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# Leveraging Maritime Cultural Heritage to Drive Smart Specialization Strategies: Fostering Innovation, Blue Economy, and Sustainable Development

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**Abstract:** Internationally, there is a modern understanding of cultural heritage, including maritime/underwater cultural heritage (MUCH)—not merely as a passive relic of the past, but as a transformative driver for sustainable growth and innovation. The paper discusses the position of maritime cultural heritage (MUCH) in relation to the smart specialization strategies (S3) and its evolving role as a driver of sustainable growth, particularly within the context of the blue economy and smart specialization strategies (S3, S4) in Europe. It then focuses on the Greek context, where UCH-driven activities, particularly soft multi-use (MU) activities that combine UCH, diving tourism, and nature conservation, are gaining momentum, especially within marine protected areas (MPAs). Despite the growing interest, there is a lack of data, regulations, and a clear strategy for such activities, although the "National (Hellenic) Spatial Strategy for the Marine Space" (issued in 2025) suggests promoting low-impact diving tourism incorporating UCH. The research paper examines the benefits and barriers to implementing UCH-driven MUs, recommending the use of maritime spatial planning (MSP) to address relevant challenges. It suggests that integrating UCH with nature conservation and diving tourism in soft MUs could support a sustainable blue economy, through balancing cultural, ecological, social, and economic goals and fostering innovation through S3/S4 on a regional level.

**Keywords:** smart specialization strategies; maritime cultural heritage; underwater cultural heritage; multi-use; maritime spatial planning; diving tourism; nature conservation; regions; innovation



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## 1. Introduction

Culture, including cultural heritage (CH), has increasingly been recognized as a key driver of sustainable and societal development, particularly through its integration into tourism sector strategies across various European regions [1–5]. This recognition highlights the modern understanding of cultural heritage—including maritime cultural heritage (MCH)—not merely as a passive relic of the past, but as a transformative driver for sustainable growth and innovation. Within this framework, maritime cultural heritage, along with underwater cultural heritage (UCH, standing for the submerged MCH), emerge as significant subsets of cultural heritage. UCH specifically refers to all remnants of human activity possessing cultural, historical, or archaeological value that have been wholly or partially submerged underwater for a minimum of 100 years—including shipwrecks, submerged settlements, ancient harbors, and other underwater heritage sites [6]. In contrast, maritime cultural heritage (hereinafter MCH) encompasses a broader range of cultural

assets related to human interaction with the sea, rivers, and other water bodies, including both tangible and intangible elements such as coastal structures, maritime traditions, and seafaring practices [6]. This transformation approach is in line with the EU's regional and innovation policy agenda and with its associated concept of smart specialization strategies (S3) [7].

The S3 term was added into the EU Cohesion Policy vocabulary during the programming period 2014–2020. Its primary objective was to guide investment decisions through the identification of key strategic priorities of the region's sustainable growth and competitiveness (prioritization) based on evidence-driven and participation processes (participation) related to the actual needs and regional strengths and opportunities of the locality (localization) [8,9].

While the S3 strategies of the 2014–2020 programming period introduced valuable mechanisms to promote growth, they were not without limitations. A key criticism is their strong emphasis on technological innovation and high-tech sectors, often at the expense of non-technological forms of innovation [10–12]—such as those emerging from social, cultural, or creative industries. This narrow focus tends to overlook regions that may lack advanced technological infrastructure but are rich in cultural, social, or environmental assets capable of driving innovation. It is therefore unsurprising that only 9% of European regions integrated cultural and creative industries or cultural heritage into their S3 strategies during this period—a trend largely observed in southern EU countries, which reflect both territorial diversity and cultural richness [11,13].

In addition, the framework has often been criticized as economically driven, with limited integration of goals related to the European Green Deal or the UN Sustainable Development Goals (SDGs), the latter aiming to reinforce social cohesion, environmental protection, and green growth [14,15]. The emerging challenges and policy developments at both the global and EU levels have prompted the inclusion of social innovation and green innovation as increasingly central elements of the EU's cohesion and competitiveness policy. Therefore, an evolution in policy logic from S3 to S4+, emphasizing smart specialization strategies that promote sustainability, and inclusiveness [15] was endorsed in the 2021–2027 Multiannual Financial Framework (MFF). Strategies now prioritize community well-being, social cohesion, and inclusive development, ensuring that innovation benefits all segments of society. In 2024, Marasco et al. [13] argued that cultural creative industries and cultural heritage are pivotal in advancing this new S4 logic as they foster social and environmental innovations. They add that sustainable tourism models or/and the digitization of heritage for broader accessibility advocate for the multi-purpose dimension of space, thus providing more opportunities for all in contrast to pure technological practices. This directly aligns also with the Communication on Sustainable Blue Economy, which underscores the economic impact of CH in coastal and maritime regions [16]. By integrating CH into S3 strategies, regions with strong maritime and coastal identity can leverage cultural tourism, marine biotechnology, and digital tools to boost economic growth while ensuring sustainability and social cohesion. Following the above-mentioned communication, the Commission fostered a sustainable blue economy through both missions on restoring aquatic ecosystems and promoting climate-neutral solutions and a co-funded European partnership to advance a climate-neutral, sustainable, and productive blue economy (Sustainable Blue Economy Partnerships).

Maritime (incl. underwater) cultural heritage, as a key component of CH, is increasingly recognized as an enabler of sustainable development [17]. It represents a unique and underutilized regional asset with significant potential for contributing to sustainable blue economy and heritage tourism development [18]. UCH sites, such as ancient shipwrecks, submerged cities, and underwater archaeological landscapes, offer invaluable insights into

human history and cultural evolution. Beyond their academic and historical value, these sites can drive economic growth through tourism, education, and cultural industries [19]. Underwater archaeological sites attract divers, researchers, and cultural tourists, creating opportunities for local businesses, including dive operators, tour guides, and hospitality providers. Additionally, MUCH can stimulate the development of related industries, such as underwater robotics, conservation technologies, and heritage management services [20]. The preservation of underwater sites plays a key role in marine conservation by safeguarding biodiversity and raising awareness for the marine environment. This emphasizes the environmental sustainability aspect of the contribution of MUCH to regional development. Moreover, MUCH is closely tied to diversification of the region's economic profile, as various regional sectors coexist and are interconnected. This diverse economic profile across various sectors fosters innovation by maintaining inter-sectoral cognitive differences and promoting effective knowledge transfer and interactive learning via interlinked supply chains [11,21,22]. Evidently, MUCH can be positioned as a multi-purpose tool in the S3 practice that integrates cultural preservation, tourism, environmental sustainability, and digitalization innovation in the region's pathway to growth [17,21,22].

A key element of criticism is that smart specialization strategies (S3) reinforce existing inequalities between regions [22,23]. Wealthier, more technologically advanced regions are better positioned to capitalize on the S3 framework due to their established infrastructure, advanced human capital, previous collaborating experience, and robust innovation ecosystems. These regions can more easily identify and exploit "niche" areas of competitive advantage, effectively engaging diverse stakeholders in the entrepreneurial discovery process (EDP) and securing EU funding for research and development [21,24,25]. Conversely, less-developed regions, particularly those with weaker institutional frameworks, limited innovation capacities, and lack of collaboration culture, struggle to engage effectively in the EDP. They often encounter challenges such as limited access to skilled labor, weak connections among key stakeholders, a lack of trust and visible synergies or collaborative networks, and insufficient financial resources—all of which hinder their capacity to fully benefit from the S3 framework [26].

In 2023, an analysis of key parameters of S3 [10] found that many regions (amongst them, the Greek ones) continue to lag in implementing successful S3 initiatives. This is attributed to structural weaknesses in governance and a fragmented innovation landscape. For instance, regional disparities in Greece are exacerbated by uneven access to research institutions, insufficient collaboration between public and private sectors, and a lack of coordinated strategies to promote innovation across sectors with the huge territorial differences between the capital region and the other regions [27].

