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Sustainable Biocultural Heritage Management and Communication: The Case of Digital Narrative for UNESCO Marine World Heritage of Outstanding Universal Value

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Abstract: The paper addresses sustainability, heritage, management, and communication from UNESCO's Marine World Heritage (MWH) perspective, analyzing its digital narrative footprint through social media. It aims to understand how MWH is conceptualized, managed, and communicated and whether it is framed with sustainability and biocultural values facilitating interactivity, engagement, and multimodal knowledge. Hence, a content analysis of the Instagram accounts of the MWH of Outstanding Universal Value (OUV) sites and protected areas has been conducted. The study included evidence from their Instagram profile, posts, features, and reactions. The findings indicated the dearth of a management and communication strategy being shared among and across UNESCO's MWH of OUV sites and protected areas, capturing the "lifeworld" and the "voice" of the marine heritage as unified. They also revealed that nature and human, and biological and socio-ecological ecosystems of MWH of OUV sites and protected areas are not interlinked in marine heritage management and communication featuring the whole and the entirety of the marine heritage site ecosystem. The lack of this expansion of meaning and engagement does not facilitate the shift of the route in the marine-scape, from discovery and being listed as World Heritage to human-nature interaction, diversity, dynamicity, and ocean literacy. The study contributes to setting the ground rules for strengthening marine heritage management and communication in light of the United Nations Sustainable Development Goals (SDGs) and the Ocean Literacy Decade (2021–2030).

Keywords: marine heritage; biocultural heritage; heritage management; heritage communication; digital narrative; social media; Instagram; UNESCO; marine protected areas of outstanding universal value; sustainability

1. Introduction

UNESCO's Marine World Heritage (MWH) acknowledges unique marine biodiversity, singular ecosystems, unique geological processes, or incomparable beauty. However, the marine landscape is more than the blue environment and its beauty. It goes beyond the blue ecosystem; the sea, the underwater environment, the sea surface, the coastline, and its land [1–4]. Marine ecology is a result of interaction between all the above ecosystems and landscapes together with human cultural and societal processes. Indicative is the fact that just over 40% of the world's population lives within 100 km of the coast [5]. Yet, this dialectic multifold nature and multimodal knowledge of the marine-scape are neglected in the conceptual definitions and academic research. Thus, unlike the marine nature-scape, the maritime cultural and social landscape is poorly observed or incorporated in the sustainable development context and praxis.

In this paper, we argue that new approaches to heritage, conservation, management, communication, and development goals should be followed and that a broader transformative impact is needed. For this purpose, we fall in line with those peers that propose a unified, joined-up approach for culture, heritage, landscape and systems, and

sustainable livelihoods. This integrated framework for heritage and the various landscapes/environments is the biocultural heritage conceptualization [6,7]. Through this optic, sustainable development outcomes derive from acknowledging that biological ecosystems are in a continuous dynamic dialogue with socio-ecological ecosystems. This means that it is recognized that human practices are being developed or originated not only by biological habitats and species, but also by other forms of outputs, like:

- cultural heritage, memory, experience, local and indigenous knowledge, practices, and ontologies [8–12], or
- knowledge, practices, and values that reflect more modernized communities and not only those that adopt traditional lifestyles [13], or
- outputs that rely on informativity, diversity, dynamicity, and interactivity, or
- interactions that relate to different human groups living with biodiversity within different contexts (rural and urban areas) [13].

Further, the abovementioned outputs mean that it is also recognized that the way these outputs are transferred from the past, play out in the present, and enhance futures literacy is of great significance. Therefore, we align with those peers supporting that sustainable biocultural heritage management and communication can benefit the heritage. These benefits are beyond the heritage's immediate value (economic, cultural) [14,15] and can have the potential to be enhanced. Their enhancement can be in an indigenous, participatory, multimodal, and metafunctional manner. It can also have strong relevance for other human and social groups across the globe. In this way, the future of humanity and the Earth will be solidified [13].

Facilitating the above, this study's purpose is to explore questions about sustainability and bioculture in the context of the management and communication praxis of the UNESCO's MWH of Outstanding Universal Value (OUV) sites and protected areas within the digital social media environment (particularly Instagram). By drawing from the literature on the forenamed topics, we sketch an overview framework for understanding functional terms like heritage, MWH, heritage management and communication, and, specifically, their relation to sustainability and bioculture. Next, and building on the former work, the research data are presented, and the findings are discussed in accordance with the digital narrative footprint, and the nature-human, sustainability, and biocultural frames. We conclude by identifying needs for further research and scope for improvement in this kind of approach and analysis in the era of big data and the semantic web.

2. Defining and Delimiting Marine Heritage as a Typology of Heritage

Heritage, unlike history, is dynamic, open, and changing, and its significance belongs to the public realm [16]. According to the International Charter of Venice (1964), "heritage" is multiple, tangible and intangible, things and their imbued message, that, in the present, remain as living witnesses of the "old" and are safeguarded for and handed on to future generations. Hence, heritage is the monuments, objects, artefacts, instruments, genes, species, ecosystems, cultural spaces, traditions and customs, folklore, performing arts, practices, representations, languages, artistic expressions, skills, beliefs, knowledge systems, and human values. All these derive from the past, are preserved in the present and passed on to future generations [13,17–19]. When heritage is in the ocean or sea areas, underwater, or is a marine island, it is known as marine heritage [1–4]. Marine heritage is also considered the heritage located in the coastal zone of the continent or continent island, or when it relates directly to marine resources or environment, the coastal line and land/surface, or even when it refers to the relationship with the ocean and sea [17–21]. When the heritage is of outstanding universal value to humanity, and of high cultural and natural importance, it is defined as world heritage, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO). Particularly, the UNESCO Conventions referring to heritage of OUV are those concerning (a) the Protection of the World Cultural and Natural Heritage (1972), (b) the Safeguarding of the Intangible Cultural Heritage (2003), and (c) the Protection and Promotion of the Diversity of Cultural Expression (2005).

Being of "Outstanding Universal Value" (OUV) means being of cultural and/or natural significance, which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity. Therefore, its permanent protection is "*of the highest importance to the international community as a whole*" [22–25]. The heritage is identified as being of outstanding relevance for future generations according to one out of the ten selection criteria of UNESCO (six cultural and four natural criteria), as Table 1 shows [22].

