports, road, and railway transportations), which facilitate and strengthen actors' interactions.

The actors who populate the Adriatic marine EE are the following:

1. *Formal institutions*, or European marine and non-marine institutions; the OECD (Organization for Economic Co-operation and Development); Italian, Croatian, and Albanian governments, and ministries (e.g., Ministry of agriculture, food, and forestry, Ministry of environment, land and sea protection, Ministry of Infrastructure and transportation, Ministry of Regional Development and EU funds, etc.); local Italian, Croatian, and Albanian institutions; ARPA (*Agenzia regionale per la protezione ambientale*); the *Associazione italiana direttori e funzioni aree protette*; Italian, Croatian and Albanian entrepreneurship associations, port authorities, and national tourism agencies.

2. *Cultural institutions*, or the Universities of Trieste, Venice, Chieti, Ancona, Bari, Lecce, Split, Valona, and Durazzo; UNESCO (United Nations Educational, Scientific and Cultural Organization); EMBRC (European Marine Biological Resource Centre); CIESM (Mediterranean Science Commission); the Italian CNR (National Research Council) and IRBIM CNR (Institute for biological resources and marine biotechnologies of National Research Council); the Italian ISPRA (*Istituto Superiore per la Protezione e la Ricerca M.A.R.E*) and ISMAR (Institute of marine sciences); the Croatian SINP (State Institute for Nature Protection), IZOR (*Institut za oceanografiju i rbarstvo*); the ONGs *Lega ambiente Italia*, the Italian *Marevivo*, and Oceana; the Croatian *Mare Nostrum*, CroMPA (Croatian Marine Protected Areas Network), SUNCE (Association for Nature, Environment and Sustainable Development).
3. *Market actors*, or individuals (e.g., tourists, citizens, employees, etc.); fishery, food, service companies; carriers; tourism companies, etc.

These three ecosystem actors are characterized by different purposes. Thus, formal institutions aim at boosting socio-economic development, and environmental protection of the Adriatic Sea, lands, and countries. This also led to a conjoint institutional effort in promoting and supporting the sustainable development of this trans-national area. A concrete example of this conjoint institutional effort is the conjoint promotion of efficient and effective policies, strategies, and action plans dedicated to the sustainable development of Adriatic areas, pointing to protecting, restoring, and enhancing their economic, social, and ecological balance. The main purpose of cultural institutions is the further development of intellectual capital and the promotion of a concrete cultural change pointing at making anthropic activities related to marine resources even more sustainable (Brooks et al., 2018; Basile et al., 2021). Among the different purposes of cultural institutions, it is possible to distinguish the willingness to enact projects and educational paths pointing to promoting a marine sustainable culture, based on the importance of coastal and marine resources and the related cultural heritage restoration, protection, and enhancement as well as on the promotion of sustainable marine businesses (e.g., aquaculture, tourism, transportation, energy production, etc.). Finally, market actors mainly aim at grasping new business opportunities (offering side) and to get new and innovative services/products (demand side), such as the creation of marine-based innovative start-ups, new and sustainable products and services dedicated to tourists, citizens, and business operators (e.g., innovative biomasses, artificial reefs, robotic and drone applications, blue biotechnologies, etc.).

Even though ecosystem actors aim at gaining different and specific goals (output), it is worth noting that they are often open to collaborating and being involved in pursuing a common objective or outcome which is the entire ecosystem's well-being and viability (Frow et al., 2018). It follows that this involvement is mainly due to the institutions and the institutional arrangements – intended as a set of different practices, rules, symbols, and organizing principles applicable to similar situations (Ostrom, 1988) – they share, and which drive and inspire their activities. It is at the level of system conditions that institutions and institutional arrangements are provided. In the case of Adriatic marine EE, SDGs (Sustainable Development Goals) and BE intended as institutions and the related set of institutional arrangements (Kerckhoff, 1995), act as sense-making frames to coordinate and limit actors' interactions (Koskela-Huotari et al., 2016). This is possible because they give 'resources' – that is meaning, power, and/or value – to actors' resources (Siltaloppi et al., 2016).