Governance and stakeholder coordination are critical, especially in sectors like the blue economy and MUCH, where multiple actors with often conflicting interests must work together. This includes governmental bodies, academic institutions, private sector entities, and local communities, all of which have varying priorities and levels of influence [27]. The complexity of managing these diverse interests is further complicated by the need for cross-sectoral and multi-level governance structures, which are often not accustomed to collaborating in less-advanced regions.

Hence, this research paper seeks to lay the groundwork for a stronger complementarity between underwater cultural heritage (UCH) practices and local economic development through smart specialization strategies (S3), positioning UCH as a resourceful, multi-purpose tool. The research has two main components:

(a) A brief review of the approaches taken by various European regions toward smart specialization in relation to UCH, also examining if they are promoting UCH-driven multi-use initiatives.

(b) A targeted research project in Greece, co-evaluating with stakeholders the potential for the co-existence of UCH with diving tourism and nature conservation. Taking into account the benefits and possible innovation created from multi-use settings, the article explores the perceptions of key stakeholders in Greek territory about the drivers, added values, barriers, and impacts of adopting UCH and multi-use in smart specialization strategies. The multi-use concept leads to creative and innovative solutions that foster positive coordination and win-win outcomes, especially if maritime spatial planning (MSP) adopts a nexus, assemblage, and resilience-thinking perspective [28–30].

## 2. How Is MUCH Integrated into S3 Across Europe? Insights from EU S3 Platform Data

Although MUCH holds significant potential for sustainable development and the green transition, its integration into regional development strategies has been limited to date. The 2021–2027 period marks a notable shift with a greater focus on cultural heritage (CH) and the blue economy, yet MUCH remains underutilized in concrete terms. Our desk research, based on the dataset from the Smart Specialization Platform (S3P), confirms this finding. The analysis of the term "Cultural Heritage" as a keyword in the smart specialization priorities of various European regions shows that 46 EU regions have included the term. This is out of 243 NUTS entities (EU regions) and 22 non-EU regions referenced in the database, as of January 2025. Of course, there has been a 50% increase in the inclusion of "Cultural Heritage" in S3 approaches compared to the previous programming period [24]. However, when attempting to link this research to the concept of the blue economy, the scope is limited to just 36 regions (Table 1).

**Table 1.** Number of regions prioritizing the terms cultural heritage, blue economy, cultural tourism, and creative and cultural industries (CCI) to S3.

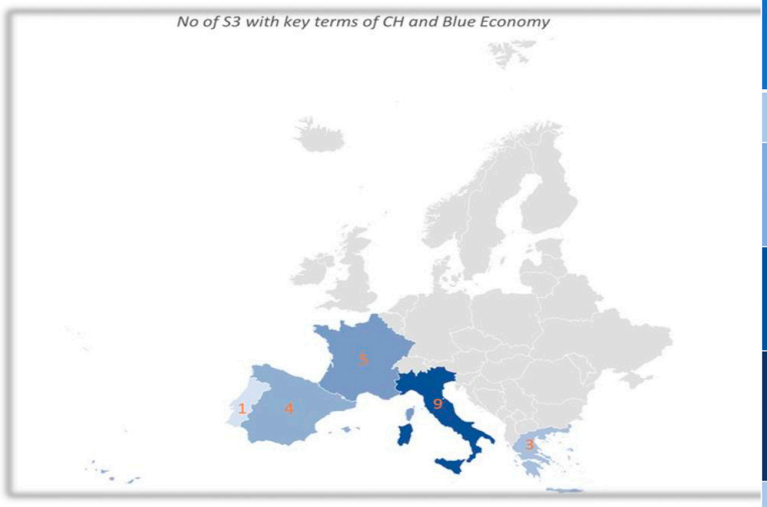
| Category of Search | Number of Regions |
|---|---|
| Blue economy | 36 |
| Cultural Heritage | 46 |
| Cultural tourism | 59 |
| Creative and Cultural Industries | 96 |

Source: Dataset of S3 CoP observatory, January 2025 (some regions are presented to all of these categories).

When exploring the significance of "MUCH" in S3 strategies, it is important to recognize that the term is not typically part of the standard S3 policy terminology, nor is it directly associated with economic classification or the expected European Innovation Ecosystem (EIC). However, an effort was made to explore its relevance within sectors tied to the EIC, such as tourism and creative and cultural industries (CCI). Searching for terms like "cultural tourism" or "CCI" did lead to an increase in related results, but the connection to the focus of this article remains limited, as some of the regions identified are neither coastal nor insular.

Nevertheless, this study has shown that even within the strategic priorities of S3, which focus on areas such as the blue economy, CCI, cultural tourism, or cultural heritage, there is no explicit mention of the term "maritime heritage" or "MUCH". This underscores the argument for better recognizing the potential of MUCH within both the blue economy and tourism sectors of the European Innovation Ecosystem (EIC), particularly for coastal and island regions in the EU. To better understand the emphasis on cultural heritage within the blue economy priorities of S3, a comparison of two datasets was carried out. The goal was to identify regions that appear in both datasets. Once again, most of these regions are concentrated in southern EU countries, with Italy leading the way (nine regions

combining both cultural heritage and blue economy priorities), followed by France and Spain (Figure 1).

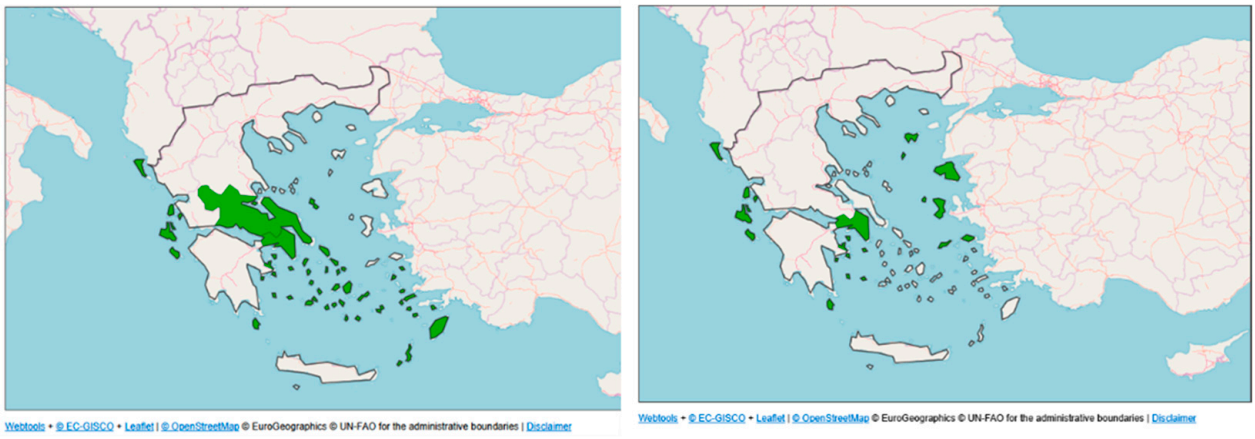



| Countries | Regions | No of S3 with key terms CH and blue economy |
|---|---|---|
| GREECE | Attica, Ionian Islands, South Aegean | 3 |
| SPAIN | Canary Islands, Balearic Islands, Catalonia, Valencian Community | 4 |
| FRANCE | Corsica, French Guiana, Guadeloupe, Martinique, Provence-Alpes-Côte d'Azur | 5 |
| ITALY | Lazio, Calabria, Apulia, Sicily, Sardinia, Friuli-Venezia Giulia, Veneto, Molise, Emilia-Romagna. | 9 |
| PORTUGAL | Azores and the whole country | 1 |

**Figure 1.** Regions prioritizing the terms cultural heritage and blue economy, in their S3, data based on the dataset of S3 CoP observatory, January 2025.