Table 1. UNESCO World Heritage selection criteria (10 in total) [22,23].

cultural	i.	to represent a masterpiece of human creative genius,
	ii.	to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design,
	iii.	to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living, or which has disappeared,
	iv.	to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history,
	v.	to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change,
	vi.	to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (the Committee considers that this criterion should preferably be used in conjunction with other criteria)
natural	vii.	to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance,
	viii.	to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features,
	ix.	to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals,
	x.	to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

When heritage is identified as being of OUV, and in order to be protected, it is inscribed in the World Heritage List of UNESCO [22,24,26,27]. This not only facilitates the preservation of the heritage identified as world heritage, and the awareness-raising about it, but it also brings prominence and monetary revenue to the related actors as well [28,29]. Being included in the World Heritage List of UNESCO raises the site's profile and brings resources and expertise to support its protection [30]. The World Heritage List is dynamic, and, nowadays, it includes a total of 1121 World Heritage sites existing across 167 countries and representing all continents; 869 cultural, 213 natural, and 39 mixed (cultural and natural) sites, with 39 being transboundary and 53 in danger ([31], data October 2020).

When applying the World Heritage Convention (1972) criteria to marine systems and connecting the UNESCO World Heritage List with marine heritage, the importance of the marine environment and its different features are revealed. Consequently, MWH of OUV, together with the marine natural values of sites, are made salient globally. This, in turn, means that they are brought under international oversight, and their protection should be shared and be a shared responsibility of us all [16,30]. Some of the globally significant marine sites and iconic ocean places on Earth are the Great Barrier Reef in Australia, the Galápagos Islands in Ecuador, the Banc d'Arguin National Park in Mauritania, the Socotra Archipelago in Yemen, and the Ogasawara Islands in Japan. In total, there are 50 MWH of OUV sites and protected areas existing across 37 countries and representing all continents; zero cultural, 46 natural, and four mixed (cultural and natural) sites, with three (3) being transboundary and three (3) in danger ([31], data October 2020).

The three (3) that are transboundary are Kluane/Wrangell–St Elias/Glacier Bay/Tatshenshini–Alsek (Canada and the United States); the Wadden Sea (Germany and the Netherlands); and the High Coast/Kvarken Archipelago (Finland and Sweden). The three (3) that are in danger are East Rennell Island (Solomon Island group); Everglades National Park (Florida, USA); and Islands and Protected Areas of the Gulf of California (Mexico). The first marine site on the UNESCO World Heritage List was included in 1979. It was the Everglades National Park in the United States of America and then, in 1981, the Great Barrier Reef in Australia [24,27,30,32]. To ensure the application of the World Heritage Convention to marine ecosystems globally and to encourage a representative, balanced, and credible World Heritage List [25,33], the International Union for the Conservation of Nature (IUCN) issued a road map. This roadmap of the IUCN also serves as a navigational chart. It addresses issues like a) introduction and interpretations of the World Heritage criteria and their relevance to and application in the marine ecosystems, and b) biogeographic gaps and ecosystem-based approaches to address them. This initiative of the IUCN was taken in order to facilitate and affect what we recognize as MWH [20,30,34–38].

3. Managing and Communicating Heritage

Further to the need to identify heritage or marine heritage and preserve and protect it, there is also a need for its management and for understanding the key issues in it in order to facilitate heritage site development. Heritage management refers to both cultural and natural heritage resources as well as tangible, intangible, formal, official, and informal collective heritage [39]. It incorporates various actors: public, private, government, advocacy groups, non-governmental organizations, and local and indigenous community, and is considered complicated because there is no commonly agreed-upon definition. Therefore, it is introduced in the literature in a variety of ways [40]. In an expansive phrasing, it can be said that heritage management refers to the process where the undertaken activities aim to care for heritage item's assets and protect the physical and natural features of its environment [40,41].

Heritage, in any form and type, is an essential element affecting sustainable development. The latter has been recognized clearly by the World Heritage Committee when, in 2002, it declared that heritage is "an instrument for the sustainable development of all societies" [42]. Moreover, besides the various policy documents highlighting the former, it is also depicted in the 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs) in which there are explicit references to cultural aspects that emphasize the central role of heritage in sustainable development [43]. As a result, heritage management practice revolves around integrating the key sustainability dimensions. On top of that, the roles of authenticity and genuineness, values, community, and the public are much appreciated in protecting and managing heritage as they can be critical delimitating and legitimating factors and components of intertwined sustainability dimensions [39,44,45]. Indeed, sustainability connects to society's adaptability and resilience by being the equilibrium between the development that is needed and the protection of its values [46]. It encapsulates a vital well-being aspect and its maintenance over a long, or even indefinite, period [47], as well as a civilization of enhanced human well-being and environmental resilience together with value-led change for getting there [48]. Communicating the latter felicitously is fundamental for heritage.

3.1. Sustainability Framework for Heritage Management and Communication

The forenamed new challenges and new attention (sustainability dimensions; roles of authenticity and genuineness, values, community, and the public) lead to new bases and focus in the managerial and communication approaches. These new tendencies invite us to become sustainable and, therefore, to implement sustainable heritage management, stimulating developmental potential and impact [49–51]. The latter means a shift from the physical consistency of the heritage to aspects pertinent to human deeds and thoughts as well as a reconsideration of distinctions; a shift from silo thinking to more integrated

approaches. Thus, heritage is not considered a collection of things and sites, but a process of meaning-making, "a way of knowing and seeing" (Smith, 2006:44 in Barrère, 2016) [39]. It is understood as a social phenomenon that strongly reflects the society in which it is created and valued. Heritage interprets, represents, and decodes the way of living of those communities that reside within the vicinity (Long, 2000 [52]). Yet, in tandem, it is strongly connected and also engaged with the global community. It is promoted and made visible for the public interest so that it delivers socio-economic and development benefits [52].

In line with the abovementioned issues, sustainable heritage management needs to integrate the economic, social, and environmental dimensions into strategic planning and actions. The latter means extending from the planetary biosphere and specifically marine ecosystems to the local and indigenous community and human and social ecosystems [53]. It needs to aim not only to preserve and restore but also to increase the knowledge about the heritage as well [54]; a heritage that is met at sea level, submerged and underwater, in the coastal area and marine environment [1–4]. Moreover, genuine sustainability exists when heritage is present anywhere and anytime in everyday life. Therefore, moving towards these new pathways in which heritage and management are harmoniously integrated leads (a) to value creation as the heritage site's outstanding universal value is recognized and (b) to proactive, future-oriented management.