Drawing on these considerations, some institutional arrangements related to SDGs and BE have been identified, able to coordinate and give the right meaning and emphasis to network, leadership, finance, talent, knowledge, and service resources belonging to the different ecosystem actors. It follows that BE– intended as the sustainable use of ocean and associated resources (Tirumala & Tiwari, 2020) – and the SDGs are associated with some specific institutional arrangements, such as among others ocean-based economic models, marine/maritime sustainable business, and operation strategies, the related legal and policy framework, coastal and marine governance. This makes BE and SDGs able to inspire and set the “rules” for boosting and supporting ecosystem actors' cooperation for meeting

“the twin goals of protecting our oceans and coasts and enhancing their potential contribution to sustainable development, including improving human well-being, and reducing environmental risks and ecological scarcities” (East Asian Seas Congress, 2012). More in detail, institutional arrangements boost ecosystem actors’ cooperation, driving the use of their resources and distributing among them the risk associated with their activities (Keen et al., 2018).

As Table 2 depicts, SDGs and BE institutional arrangements connect ecosystem actors, guiding them to 1) pursue their short-term purpose of avoiding conflicts, and 2) align their long-term goals towards coastal and marine sustainable development, achievable possible through ongoing and aggregate value creation. To better understand these mechanisms, some specific practices have been identified for each group of ecosystem actors. Thus, formal institutions practices are those strategies and action plans pointing to 1) developing and enacting a cross-national marine/maritime governance, 2) promoting a cross-country socio-economic cooperation and collaboration, 3) defining new laws, standards, and rules for a sustainable use of socio-economic, and marine environmental resources, and 4) improve, develop, and manage physical infrastructures.

Some of the practices that institutional actors have enacted in the Adriatic marine EE are, among others, the EU (European Union) Strategy for the Adriatic and Ionian Region (EUSAIR), the OCSE Mediterranean Action Plan (MAP), the North Adriatic Sea Port Authority Strategic Planning and Development, the legal and institutional framework assessment for conservation of coastal and marine biodiversity in Croatia and Albania (MedMPAnet), the Italian PRISMA (National Research Program for the Adriatic Sea) project, the Regione Marche “Get up start-up” project, ML-Repair (Reducing and Preventing Marine Litter an Integrated Approach to Management in the Adriatic Sea), “Change we care” (Climate challenges on coastal and transitional changing areas: weaving a Cross-Adriatic response”), the conjoint Italian-Croatian project “A clean Adriatic Sea for future generations”, and the UNDP call for proposals “Blue Economy Programme”.

Cultural institutions practices are those projects/activities pointing to 1) promoting knowledge creation and sharing, 2) creating and sharing a sustainable entrepreneurship culture, and 3) promoting the development and the commercialization of innovative processes, products, and/or services. Some of the practices that cultural/academic actors have enacted are, the MUSES project (coastal and maritime tourism and O&G decommissioning as drivers for potential multi-use in the northern Adriatic Sea) managed by the Italian CNR-ISMAR, the project “Governing Future Challenges in Mediterranean Protected Areas” managed and promoted by the Italian CNR (National Research Center), the Adriacim project, the ADRIPLAN (Adriatic Ionian maritime spatial Planning) project, the oceanographic system “Tiresias”, and the GEF Adriatic project.

Finally, market actors’ practices are intended to further develop marine/maritime markets mainly through innovative products/services in line with customers’ expectations and launching new start-ups. Some of the practices that these actors have enacted are the creation of the Italian-based service platform dedicated to marine/maritime companies “MAREfvg”, the development of a new wind farm in the Adriatic Sea off the coast of Ravenna, the ENI and INA joint creation of two sister platform (Annamaria A and Annamaria B) for gas production located in Croatian and Italian waters of Adriatic Sea, the decommission of some oil platforms, the creation of Italian ZeroCO2 (marine flora nourishment), Ocean Grazer (battery production for energy stockage over the sea), Ogyre (fishing for litter), Ittisect (biological fish feed), Antlos (a peer-to-peer online marketplace for sustainable boat holidays) start-ups, and the Croatian ELNAV (an artificial intelligence system for monitoring helm orders) and CampMap (digital interactive maps).

It is worth noting that the different evolution mechanisms that each ecosystem actor enacts tend to lead to different outputs. However, the effect of these outputs spread across the EE and together with aggregate mechanisms of value creation contribute to the creation of shared outcome that makes the marine EE able to constantly evolve (Xue et al., 2020). When driven by institutional arrangements individual purposes and initiatives tend to be not conflicting, but willing to find a certain match in designing and enacting their specific and often innovative practices pointing to get the same long-term goal, that is the sustainability of the EE (Xue et al., 2021).