Of course, just because both terms appear in a region's priorities does not necessarily mean they are interconnected in policy or practice. A closer review of policy documents is needed to confirm if cultural heritage and specifically MUCH is being integrated into blue economy initiatives. As an example, concerning the Smart Specialization Strategies (S3) of Lazio region in Italy, a well-known region advocate of the blue economy, its "Economia del Mare" (Blue Economy) does not include evidence on MUCH-related innovative actions [31]. There is a recognition of the importance of the maritime economy, including coastal tourism, logistics, marine biotechnology, and renewable offshore energy. Lazio has highlighted the importance of multi-use marine spaces by developing platforms that integrate various maritime activities. However, while the region recognizes the value of a multi-use approach to marine space and prioritizes cultural and creative industries within its smart specialization strategy (S3), there is limited evidence of cultural heritage—particularly MCH—being incorporated into the broader marine-based economic strategies of this multi-use approach [31].

In the Greek context (Figure 2), even in areas where both cultural heritage and the blue economy are considered priorities, there is limited evidence of clear policy measures linking the two. For instance, consider the smart specialization strategy (S3) of the Region of Central Greece, where cultural heritage, specifically MUCH, is emphasized within the tourism sector but not as part of the blue economy initiatives. A notable example is the Alonissos Underwater Museum, an innovative project included in the S3 strategy, which underscores the economic potential of underwater cultural heritage (UCH) in regional development. Opened in 2020, the museum enables divers to explore the Peristera shipwreck, a 5th-century BC merchant vessel near Alonissos. This initiative successfully merges UCH preservation with diving tourism, highlighting how maritime cultural assets can contribute to a sustainable blue economy [32]. Despite its clear maritime focus, the Alonissos Underwater Museum is categorized under tourism development rather than as part of the Blue Economy. This classification further highlights the policy disconnect between underwater cultural heritage (UCH) and broader maritime economic strategies, especially considering that the region, though coastal and partly island, is mainly a mainland region.




(**a**) (**b**)

**Figure 2.** Greek regions prioritizing the term cultural heritage (**a**) and regions prioritizing blue economy (**b**) in their S3 based on the dataset of S3 CoP observatory, January 2025.

This concrete linkage is recognized by the research community and is emphasized in Horizon funding projects such as Blue Culture Technology Excellence Hubs in the EU Widening Member States (BCT Hubs) project [19]. This project aims to establish excellence hubs offering innovative solutions for the sustainable protection, restoration, valorization, management, accessibility, and promotion of UCH. Each hub collaborates with stakeholders from research, academia, businesses, the public sector, and societal actors, following a quadruple helix approach. There it acknowledges once more the emphasis on MUCH in the region of Central Greece as the first Underwater Accessible Cultural Heritage (UWCH) sites of ancient wrecks with the cargo of Amphoras globally, the adoption or creation of new technologies for protection and all-inclusive accessibility of UWCH sites and the new concept of the Knowledge Awareness Centers (KACs), and,, finally a vibrant ecosystem around the notions of protection–promotion–inclusiveness–behavioral change–local business development of MUCH.

The analysis highlights a significant gap in the explicit integration of maritime cultural heritage (MUCH) into the smart specialization strategies (S3) of EU coastal and island regions, despite its potential within the blue economy, the cultural tourism, and the cultural heritage sectors. While multiple regions in Southern Europe—including Italy, France, Spain, Greece, and Portugal—prioritize both themes in their S3 frameworks, there is little evidence that they are effectively interconnected in policy or practice. The case studies of Lazio (Italy) and Central Greece exemplify this disconnection, where blue economy initiatives focus on marine technology, coastal tourism, and multi-use marine spaces for energy and agriculture, but rarely integrate cultural heritage—let alone maritime cultural heritage—into these strategies.

The exclusion of maritime cultural heritage (MUCH) from smart specialization strategies (S3) raises the question of whether this is due to governance inefficiencies or a deliberate policy choice driven by economic priorities and sectoral competition. Governance weaknesses in EU coastal and island regions, particularly in Southern Europe, result in fragmented stakeholder networks, weak inter-institutional coordination, and a lack of formal mechanisms to connect maritime industries, tourism, and cultural heritage, suggesting an administrative failure rather than intentional exclusion. At the same time, policymakers often prioritize economic sectors with immediate returns, such as shipping, marine biotechnology, and coastal tourism, viewing MUCH as secondary or non-essential within the blue economy. Additionally, conservation efforts may be perceived as conflicting with commercial interests like maritime construction, offshore energy, and mass tourism, mak-

ing its integration more complex. Economic pressures further shape regional S3 priorities, favoring sectors with clear economic metrics and aligning strategies with global investment trends, which makes it difficult for cultural heritage initiatives to compete for funding. This raises concerns about whether the S3 framework itself is structurally biased against heritage-related initiatives. Understanding whether this exclusion is rooted in governance inefficiencies or deliberate policy decisions is critical to identifying effective strategies that can enhance the integration of maritime cultural heritage into regional innovation and development frameworks and at the same time advocate for the multi-use aspect [33–36] of marine and island areas.

## 3. Materials and Methods

The methodological research process used to conduct the desk and field research is illustrated in Figure 3. It consists of four steps:

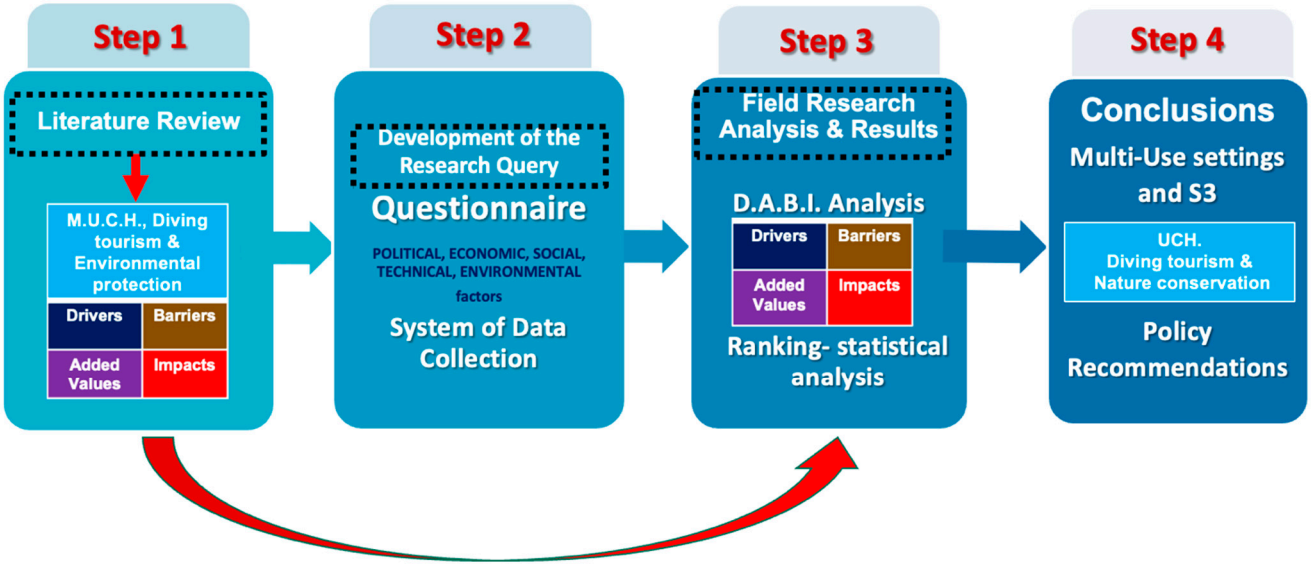



**Figure 3.** Methodological framework to investigate the coexistence of UCH, diving tourism, and nature/biodiversity conservation and associations with S3. Source: Own elaboration by authors.

Step 1—Literature Review.