Further, sustainable heritage management and communication leads to futures literacy and futures foresight, since alternative future scenarios for the heritage site and the desired future are constructed and selected. Through this process, likely outcomes are predicted, and today's planned actions define tomorrow's outlook [55]. All these result in applying participatory practices and cultivating a participatory culture [56], developing a forward-looking attitude and skills, and establishing dialogic collective action. The former challenges also tightly relate to the MWH of OUV sites, because they raise the question of how conservation of a site's irreplaceable values can be balanced with the shift to socio-economic development and use, although sustainable in nature [57]. Besides a few geographically remote marine heritage sites, which are off-limits for exploitation, the remaining MWH of OUV sites are confronted with this challenge, and durable and meaningful ways to respond to it are sought by the site managers [57]. Concurrently, the industrialization of the ocean, climate change, habitat destruction, marine pollution, overfishing, invasive species, and others threaten the irreplaceable core values of the marine heritage sites.

On top of the abovementioned challenges, it is also a fact that coastal and pelagic biogeographic provinces are under-represented in terms of MWH [25]. Therefore, being recognized as having outstanding value does not necessarily mean that nature and humans are interconnected, but rather it appears that they are dichotomized [30,55,58]. Therefore, it is made evident that efforts, plans, actions, and impact should be future oriented, in line with shared and common goals. These goals are summarized in the five Cs: credibility, conservation, capacity building, communication and outreach, and communities [59]. In addition to them, great effort is needed to be sustainable by interlinking biodiversity and ecosystems to the broader seascape.

Through the prism of the previously mentioned issue, the management objectives need to shift focus. Nowadays, they are related mainly to science, wilderness protection, ecosystem protection and recreation, conservation of specific natural features, protected seascapes, and sustainable use. Following the this approach, the management objectives need now to facilitate a more ecosystem-based management approach and benefit from cooperation, partnerships, open communication, engagement, and interconnectivity between the heritage site and the surrounding marine area. Then, the result of the latter approach will be a reveal of the "big picture"; the entirety of the marine heritage site ecosystem, and its dynamics [60,61]. It is also worth mentioning here the insight with regard to the heritage communication and outreach, from the results of a survey on management issues on MWH sites from the marine site managers' point of view. This survey was conducted by the World Heritage Marine Programme during the 1st World Heritage Marine Site Managers

Meeting in Honolulu, Hawaii (1–3 December 2010). In this survey, it is noted that communication and outreach, in particular, which both relate to goals and vision formulation and, as a strategy/process/stage, run throughout the whole life cycle of the management, are not considered essential. As a result, they are not included in the identified categories of management issues and the elements of the effective management cycle by the heritage site managers. They actually ended up rating MWH sites' current management positively [60].

It is evident that we are in an era when MWH sites are acknowledged as exceptional, diverse, of highest international recognition, sharing common characteristics (at least one), and are more than the sum of their parts. We are also in an era when all these sites also share common threats and management challenges. Yet, in this era, there is additionally a need for heritage management and communication change. Indeed, heritage management and communication should act proactively, leading by example and as models of excellence [60,62]. They should assist by acting as models of a broader effort and transform MWH sites and their human community to change-facilitators and future-thinking actors towards a sustainable society and engaging community.

3.2. Biocultural Framework for Heritage Management and Communication

The sustainable shift in heritage management and communication and the aim to facilitate resilient livelihoods suggests interlinking landscapes, biodiversity, customs, cultural values, traditional knowledge, and local and indigenous communities. In other words, it is necessary, nowadays, to view the well-being of society and to develop a view of its future (futures foresight) through a biocultural lens [55,63,64]. The latter means that new approaches to heritage, nature conservation, landscape planning, and development goals are entering the conceptual framework of heritage [65]. These new approaches assist the conceptualization of biocultural heritage [8]. In turn, management goals and Sustainable Development Goals (SDGs) are connected and evaluated via resilience indicators. The response to this biocultural challenge is structured upon the adoption and application of sustainable biocultural heritage management and communication aiming at sustainable development and a broader transformative impact. This biocultural framing shapes the development of goals to be not only either nature-focused or people-focused but jointly interwoven. Additionally, it shapes evaluation and performance indicators that measure nature-human ecosystems in an integrated manner. This means that there are not only growth and wildlife indicators and indexes, and gross domestic product (GDP) rankings, but also biodiversity and social and human well-being ones (e.g., economic welfare, genuine progress, social connections, environmental quality, human capital, services to and from ecosystems, sustainable human development, local ontologies) [59,66–70].

Biocultural heritage links biodiversity with human diversity [71], the biological and cultural, the environment and the people [72]. It conceives human and ecological well-being as an interrelated system [59]. It focuses on the nexus between biology and culture and all that they involve [73]. Seeing it in more detail, it is the local ecological knowledge, innovations, and practices of indigenous peoples and local communities, and their associated landscapes, ecosystems, and biological resources. Indicative paradigms entrench (a) "from genetic varieties of crops the communities develop to the landscapes they create", or (b) "from seeds to landscapes", and (c) from knowledge to cultural landscapes and values. All of these are interwoven with heritage, memory, experience, living practices (e.g., traditional food/crops, medicines, handicrafts, long-standing traditional activities related with nature (i.e., festivals)) [8,10,11]. Biocultural heritage "encompasses the natural and cultural components of human and environment interaction, including knowledge, practices and innovation" [74]. According to UNESCO (2008) [75] (p. 8), it is defined as "living organisms or habitats whose present features are due to cultural action in time and place" [10]. Moreover, within it, there are recognized "areas of interdependencies between biological and cultural diversity" (e.g., language and linguistic diversity, material culture, knowledge and technology, modes of subsistence, which includes land use, economic relations, social relations, belief systems, etc.) [10]. According to Lindholm and Ekblom

(2019) and Ekblom et al. (2019) [8,74], biocultural heritage is constituted and framed by the following five interactive elements, as shown in Table 2.

Table 2. Interactive elements of biocultural heritage [8,74].