6. Implications and final remarks

This paper has been designed to contribute to the nascent research on marine entrepreneurship ecosystems. In doing so, the analysis has been intended to better understand and describe how anthropic activities and the actors who perform them impact marine resources exploitation and environmental changes.

The results of both theoretical and practical analysis demonstrated that, despite a growing attention and effort toward a sustainable approach to marine resource management, further and coordinated research is still needed for addressing the grand challenge of sustainable development in terms of balancing environmental protection, economic development, and social equity (Espinosa et al., 2008). In this vein, to better understand how to balance these goals, it has been assumed an ecosystem perspective can better focus on the role that different marine stakeholders – intended as ecosystem actors – have and the activities they perform for creating an aggregate and mutual value (Schlange, 2009; DiVito and Bohnsack, 2017). In doing so, an institutional approach (Hamilton, 1919; Ménard, 2008) has been also assumed for defining the institutional framework which should inspire and drive ecosystem actors' actions and interactions (Xue et al., 2021). It follows that SDGs and in particular BE have been intended as those institutional arrangements able to guide ecosystem actors towards not conflicting purposes as well as towards the long-term common goal of sustainable development. This theoretical framework led to the design of a general marine EE (as Fig.1 and Tab.1 depict) and to apply it to the Adriatic Sea, identifying its essential building blocks in terms of actors (intuitional or not), individual purpose, institutional arrangements, practices, and related outputs as well as the general ecosystem outcome. This led to addressing the first RQ.

The case application demonstrated that even though ecosystem actors (especially the institutional and cultural ones) often tend to pursue common purposes, for example developing and enacting conjoint development or business projects or participating together in specific calls or action plans, more often individual purposes drive their action. This seems to be mainly due to their awareness of the importance to protect and enhance the Adriatic Sea and its environmental, social, and economic resources, orienting the related activities to sustainable development following the BE and SDGs principle. This happens also in the case of market actors', who recognized the potential of BE strategies and assuming a sustainable perspective have grasped some business opportunities creating innovative and sustainable start-ups and/or products and services. This is what has come out from the case analysis; thus, thanks to the acceptance of the existing institutional arrangements, the actors of Adriatic marine EE tend to align their purposes mainly by collaborating on shared projects and actions. In other cases, specific laws or rules push them to align their conduct through reinforcing actions pointing to face unexpected situations and avoid/reduce possible misalignments or conflicts (Lee et al., 2020). It follows that the key element for a harmonic and collaborative functioning of an EE is the actors' commitment and interest toward the common elements at the core of institutional arrangements, that in this case are the rules, values, norms, and symbols related to ocean protection, to the equitable protection and development of marine resources as well as to the provision of sustainable products and services (Tang, 1991). To achieve this commitment and to make institutional arrangements effective the agency needed to engage in a participatory "bottom-up" decision-making perspective (Steinheider and Wuestewald, 2008). This also implies that when this participation and consensus lacks, the marine EE needs new institutional arrangements and governance mechanisms to be publicly discussed and agreed upon to avoid disruptive and conflictual situations that can hinder ecosystem viability. All these insights led specifically address the second RQ.

This work has also offered some interesting theoretical and practical implications. Thus, on the one hand, it has contributed to the nascent research on marine EE, highlighting the essential role that institutional arrangements, such as SDGs and BE, have in its design and future development, supporting actors in assuming rational decisions and behaviors in almost all situation (Friedland and Alford 1991; Scott, 2014). On the other, the practical implications that this work offered are related

to the principles for designing a general marine EE. Moreover, some insights in terms of new practices, products, and services that can be developed in a marine or not EE have been provided (see Tab.1). Together with these elements, it has been also emphasized that public decision-makers should search for public engagement and consensus on institutional arrangements and the policies they contribute to defining. This can be achieved also through the promotion of concrete cultural change pointing to changing the general mindset and making it much more oriented toward sustainable development principles and goals (Brooks et al., 2018).

Even though this study attempted to contribute to the extant literature on EEs and their application to marine context, its inherently explorative nature somewhat limits it; thus, further research based on quantitative methods is to be applied to primary data.

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