The literature review aimed to explore the status of the co-existence of three key activities: underwater cultural heritage (UCH), diving tourism (DT), and nature conservation (NC) within S3 strategies. It encompassed a wide range of sources including the S3 Data Platform, scientific articles, national and regional reports, policy documents, laws, and regulations, as well as national and international projects related to the multi-use of the sea and its linkage to S3 strategies. Key findings from this literature review were as follows:

- UCH is increasingly recognized for its potential in sustainable development, particularly within tourism and conservation efforts, yet its integration into S3 strategies remains underexplored.
- Diving tourism, when combined with UCH and conservation goals, can create synergies that promote sustainable tourism, but this faces regulatory and operational barriers.
- Nature conservation, particularly through marine protected areas (MPAs), presents a critical opportunity for fostering a balance between ecological preservation and economic activities like tourism.
- Despite growing interest, there is a clear lack of integration of UCH into the broader policy frameworks of the blue economy and S3 strategies in the context of multi-use.

While some regions (e.g., Italy, Spain) have identified cultural heritage as a priority, the connection between UCH, the blue economy, and S3 remain largely absent.

The review also gathered information from various practitioners such as archaeologists, planners, divers, maritime tourism experts, environmental NGOs (representing fishing communities' interests as well), academia, and researchers. These insights guided the identification of the main factors influencing the coexistence of UCH, diving tourism, and nature conservation, which were later classified according to the DABI framework (political, economic, social, technical, and environmental factors).

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This comprehensive investigation sought to provide insights into the following interconnected fields:

a./Regions where the multi-use setting under study (UCH-DT-NC) was already implemented.

b./Mapping of related practitioners and researchers (archaeologists, planners, divers, fishers, entrepreneurs, maritime tourism experts, environmental NGOs, academia, researchers, etc.).

c./Analysis of the status of multi-use at the regional and local levels.

d./Identification of factors—acting as drivers, added values, barriers, and impacts, both positive and negative, that influence the success or failure of the multi-use setting.

e./Detailed description of the factors that may either constrain or foster the development of the multi-use setting.

The DABI (standing for drivers, added values, barriers, and impacts) classification is a structured framework used to analyze and categorize the various factors influencing a given issue, particularly in complex, multi-sectoral areas like heritage conservation, tourism, and regional development. DABI explores political, economic, social, technical, and environmental factors, which are critical elements when considering the integration of underwater cultural heritage (UCH) with diving tourism (DT) and nature conservation (NC). Each of these categories provides a systematic way to identify the drivers and barriers affecting the coexistence of UCH with sustainable tourism and environmental goals. By breaking down these factors into distinct categories, DABI allows for a comprehensive and organized analysis that ensures that no critical element is overlooked, such as the political will to enact necessary regulations, the economic viability of UCH-driven tourism, or the technical innovations required to preserve underwater sites [33]. This framework is particularly relevant for analyzing the smart specialization strategies (S3) in Europe, which require regions to leverage their unique strengths in a balanced and inclusive way [17]. Understanding the political, economic, social, technical, and environmental factors (through the DABI method) enables more informed recommendations for integrating UCH into S3. The research find-

ings can guide policymakers in balancing economic development, conservation efforts, and cultural heritage protection, ensuring that smart specialization strategies (S3) are not only economically viable but also socially inclusive and environmentally sustainable.

Step 2—Development of the Research Query. Based on the literature regarding the DABI tool and its application, the key factors influencing the development of the multi-use (MU) model were classified as follows (Table 2). DABI factors were then further classified into the following categories: political (incl. institutional, regulatory, or administrative), economic (incl. financial), social, technical, and environmental [37]. This classification allowed for a comprehensive understanding of the factors that either facilitate or hinder the development of the MU setting.

**Table 2.** Classification of factors that either facilitate or hinder the development of the MU setting.

| | | |
|---|---|---|
| Drivers | Factors that promote, support, facilitate, or strengthen the development of the MU. | Political, economic, social, technical, environmental |
| Added Values | Benefits or positive effects that arise from the implementation or enhancement of the MU. | Political, economic, social, technical, environmental |
| Barriers | Factors that negatively affect or prevent the development of the MU. | Political, economic, social, technical, environmental |
| Impacts | Negative effects associated with the establishment or strengthening of the MU. | Political, economic, social, technical, environmental |

Then, an online survey, including both open and closed questions, was linked to the initial data collection and processing system. Subsequently, a fully structured questionnaire was designed concerning the prospects for harmonious coexistence of UCH—diving tourism—and nature/biodiversity conservation, through the implementation of a multi-use setting. Firstly, basic anonymous information from the recipients of the questionnaire was asked, concerning type of stakeholder and previous experience on a multi-use project (e.g., UCH and tourism) either of a plan or of a realized project, in Greece or elsewhere.

Through the online survey, recipients were asked through closed questions, to evaluate and rate using a five-point Likert scale several factors and determine if they act as drivers, added values, barriers and impacts (1—absent, 2—not relevant, 3—low priority, 4—very important, and 5—extremely important).

An example of a closed question related to drivers was as follows: "*On a scale of 1 to 5, how important is improving eco-tourism in the blue economy to support the coexistence of underwater cultural heritage, diving tourism, and nature conservation?*"

A similar closed question about added values was as follows: "*On a scale of 1 to 5, how important is diversifying local tourism and extending the tourist season as added benefits from combining diving tourism, underwater cultural heritage, and nature conservation in or near MPAs?*"

Additionally, an example of a closed question addressing barriers was as follows: "*On a scale of 1 to 5, how much does the lack of approved Marine Protected Area (MPA) Management Plans hinder the successful coexistence of diving tourism, underwater cultural heritage (UCH), and nature conservation in or near MPAs?*"

A similar question focusing on the impacts of the above multi-use was as follows: "*On a scale of 1 to 5, how important are potential conflicts with other economic activities (e.g., fishing, maritime transport) as negative impacts of combining diving tourism, underwater cultural heritage (UCH), and nature conservation?*"

The survey also included open-ended questions, such as the following: "*Please share any additional thoughts, ideas, or opinions on the factors that drive this specific multi-use in marine spaces*"

Step 3—Research Analysis and Results

The survey gathered input from a broad range of stakeholders and practitioners, including government institutions, academia, research organizations, tourism entrepreneurs, NGOs, local governments, fishers, diver associations, and experts (Table 3). It was designed to be inclusive and multi-level, engaging participants at international, national, regional, and local levels. Conducted in May 2023, the survey invited 50 stakeholders, and 34 responded, yielding a 68% response rate.

**Table 3.** Breakdown of stakeholders participating in the research.

| Type of Stakeholder | Number of Participating Entities and Persons | Percentage (%) of Participating Entities and Persons |
|---|---|---|
| Central government (state-ministries-state agencies) | 4 | 11.8% |
| NGOs (environmental and cultural, incl. fishers) | 4 | 11.8% |
| Local authorities (regional/local government) | 3 | 8.8% |
| Scuba divers (scuba diver associations and diving experts) | 4 | 11.8% |
| Academia (science-research-universities) | 13 | 38.2% |
| Experts (independent experts—consultants) | 6 | 17.6% |
| Total | 34 | 100.0% |

Source: Elaboration by the authors.

No predefined selection criteria were applied to restrict participation. This choice was deliberate and aligned with the study's objective to capture a broad range of perceptions and experiences, particularly from actors who may not be formally represented in institutional processes but are nonetheless relevant to the thematic and territorial dimensions under investigation. The survey thus serves as a scoping instrument, allowing for the identification of key issues, gaps, and perceptions within the broader ecosystem of stakeholders. Future research may build upon this foundation with more targeted sampling strategies, but the current approach offers valuable initial insights into the visibility and perceived integration of MUCH within S3 and MSP frameworks.

The research aimed to identify and rank factors related to the MU "UCH-DT-NC". First, participants ranked each DABI factor and suggested additional factors or actions that could help promote the MU. Second, the data was automatically collected and organized into Excel tables. Third, diagrams were created based on the Excel data, with color coding: political factors were marked in red, social and technical factors were marked in light blue and dark blue, respectively, economic factors were marked in orange, and environmental factors were marked in light green. Finally, all responses to open-ended questions were reviewed and presented.