Ecosystem memories	"biophysical properties, non-human organisms and agents changed or affected directly or indirectly by humans"
Landscape memories	"tangible materialized human practice and semi-intangible ways of organizing landscapes such as built environments and archaeological sites, and settlement systems linked to user and property rights"
Place-based memories	"intangible living features of human knowledge and communication expressed in know-how, place names, orature, arts, ideas and culture, received, preserved and transmitted over generations"
Integrated landscape analysis	"an inclusive network-based approach to knowledge", "a toolbox and a conceptual framework for knowledge construction and landscape management"
Stewardship and change	"a reservoir of knowledge and experience for landscape management", "activity of, and ability in, exploring memory reservoirs of biocultural heritage for transferring knowledge to policy and management and for shaping collaborative initiatives"

The concept of biocultural heritage offers a holistic approach to conventional cross-cutting boundaries, as it inextricably links social, ecological, and biophysical systems [6,7]. This means that biological and material features of the landscape interlink with memory, experience, and knowledge [8–12]. Or that they encapsulate knowledge, practices, and values that reflect more modernized communities and not only those that adopt traditional lifestyles. Or that they are outputs that rely on informativity, diversity, dynamicity, and interactivity or interactions that relate to different human groups living with biodiversity within different contexts (rural and urban areas) [13]. It further paves the path to sustainability as it enhances the impact of partnerships. The reasoning for the latter is that it stresses local collaborative initiatives in tandem with institutional incentives (state, supra-state), emphasizing collective action and participation, and therefore features new forms of management and communication [8].

Moreover, it serves as a guiding framework for collective resource management and endogenous development [76]. It can synthesize in situ and ex situ knowledge recognizing local perspectives [66]. It can be conceptualized in a multimodal and metafunctional manner with strong relevance for other human and social groups across the globe, solidifying the future of humanity and the Earth [13]. Therefore, it has become a development tool used to inform thinking about the environment, nature governance, and management (for example, by the Institute for Environment and Development, or the International Union of the Conservation of Nature) [77]. Hence, using such an ecosystem-based approach helps ensure the integrity of MWH and ensures that the conditions of integrity are maintained further and enhanced over time [32,38]. It further endures on-the-ground impact [66]. It reflects the notion that people should also be recognized as central social figures for the conservation of nature and sustainable development (anthropo-centricity), in tandem with the marine ecological environment aiming at livelihood and climate resilience (biocultural frame).

4. Methodology, Materials and Methods

This paper aims to elaborate on the value and complexity of marine heritage by focusing on UNESCO's MWH management and communication approaches, and the challenges they face in light of the United Nations Sustainable Development Goals (SDGs) and the Decade of Ocean Literacy (2021–2030), and in the era of big data and the semantic web [78–80].

The MWH of OUV (50 sites in total across 37 countries) features some of the world's most exceptional ecosystems and is globally significant and a shared responsibility of humanity. It amounts to 10% by surface area of all the world's heritage protected areas [24,27,30,32]. On top of this, it is worth noting that the MWH of OUV represents 4.7%

of all sites, and 20% of natural and mixed sites. Additionally, the fact that "the area included in these marine sites is 56.5% of the area of all World Heritage sites, due to the enormous size of some marine listings, notably Papahānaumokuākea in the Hawaiian Archipelago in the United States of America, the Phoenix Islands Protected Area (PIPA) in the Republic of Kiribati in the Southern Pacific Ocean, and the Great Barrier Reef in Australia, which are, by a considerable margin, the three largest World Heritage Sites. Further, only about 40% of the world's oceans are within the jurisdiction of countries" [25–27,33]. Additionally, lastly, that "currently, about 2.9% of Earth's coastal and marine areas have some form of protected status [30,81], and only 0.01% of the global area is fully protected from extractive uses" (Laffoley and Langley, 2010) [22,25,33].

Focusing on MWH of OUV, this paper aims to illuminate the importance of a more holistic and integrated heritage management and communication approach, the sustainable biocultural framing. In this way, the shifting of the route in the blue marine-scape, from discovery and being listed as a World Heritage site to engagement and expansion of meaning, including other social and ecological contexts, together with informativity, diversity, dynamicity, and interactivity, will be facilitated. This biocultural heritage conceptualization functioning as an integrated framework for heritage and the various landscapes and environments reframes and facilitates synthesis across human and ecological well-being [55,63,64]. As a result, this expansive biocultural framing can create a common ground to develop futures literacy and build a joint future for nature and people [55]. More particularly, when entering the blue dimension, it encapsulates the fact that marine and maritime-scapes and systems include any kind of hermeneutic human relationship to the sea and the communities living along the coastlines. Therefore, it enriches the appreciation of marine heritage [16,82,83].

By mapping and analyzing the UNESCO MWH through the lens of social media, it comes into focus how MWH is conceived, managed, and communicated. By studying how it is framed, its meaning for a sustainable future is disclosed [84]. Furthermore, by showcasing the heritage management and communication approaches, it is revealed whether they are sustainable and biocultural in nature. Hence, it is revealed if they facilitate multimodal knowledge, engagement and participation, ocean literacy, and sustainability in light of the United Nations Sustainable Development Goals (SDGs) and the Decade of Ocean Science for Sustainable Development (2021–2030) [85–88].

All the above are approached and explored by focusing on how UNESCO MWH is promoted through social media and, particularly, Instagram. Specifically, the study and methodology approach is articulated as follows:

Firstly, the conceptual framework of marine heritage and further biocultural heritage and its specific correlation to sustainable management and communication is provided. Then, the sustainable and biocultural framework is researched by using as a case study heritage sites that are blue in nature and of great importance to humanity and of outstanding universal value. Later on, through the research findings, their digital communication profile on Instagram and what it says about each one of them are analyzed, and further, how they are communicated to and experienced by the public (multimedia and user-generated content). Through this approach, via its social media footprint on Instagram, the digital "living" culture and knowledge of UNESCO MWH are mapped, as an attempt to capture (in a database) everything about MWH and explore its "lifeworld", and its "voice" [89–95]. Moreover, the digital narrative footprint of heritage as content, experiences, discourse, voice, music, video, audio, and visual messages according to text interwoven on Instagram and in general in digital environments is depicted [96–98]. The digital narrative is a meaning vehicle articulated by media usage, motion, relationships, context, and communication [99]. Moreover, as genuine sustainability exists when heritage is present anywhere and anytime in everyday life [57], in the era of big data, this means that the concept of data from everywhere is applicable. The digital narrative footprint of heritage offers (a) meta-functional meanings in the flow of information, (b) indigenous, traditional, or biocultural data that indicate interests as the data travel, and (c) indigenous land, geospatial, and

place-based datasets. Sets of metadata can be developed, and culturally sensitive materials can be found online. In the case of heritage, and with regard to sustainability, it is important not only to foster openness by sharing and creating knowledge and to preserve all these cultural and heritage items for future generations but also to do it in a sustainable manner, which is to respect rights and follow the norms of the communities that created them.