Step 4—Conclusions and Policy Recommendations

The survey results were analyzed to identify key factors among drivers, added values, barriers, and impacts influencing multi-use (MU) settings. These results were evaluated as for their potential association with S3. This led to policy recommendations aimed at

balancing underwater cultural heritage, diving tourism, and nature conservation in the Eastern Mediterranean, with a focus on the regional (NUTS3) level.

## 4. Results

As already mentioned, the stakeholders' responses and insights led to the identification of key economic, political/regulatory, social, environmental, and technical factors that either support or challenge the multi-use between UCH, diving tourism, and nature conservation. It also highlighted both the positive and negative impacts of these factors on implementing this multi-use approach for maritime spaces.

### *4.1. Most Important Drivers Fostering the Development of the MU Under Study, by Factor*

In terms of driving forces (Figure 4), several political and regulatory factors were found to strongly promote the UCH-driven multi-use (incl. diving tourism and nature conservation). Notably, the policy for the promotion of MPAs and UCH as local natural and cultural heritage (interconnection of natural and cultural capital) was considered extremely or very important by 91.2% of stakeholder representatives, while the harmonization of UCH and nature/biodiversity conservation strategies through MPAs was viewed as extremely or very important by 85.3% of stakeholders.

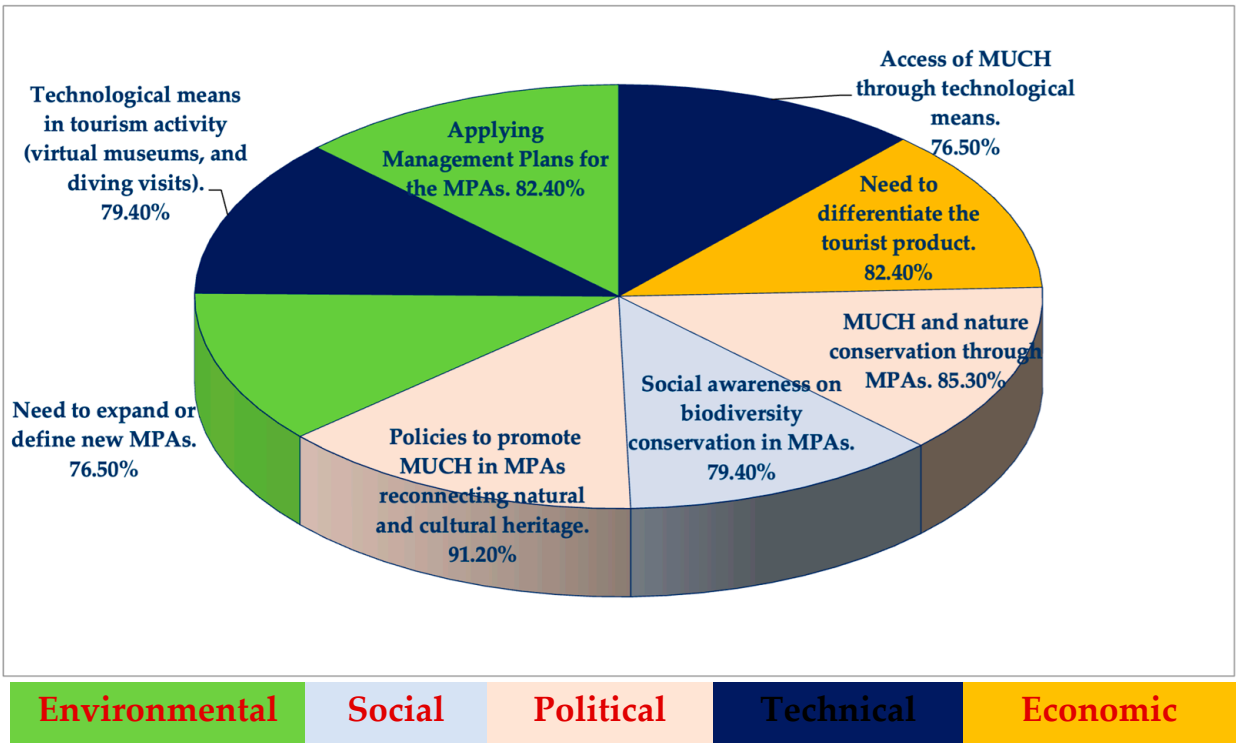


**Figure 4.** Stakeholders' responses—most important drivers fostering the development of the MU under study, by factor ("extremely important" to "very important"). Source: Own elaboration by the authors.

Key environmental factors also emerged, with the necessity of expanding MPA areas or defining new MPAs (in compliance to the EU biodiversity strategy) considered extremely or very important by 76.5% of respondents. Additionally, the possible implementation of management plans in MPAs was deemed extremely or very important by 82.4% of stakeholders.

In terms of technical drivers, the facilitation of access to UCH through new technological means (e.g., virtual diving visits, etc.) was rated as extremely or very important by 76.5% of stakeholders, while the integration of technological innovations in diving

tourism activities (virtual museums, virtual diving visits) was considered extremely or very important by 79.4% of respondents.

Additionally, a key economic factor was the necessity of differentiating the locally offered tourist product, which was considered extremely or very important by 82.4% of stakeholder representatives. The social driving forces were less important, with social awareness for the protection of biodiversity in MPAs being regarded as extremely or very important by 79.4% of stakeholders. The most important drivers fostering the development of the multi-use setting under assessment, by factor (environmental, technical, social, political, and economic), according to stakeholders, who rated them as "extremely important" to "very important", are displayed in the following Table 4.

**Table 4.** Preferred actions by stakeholders by kind of factors and estimated potential of S3 related innovation.

| Kind of Factors | Actions | Percentage of Stakeholders Rating "Extremely or Very Important" | Potential Innovation Related to S3 YES/NO |
|---|---|---|---|
| Political—Regulatory | Joint promotion of MPAs and UCH sites, as reconnection of natural and cultural capital. | 91.2% of stakeholders | YES |
| | Integration of UCH and nature/biodiversity conservation strategies through MPAs. | 85.3% of stakeholders | YES |
| Environmental | Need for expanding MPAs or establishing new MPAs (in line with the European biodiversity strategy). | 76.5% of stakeholders | - |
| | Existing potential for implementing management plans in MPAs. | 82.4% of stakeholders | - |
| Technical | Enhancing access to UCH monuments through new technological methods (e.g., virtual diving tours, etc.) | 76.5% of stakeholders | YES |
| | Incorporation of technological innovations in diving tourism (virtual museums, virtual diving tours, etc.). | 79.4% of stakeholders | YES |
| Economic | Importance of differentiating the locally offered tourism products. | 82.4% of stakeholders | YES |
| Social | Social awareness for the protection of biodiversity in MPAs, capacity building on why and how to protect biodiversity. Development of monitoring tools for the health of the sea. | 79.4% of stakeholders | YES |

These factors were considered essential for the effective integration of underwater cultural heritage, diving tourism, and nature conservation within the maritime space.