The purpose of this study can be identified with the following research questions:

RQ1: How are UNESCO's MWH of OUV protected areas and sites of Europe promoted and communicated through social media nowadays? (What is their digital narrative footprint?) Subquestion: Are multimodal knowledge, engagement and participation, ocean literacy, and sustainability triggered and facilitated?

RQ2: Is MWH framed through a unified, joined-up approach for culture, heritage, landscape and systems, and sustainable livelihoods?

RQ3: Can Europe's UNESCO MWH protected areas and sites be interlinked and brought into existence by a unified nature-human ecosystems frame, viewing nature and people as an undifferentiated whole and be promoted and communicated in "one voice" (the blue digital narrative footprint), highlighting their sustainable and biocultural value (sustainability and biocultural framework)?

The choice of the mobile and sharing social media environment and, particularly, the Instagram service, as the field of research is based on the following:

The mobile and sharing social media environment refers to a broad spectrum of digital interaction and information exchange platforms aiming at enabling the general public to contribute, disseminate, and exchange information [100–102]. It constitutes a vehicle upon which experiences and emotional connections with geographical landscapes and wildlife are created and shared with the rest of the world. Thus, it is a big data system, since it is characterized by volume, variety, velocity, and users [78–80,103], and can be analyzed through social media analytics. Further, when social media is entangled with heritage, then big datasets are created, culture is presented and communicated in a multimodal way, heritage itself and heritage data are displayed, and heritage management and communication have to exploit knowledge from multimodal cultural and heritage data analytics. Thus, social media is fertile ground for harvesting various forms of multimodal-based data (e.g., images, videos, speech data, gestures, facial expressions, location-based data, gene-based data) [104,105], and their analysis also entails social media listening and sentiment analysis.

Additionally, social media consists of the digital online space where the management and communication strategy and practice are revealed and applied. It is also the space where the public interacts with heritage through the social media profile and the generated content (user-generated content, UGC) [106,107]. How the public experiences and understands a heritage site is of the highest importance for its lifespan and conservation [108]. It is worth mentioning that today, one out of two organizations enrich and enhance their internet profile by using social media and exploit this to develop their image and communicate, interact, and facilitate collaboration and knowledge-sharing with peers and the public. It is characteristic that European entities use social media and networks mostly for activities that relate to information and communication and for the development of their image. Additionally, it is characteristic that social media and network participation in the European Union reaches 56% of people aged 16–74, with the highest participation scores found in Denmark (79%), Belgium (73%), Sweden (70%), and the United Kingdom (70%) [109–111].

Instagram, which is a social photo and video sharing service that allows users to generate content, is one of the most popular social networks worldwide, and has 1.158 billion active users (monthly). Moreover, together with other social media platforms like Facebook, WhatsApp, and Facebook Messenger, it constitutes a core family product surpassing 7.2 billion registered accounts [112]. Furthermore, almost 855 million users access the platform monthly, and it is foreseen that this will exceed 988 million users in the next two years, a 15.5% increase [112]. On top of that, Instagram is the second leading platform

after Facebook that is used by marketers worldwide for promotion purposes in the digital environment due to its significant potential reach to audiences and its popularity in influencer marketing, with global spending worldwide growing to 8.08 billion US dollars [112]. Additionally, Instagram incorporates engaging tools like Instagram stories (which are temporary videos or a sequence of photos to form a storyline in a slideshow) that boost engagement and advance strategies for creating content and building an audience. For these reasons, Instagram stories have an ever-increasing trend in the number of daily active stories users worldwide [112].

Sharing information and experiences and commenting and interacting on social media, and particularly Instagram, is a usual practice. It is a practice that is deployed for impacting the conceptualization of culture and heritage [113,114], and strategically engaging in communication and creating a public image of blue marine heritage-scapes. Furthermore, the social media content is often geo-tagged as coordinates or toponyms of locations, which constitute a "crop" to harvest and analyze content, revealing information on issues, cultural dynamics, and the human landscape [100]. The latter transforms social media to also be geo-social since, by studying the interaction of users and data (topics, sentiment, space, etc.), the social structure and community connections can be observed [100]. Hence, the volume and richness social media offer open research paths for understanding situations and responding to research questions' challenges that, in our case, relate to sustainable biocultural heritage management and communication.

The data source and place of analysis were the official Instagram account and profile of each of the 14 UNESCO MWH of OUV of Europe. The analysis of more than one case in the same study assists the comparison and further considers the heritage management and communication in different settings. This diversity adds value to the research and offers a holistic vision [114].

The analysis unit was the multimedia and user-generated content in the Instagram accounts, which creates the mosaics and multiples of UNESCO MWH of OUV sites of Europe while connecting land and people digitally [102].

The sample consisted of 14 UNESCO MWH of OUV sites of Europe representing 11 European countries: Denmark—1 heritage site (HS), Finland—1 HS, France—3 HSs, Germany—1 HS, Iceland—1 HS, Netherlands—1 HS, Norway—1 HS, Russian Federation—1 HS, Spain—1 HS, Sweden—1 HS, United Kingdom—2 HSs. Specifically, they include the following, grouped by country:

- Denmark: Wadden Sea (transboundary property)
- Finland: High Coast/Kvarken Archipelago (transboundary property)
- France: (1) Gulf of Porto: Calanche of Piana, Gulf of Girolata, Scandola Reserve (included for geological value before 1994); (2) Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems; (3) French Austral Lands and Seas
- Germany: Wadden Sea (transboundary property)
- Iceland: Surtsey
- Netherlands: Wadden Sea (transboundary property)
- Norway: West Norwegian Fjords—Geirangerfjord and Nærøyfjord
- Russian Federation: Natural System of Wrangel Island Reserve
- Spain: Ibiza, Biodiversity and Culture
- Sweden: High Coast/Kvarken Archipelago (transboundary property)
- United Kingdom of Great Britain and Northern Ireland: (1) St Kilda; (2) Gough and Inaccessible Islands (Extension of "Gough Island Wildlife Reserve")

This study's research method is based on observation of Instagram through content analysis and comparative metrics between the official accounts of UNESCO's MWH of OUV sites of European countries [114]. The choice of the particular research method (content analysis) is because it is especially facilitative in drawing inferences from the text and visual information in social media postings through a set of procedures. Therefore, it constitutes a useful evaluation tool (Weber, 1990 [114]) and offers practical applicability [115]. In order for the researchers to strengthen the content analysis in the era of big data and the semantic

web [78–80], they connected systematic rigor with contextual sensitivity and blended them with multimodal representations that reveal the communication process and the multifold role of the actors (e.g., targets of messages, producers of communication and meanings, and co-creators in meaning-making) [116–118]. The analysis of the content generated by the official account holder and the reactions or interactions it produces provides a fertile ground for understanding UNESCO's MWH management and communication and offers an overview of the heritage marine-scape and how it is conceptualized.

According to the three research questions developed, MWH is analyzed through the following:

(i) the digital metrics of the posts, such as activity traffic, likes, views, comments, posted photos and videos (visual and audiovisual representations), hashtags, tags, volume of entries, engagement, interaction, sentiment [114], and

(ii) hermeneutic themes and meaning units (i.e., cultural or biocultural heritage, ecosystems, landscapes, memory, knowledge construction, experience, activity, collaboration, informativity, diversity, dynamicity and interactivity, local and indigenous knowledge, practices, ontologies, and their synthesis with landscapes and biological ecosystems) [8–12,74] and frames related to the style of expression, critique (negative; neutral; positive/normative), rhetoric (hopeful/optimistic; alarmist/pessimistic), and generation references of looking at the present or ahead (current generation references/present/now; future generation references/resilience/sustainability) [119]. Themes and frames express data on an interpretative level and underlying meanings by answering questions like why, how, and by what means and communicating with the public on both the intellectual and emotional level [116].

The data collection method and tools used were scraping and searching thoroughly through official Instagram profiles and completing a documentation scheme for data entry designed for this purpose. The form included 60 closed-ended and open-ended purpose-built questions that required inputting values and specific information and data elements. These questions were grouped into thematic units (e.g., profile information, technical information, communication and audiovisual information, interaction, metadata), as Figure 1 shows.
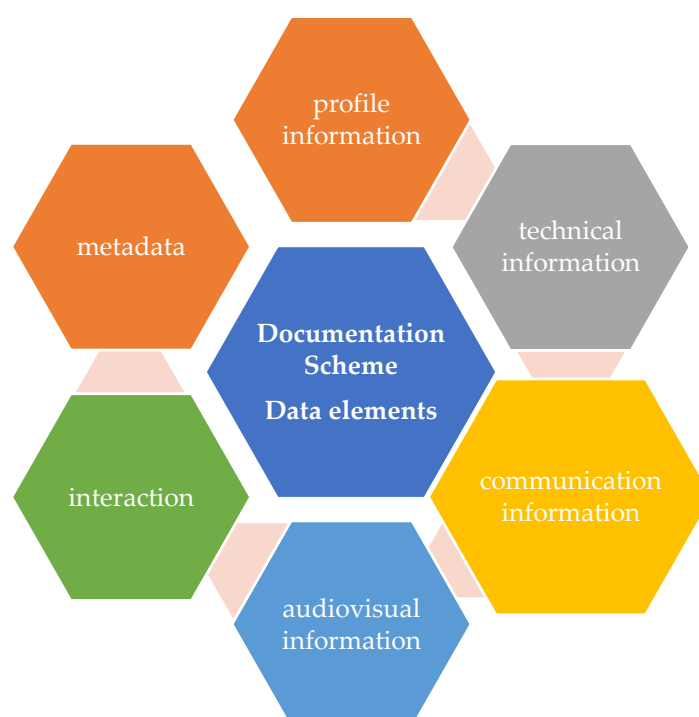

Figure 1. Research documentation scheme of data elements for data entry.

By using this research documentation scheme of data elements groups, multimodal forms of knowledge and communication based on observations are mined (e.g., opinions, sentiments/emotions, interaction), and management and communication lines of strategic thinking are captured [103].