### *4.2. Most Important Added Values of the MU Under Study, by Factor*

The added value (positive impacts) of developing the MU under study, as perceived by stakeholders, is outlined in Figure 5. These positive impacts encompass a range of social, economic, and environmental factors, as detailed below:

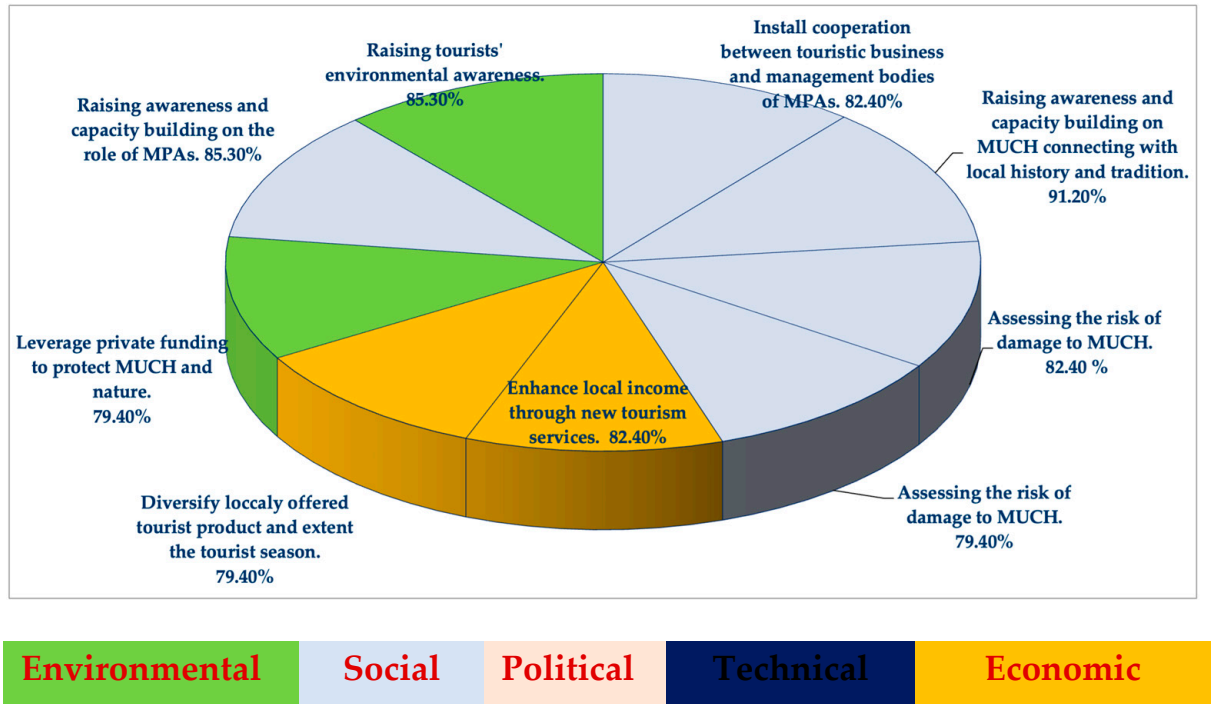


**Figure 5.** Stakeholders' response on the added values from the MU under study, by factor ("extremely important" to "very important"). Source: Own elaboration by the authors.

#### 4.2.1. Social Added Value

The social added value was analyzed as follows:

Awareness and capacity building of the local community about UCH and its connection with local history and tradition was considered extremely or very important by 91.2% of stakeholders.

Awareness and capacity building of the local community regarding environmental protection within MPAs was viewed as extremely or very important by 85.3% of stakeholders.

Addressing the risks of damage to UCH monuments was recognized by 82.4% of stakeholders as a crucial impact.

The effective cooperation between tourism enterprises and management organizations for managing, protecting, and sustainably utilizing MPAs was also rated as extremely or very important by 82.4% of stakeholders.

Strengthening cultural identity and social cohesion in coastal and island communities was identified by 79.4% of stakeholders as a highly significant positive impact.

#### 4.2.2. Economic Added Values

Enhancement of local income through the introduction of new tourist services was considered extremely or very important by 82.4% of stakeholders.

Diversification of the locally offered tourist product and extension of the tourist season was seen as an important economic benefit by 79.4% of stakeholders.

#### 4.2.3. Environmental Added Values

Raising tourists' awareness of the environmental problems threatening the seas was considered extremely or very important by 85.3% of stakeholders.

Leveraging private funds and strengthening the national and regional public budget for the protection of UCH and the natural environment was recognized as a positive environmental impact by 79.4% of stakeholders.

These factors collectively underscore the multifaceted benefits that the development of the MU under study could bring to local communities, economies, and the environment.

### *4.3. Most Important Barriers That Hinder the Development of the MU Under Study, by Category of Factor*

The research identified political/regulatory barriers (Figure 6) as the most significant obstacles to the development of the MU under assessment, with less emphasis on social, economic, or technical/environmental barriers. Key political/regulatory barriers include the following: a. Limited coordination between authorities at various levels (Ministry of Culture, local authorities, chambers), with 85.3% of stakeholders viewing this as an extremely or very important barrier. b. Lack of approved MPA Management Plans (Natura 2000), considered extremely or very important by 82.4% of stakeholders. c. Absence of an institutionalized national strategy for the protection and utilization of UCH, highlighted by 79.4% of stakeholders. d. Lack of public support for local entrepreneurship in coastal/small island areas, also seen as extremely or very important by 79.4% of stakeholders. Other notable political/regulatory barriers include the following:

- Absence of structures for education and training of the local population in coastal/small island areas, with 76.5% of stakeholders identifying this as a critical issue.
- The current national institutional framework, which was considered a barrier by 73.5% of stakeholders.

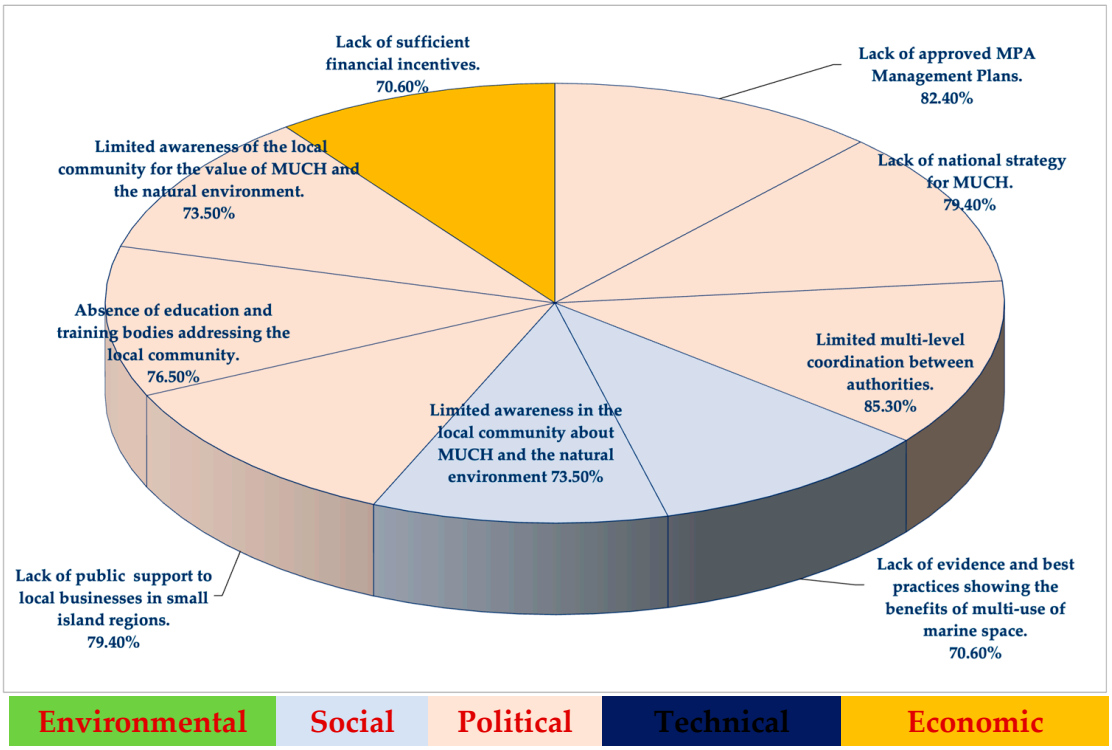


**Figure 6.** Stakeholders' responses regarding the barriers hindering the development of the MU under study, by factor ("extremely important" to "very important"). Source: Own elaboration by the authors.

In addition to political/regulatory barriers, two social factors were also considered as important challenges:

- Limited awareness among the local community about the value of UCH and the importance of protecting both cultural heritage and the natural environment, flagged by 73.5% of stakeholders.

- Limited experience and knowledge of best practices, which could help stakeholders understand the real benefits of this integrated marine space usage, noted by 70.6% of stakeholders.
- Lastly, an economic barrier identified was the lack of sufficient financial incentives, seen as a critical issue by 70.6% of stakeholders.

### *4.4. Most Important (Negative) Impacts of the Development of the MU Under Study, by Category of Factor*

The research identified the "potential conflicts with other economic activities" (e.g., fishing or maritime transport) as the most significant negative impact of the MU under study (Figure 7). A substantial 70.0% of the respondents considered this factor to be extremely or very important. Other social and environmental negative effects were viewed with less concern, though still significant. These included the following:

- The risk of loss or theft of UCH items, with 58.8% of stakeholders considering it extremely or very important.
- The risk of damage to MPAs and UCH sites due to inexperienced divers, which was deemed extremely or very important by 55.9% of the stakeholders.
- Environmental pollution and marine litter generated by new tourism activities, which 58.8% of stakeholders also considered an extremely or very important negative effect.

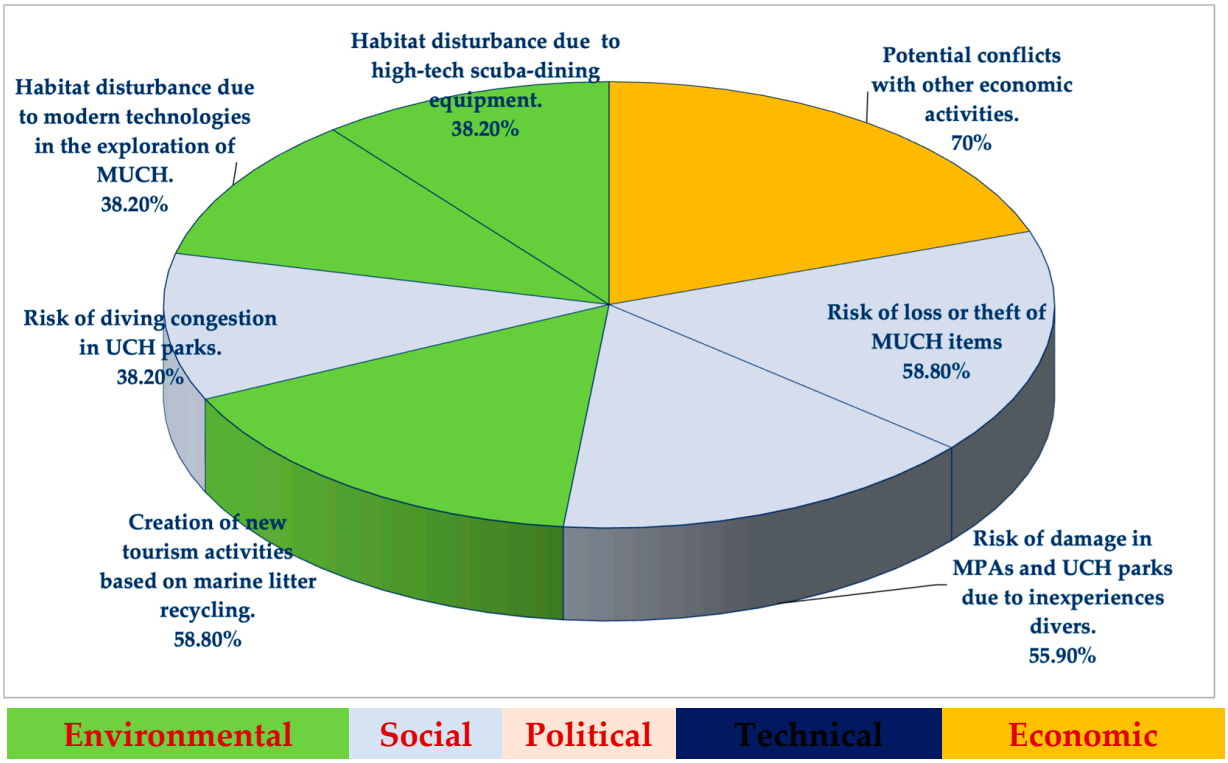


**Figure 7.** Stakeholders' responses on the negative impacts of the development of the MU under study, by factor ("extremely important" to "very important"). Source: Own elaboration by the authors.

### *4.5. Drivers and Barriers That Foster or Hinder the Development of the MU Under Study, by Group of Stakeholders*

The driving forces and the barriers that foster or hinder the development of the MU under assessment by factor (environmental, technical, social, political and economic) were as follows, according to the group of stakeholders.

Local authorities identified economic factors as the most important driving force, with 96.7% of stakeholders considering these factors as extremely or very important. Environ-

mental and technical factors followed, with 66.7% of stakeholders highlighting them as key drivers. Regarding barriers, local authorities indicated that economic factors posed the greatest obstacle to MU development, with 100% of stakeholders viewing these as highly significant barriers. Environmental and political/regulatory factors were also seen as important barriers, with 78% and 77.8% of representatives, respectively, acknowledging their significance.

Government authorities emphasized technical, economic, and environmental factors almost equally as driving forces for MU development, with 58.3%, 57.5%, and 55.3% of stakeholders, respectively, ranking them as extremely or very important. In terms of barriers, governmental representatives saw social factors (68.8%) and political/regulatory factors (63.9%) as the most significant obstacles.

Academics and researchers pointed to technical and environmental factors as the most crucial driving forces, with 92.3% and 87.2% of stakeholders, respectively, considering them extremely or very important. As for barriers, they identified political/regulatory and social factors as the most significant, with 72.6% and 68.9% of stakeholders, respectively, viewing these factors as crucial obstacles.

Experts and consultants regarded technical, environmental, and political factors as nearly equally important drivers for MU development, with 83.3%, 83.3%, and 77.1% of stakeholders, respectively, marking these as highly significant. The most critical barriers, according to experts, were economic and political/regulatory factors, with 94.4% and 85.2% of stakeholders, respectively, considering them as very important.

The scuba divers' community highlighted political, technical, and economic factors almost equally as the main driving forces for MU development, with 76.5%, 75%, and 75% of stakeholders, respectively, identifying these factors as extremely or very important. For barriers, the scuba divers' community most frequently pointed to political and economic factors, with 68.5% and 58.3% of representatives, respectively, citing them as the most significant obstacles.

Finally, NGOs identified technical, environmental, and political factors as the primary driving forces, with 58.3%, 55.6%, and 53.1% of stakeholders, respectively, acknowledging these factors as highly important. Regarding barriers, NGOs most frequently noted social factors (68.8%) as the main impediment to development, followed by economic, political, and environmental factors, each cited by 63.9% of stakeholders.

This summary provides a detailed view of the diverse perspectives across stakeholder groups regarding the key driving forces and barriers impacting the development of the UCH-diving tourism-nature conservation MU.

### *4.6. Added Values and (Negative) Impacts of the MU Under Study, by Group of Stakeholders*

The positive and negative effects of developing the multi-use under study are categorized by environmental, technical, social, political, and economic factors, and the different stakeholder groups reported the following:

Local public authorities identified significant positive impacts across the above categories. Specifically, 93.3% of stakeholders viewed the economic and environmental effects as highly positive, 91.7% rated technical impacts positively, and 83.3% highlighted the social benefits. The primary negative impact, as reported by local public authorities, was economic, with 66.7% of stakeholders recognizing the potential for conflicts with other economic activities (e.g., fishing, maritime transport) as a critical concern.

Government authorities, on the other hand, emphasized the social, economic, and environmental positive impacts, with 73.6%, 65%, and 60% of stakeholders, respectively, considering these factors to be highly positive. In terms of negative impacts, governmental representatives focused more on environmental concerns (58.3%), followed by

social and economic issues, which were each rated as significant negative effects by 50% of stakeholders.

Finally, social positive effects were most strongly recognized by groups such as the scuba diving community, experts/consultants, academics/researchers, and NGOs. These groups reported the social benefits of the MU as extremely important or very important in 95.8%, 91.7%, 80.8%, and 73.6% of responses, respectively. Conversely, the most significant negative impacts identified by these groups were primarily economic, with less emphasis on environmental and social concerns.