The data were collected in April and May 2020. The database was created only through UNESCO's MWH of OUV protected areas and Europe sites, which had created an official social media account and an Instagram profile. These cases were seven out of the 14 UNESCO MWH of OUV protected areas and sites of Europe, representing six out of 11 countries, as in Figure 2: Denmark, Wadden Sea (transboundary property); Finland, High Coast/Kvarken Archipelago (transboundary property); France, Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems; Germany, Wadden Sea (transboundary property); Netherlands, Wadden Sea (transboundary property); Norway, West Norwegian Fjords—Geirangerfjord and Nærøyfjord; Sweden, High Coast/Kvarken Archipelago (transboundary property).
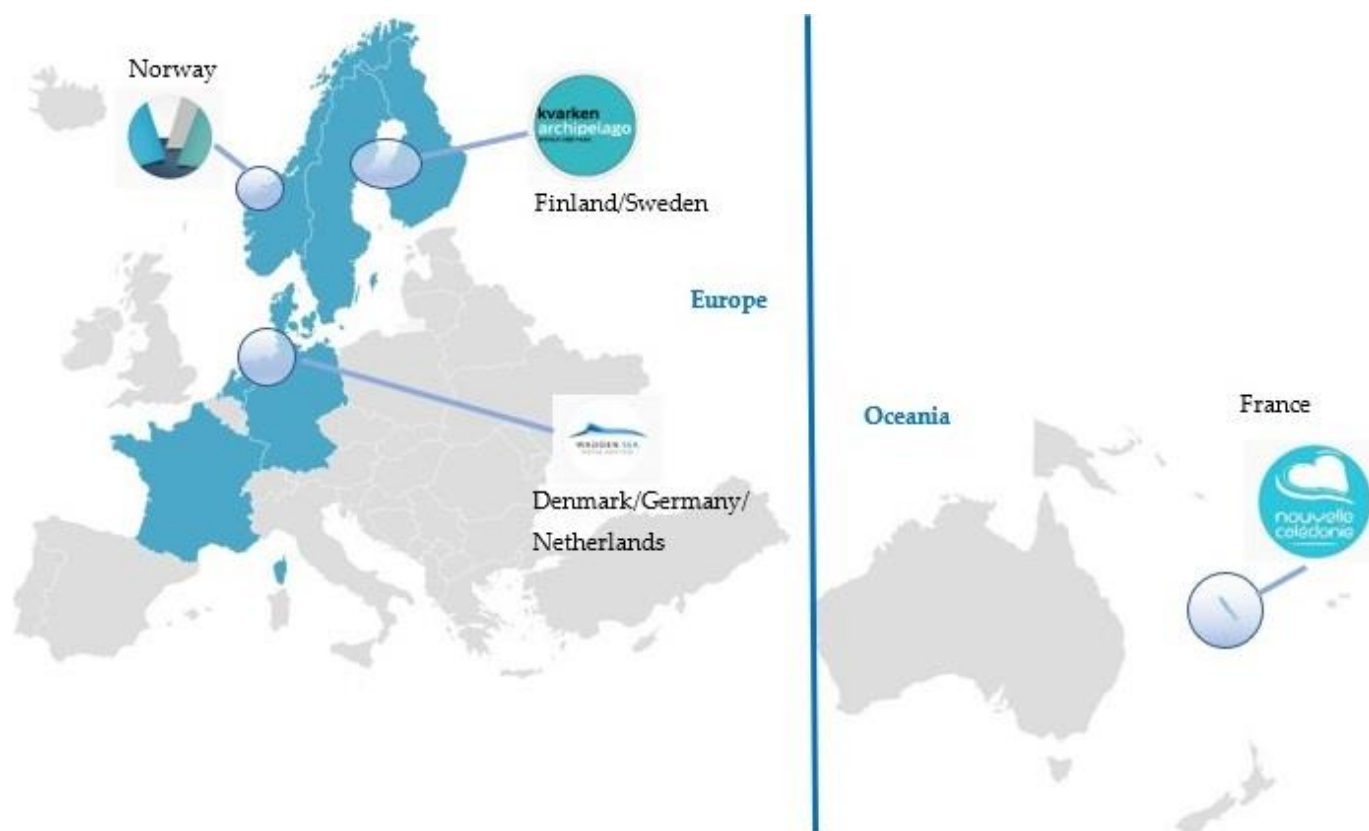

Figure 2. UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe (research sample).

The researchers retrieved from their Instagram accounts and analyzed a total of 4223 posts of UNESCO MWH of OUV protected areas and European sites. The total of 4223 posts created by the account holder generated a total of 30,451 comments and their diffusion, immersion, impact, communication, and dissemination were amplified by 53,442 hashtags (#) and 5505 tags (@). Moreover, in the total posts, framing was researched regarding the style of expression based on keywords/phrases found in the text, revealing critique, rhetoric, or looking at the present or ahead [83]. Additionally, mapping was conducted with regard to audiovisual material, emoticons, and geoinformation. Furthermore, in an attempt to carry out a more in-depth analysis, the top 10 most popular posts (according to their likes) created by each account holder were identified (a total of 70 most

popular posts with 2733 comments, 1250 #, and 156 @). They were studied thoroughly regarding their framing, audiovisual material, emoticons, geoinformation, metadata, and interaction.

5. Results and Discussion

The findings of the study demonstrate that maritime heritage should be managed and communicated through a more digitally and socially enriched internet profile (including social media and particularly Instagram). It also needs to be managed and communicated through a more active, informative, diverse, dynamic, interactive, participatory, and collaborative manner. Additionally, it needs to be managed and communicated in sustainable and biocultural terms, if it is to cultivate public multimodal knowledge and engagement, literacy, and resilient future livelihoods.

Regarding UNESCO MWH, it can be noted, as a general observation, firstly, that even only by the name of the site, which builds and represents its identity, patterns of marine heritage management and communication are revealed. All 14 UNESCO MWH of OUV protected areas and European sites have a blue item in their name that is traditionally linked to landscapes or, better, marine-scapes (e.g., sea, lagoon, archipelago, fjords, gulf, island). Yet, the United Kingdom, Spain, and Iceland's choice are toponym oriented; they use the actual name of the islands (St Kilda, Scotland, GB and Gough, GB; Ibiza, Spain; Surtsey, Iceland) to refer to and promote the UNESCO MWH sites, with no significant sensitivity towards whether the names of the Scottish, Spanish, and Icelandic islands are widely known. Having the site bound to the country designates the country and property ownership over its world importance and belonging to humanity. Additionally, besides the Wadden Sea, St Kilda, and Surtsey, all the others have a descriptive title articulated by at least of an average of six to seven words. This makes it difficult to remember them or be imprinted in one's mind so that one can recall them or search for them on the web through a search engine. As a result, online visibility, findability, and interaction are not facilitated or enhanced.

Secondly, with regard to the internet profile, out of the 14 UNESCO MWH of OUV protected areas and sites of Europe, only seven (7) have an official social media account and an Instagram profile, representing six out of the 11 countries: Denmark, Wadden Sea (transboundary property); Finland, High Coast/Kvarken Archipelago (transboundary property); France, Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems; Germany, Wadden Sea (transboundary property); Netherlands, Wadden Sea (transboundary property); Norway, West Norwegian Fjords—Geirangerfjord and Nærøyfjord; Sweden, High Coast/Kvarken Archipelago (transboundary property).

Thirdly, with regard to the blue marine heritage communication identity, it is observed that the visual identity/logo of the UNESCO MWH of OUV protected areas and sites of Europe that hold an Instagram account is mostly co-aligned, with one exception, as Figure 3 shows.