## 5. Discussion

The results of this research underline the key drivers, barriers, added values, and negative impacts related to the integration of underwater cultural heritage (UCH), diving tourism, and nature conservation into a multi-use (MU) setting. These insights align with and expand upon previous studies concerning the governance, economic priorities, and sectoral competition affecting maritime spaces. Among the critical observations is the strong political and regulatory support for the promotion of MPAs and UCH as interconnected elements of natural and cultural heritage [36].

This aligns with European policy frameworks that highlight the sustainable use of marine resources, involving the European Biodiversity Strategy. Nevertheless, significant governance challenges endure, despite the regulatory support. We may refer to some major barriers: limited inter-institutional coordination, fragmentation among stakeholders, and absence of cohesive national/regional strategies for the co-existence of UCH with other sea uses. Survey respondents frequently pointed to the lack of coordination between local authorities, national bodies, and environmental agencies as a primary obstacle. This lack of coordination hampers the effective integration of UCH into national and regional strategies, particularly in relation to maritime spatial planning (MSP) and marine protected areas (MPAs). These challenges underpin existing literature on governance inadequacies in EU coastal and island regions, particularly in Southern Europe, where weak institutions impede the effective implementation of maritime multi-use initiatives.

The marginalization of maritime cultural heritage (MUCH) in relation to the smart specialization strategies (S3) as analyzed by the authors of this paper raises the question regarding whether this results from bureaucratic shortcomings or vigilant policy choices spotlighting high-revenue economic sectors. Governance limitations, including fragmented stakeholder networks and a deficiency of institutionalized instruments for cross-sector collaboration, are all significantly contributing to this marginalization. This echoes findings from preceding studies, arguing that cultural heritage initiatives often struggle to fit within the economic or monetary-centric priorities of the blue economy. Decision makers and legislators frequently emphasize sectors such as shipping, marine biotechnology, and offshore wind energy, which deliver instant economic returns, lowering culture and heritage-related initiatives to inferior importance. Economic concerns or strictly monetary considerations further complicate the incorporation of UCH into regional development frameworks.

The research identified financial constraints as a major barrier, with deficient incentives and funding mechanisms restraining local businesses in coastal and island communities. This aligns with research indicating that smart specialization strategies (S3) favor sectors with clear economic metrics and strong compatibility with global investment trends. Hence, MCH and UCH initiatives face challenges in capturing funding and institutional support, underlining the perception that conservation and heritage management are contradictory to economic development.

Despite these constraints, the paper reveals significant positive impacts associated with the MU framework. Social added values, particularly in promoting awareness and

education regarding UCH and nature conservation, arose as key benefits. The consolidation of cultural identity and social cohesion in coastal and island communities further underlines the non-economic values when integrating UCH into broader marine governance strategies and MSP. This encourages previous research advocating for a more holistic approach to maritime spatial planning (MSP), where cultural and natural heritage are considered as fundamental to sustainable regional development.

From an economic viewpoint, substantial opportunities are the "diversification of the locally offered tourist product" and consequently the "extension of the tourist season". These findings emphasize the economic sustainability of heritage-based tourism, particularly in regions looking for the transition from mass tourism towards more sustainable and "niche" tourism offerings. The incorporation of technological innovation, such as virtual diving experiences and virtual museums, further sustains this transition by expanding accessibility to UCH sites and strengthening the visitor's experience without provoking additional pressures on marine ecosystems.

However, the research also detects potential negative impacts that should be mitigated. Conflicts with other maritime activities, such as fisheries and maritime transport, pose a significant challenge, necessitating vigorous regulatory frameworks to balance contesting interests. Additionally, concerns regarding nature degradation, marine litter, and the potential damage of the UCH sites from non-accredited divers highlight the need for strict management measures and comprehensive stakeholder engagement.

Future research should explore mechanisms for enhancing institutional coordination and stakeholder collaboration in maritime spatial planning (MSP), given the identified governance and economic challenges. Moreover, the existing literature showed that there is a need for comparative analyses of successful multi-use initiatives across different regions. These could offer valuable insights into good practices for integrating cultural heritage into regional innovation frameworks. Additionally, further research is needed to examine whether the marginalization of UCH in relation to S3 strategies is structurally embedded within the policy framework or if it can be addressed through targeted support and policy revisions. The UNESCO but also the European Commission could here play a decisive role [37] probably in the next IOC-UNESCO and DGMARE joint roadmap.

Another important avenue for research is the role of financial instruments in supporting UCH conservation and sustainable tourism development. Exploring alternative funding models, such as public-private partnerships, crowdfunding, or EU-funded grants, could provide practical solutions to address the economic barriers identified in this study.

Finally, interdisciplinary studies incorporating marine ecology, cultural heritage management, and tourism economics would offer a more comprehensive understanding of how MU frameworks can be optimized.

## 6. Conclusions

This research paper emphasizes that while there is a strong market preference for high-revenue economic sectors with strong demand of exclusivity in marine spaces—particularly in coastal zones—often at the expense of conservation areas, insights from stakeholders highlight that there is significant potential for UCH conservation through the development of UCH-driven multi-use settings. It seems that this potential can be realized with emphasis in the following cases:

- When interdependent natural and cultural capital are effectively reconnected [36,38], also allowing for a sustainable blue economy through heritage tourism.
- When sustainable practices are integrated into the planning and management of coastal and marine spaces, ensuring that both ecological integrity and economic development are prioritized simultaneously. This involves adopting approaches that balance

commercial use with conservation efforts, such as ecosystem-based management and adaptive co-management strategies that involve local communities, businesses, and government stakeholders.

These strategies could help pave the way for mutually beneficial outcomes, such as fostering sustainable tourism, reducing the environmental footprint of marine activities, and ensuring long-term resilience of coastal ecosystems. By bringing together various stakeholders with a shared vision of sustainable development of the ocean and the sea, UCH-driven multi-use settings could be optimized in a socially innovative way to support the blue economy while preserving the health of marine and coastal environments.

The authors propose using UCH-driven MUs as a tool for the sustainable use of marine space. This approach may support the social and cultural aspects of the blue economy and promote an ecosystem-based and a people-centered strategy for maritime spatial planning (MSP), which, in turn, may enhance its enforceability.

Another key takeaway message is that incorporating socio-cultural values in MSP [38–41] can support its evolution into a mechanism that both fosters and regulates market forces. In this sense, the primary challenge for MSP is finding the right balance between market-driven and non-market considerations and their respective outcomes. Such a framework, may be understood as the interplay between commercial interests and conservation efforts that requires a nuanced approach balancing economic growth with long-term sustainability, ensuring that MCH (with emphasis on submerged heritage) is not only preserved but also leveraged as an asset for regional sustainable economic development.

Another key element is that S3 strategies are really linked with the administrative character of the regions and not with the notion of "cultural regions", which are constructed through shared identity, memory, and practice, often transcending administrative boundaries [42]. In the context of MCH, deeply rooted seafaring traditions, shipbuilding knowledge, and coastal cultural expressions are often regionally diffused, historically embedded, and informally transmitted. This administrative/political approach to regional development risks overlooking culturally grounded innovation potentials, particularly those found in smaller or cross-regional maritime communities that go beyond political boundaries [43].

Limitations of this research should also be acknowledged. The empirical scope of the study is constrained by its reliance on stakeholder perceptions, which, while valuable, reflect situated and potentially interest-driven viewpoints. Moreover, the research instruments—such as the structure of the questionnaires—are inevitably shaped by dominant policy narratives, which may prefigure the type of responses received and restrict the emergence of alternative imaginaries.

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## Abbreviations

The following abbreviations are used in this manuscript:

| | |
|---|---|
| CH | cultural heritage |
| MCH | maritime cultural heritage |
| UCH | underwater cultural heritage |
| S3 | smart specialization strategies |
| MSP | maritime spatial planning |
| MPA | marine protected Area |
| ND | nature conservation |
| DT | diving tourism |
| MU | multi-use of the sea |

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