Specifically, the ones that are a transboundary property (Wadden Sea; High Coast/Kvarken Archipelago) chose to present themselves publicly by using the name of the heritage site in the visual identity/logo together with blue elements or graphics and with a wording emphasizing that they are "world heritage" and thus bring out the sites' universal value. The one that is property of France (Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems) also follows the same line as the transboundary ones, except the emphasis on "world heritage". Yet, the one that is property of Norway (West Norwegian Fjords—Geirangerfjord and Nærøyfjord) differentiates itself by using only blue elements or graphics, with no text at all and not making its world heritage nature salient.
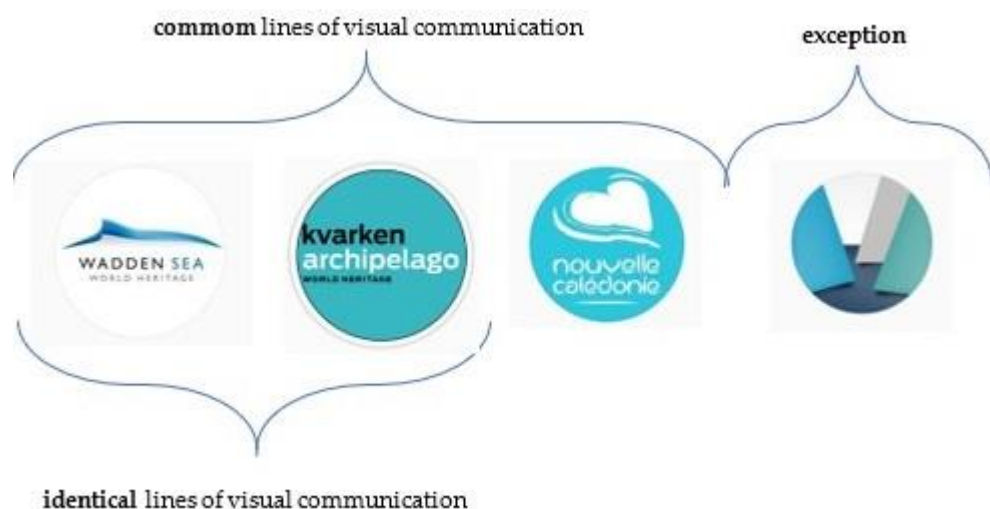
Figure 3. UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe (visual identity/logos). Own elaboration by authors.

5.1. The Digital Narrative Footprint of UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) Protected Areas and Sites of Europe

According to the research findings, and with regard to the social media footprint through the Instagram profiles of the researched UNESCO MWH of OUV protected areas and sites of Europe and the type of site with regard to property, the following results are observed, as Figure 4 shows.
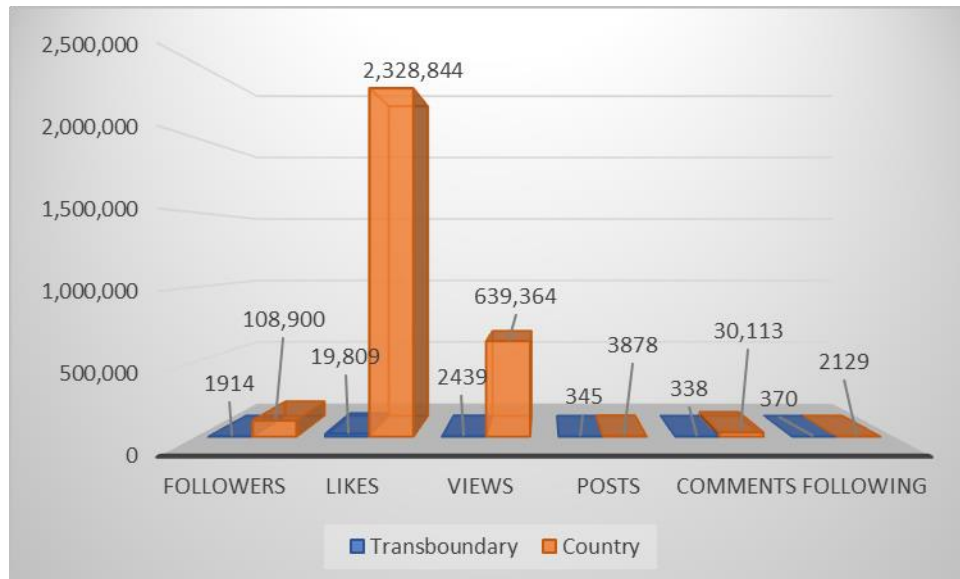

Figure 4. Instagram feature distribution chart (followers, following, posts, likes, views, and comments) of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe, by property type. Own elaboration by authors.

When a UNESCO MWH of OUV protected area or site of Europe constitutes transboundary heritage (e.g., Wadden Sea—transboundary property: Denmark, Germany, Netherlands; High Coast/Kvarken Archipelago—transboundary property: Finland, Sweden), then its public communication is not as vivid, active, and dynamic as when the UNESCO MWH of OUV protected areas or site of Europe is managed and communicated by one country and, therefore, by a central actor (e.g., Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems—France; West Norwegian Fjords—Geirangerfjord

and Nærøyfjord—Norway) (Figure 4). As a general remark, it can be said that location and promotion of the local cultural authorities and tourism organizations play an essential role in the public communication footprint and the visibility and engagement of the MWH site. On top of that and, responding in part to *RQ3:* "Can Europe's UNESCO MWH protected areas and sites be interlinked in a unified nature-human ecosystems frame viewing nature and people as an undifferentiated whole and be promoted and communicated in "one voice" (the blue digital narrative footprint), highlighting their sustainable and biocultural value (sustainability and biocultural frame)?", it is apparent that shared management and communication do not lead to common strategic plans of action that have as an outcome a "common, one voice" of UNESCO MWH of OUV protected areas and sites of Europe. Hence, a broad transformative and positive blue sustainable impact cannot be identified and detected.

Furthermore, and in relation to the former finding (Figure 4), it is of significant interest that an oxymoron appears in the communication of the transboundary MWH sites, as noted via their Instagram profile information; instead of having a common voice building on their transboundary nature, they chose different communication paths. One (Wadden Sea) highlights its world and common nature and ownership. In contrast, the other one (High Coast/Kvarken Archipelago) chooses to act as country property and stand out not with its unified nature but with its Finnish ownership and geographical aspect. Additionally, combining the latter finding with the one about using geoinformation in the posts (Table 4), it is notable that when unity is in the foreground, geolocation is paired with its featured region–country–place, but when disaffiliation is noted, then geoinformation is linked to the region–place–landscape–protected area. Therefore, trying to conceptualize and depict the antinomy, it can be said that country is a secondary reference when universality is a prominent element in the public communication profile, and conversely, the landscape and protected area are given prominence only after first having the country pinpointed as a core public communication element.

The statistical results of the social media footprint through the Instagram profiles of the researched UNESCO MWH of OUV protected areas and European sites are presented in Figure 5.
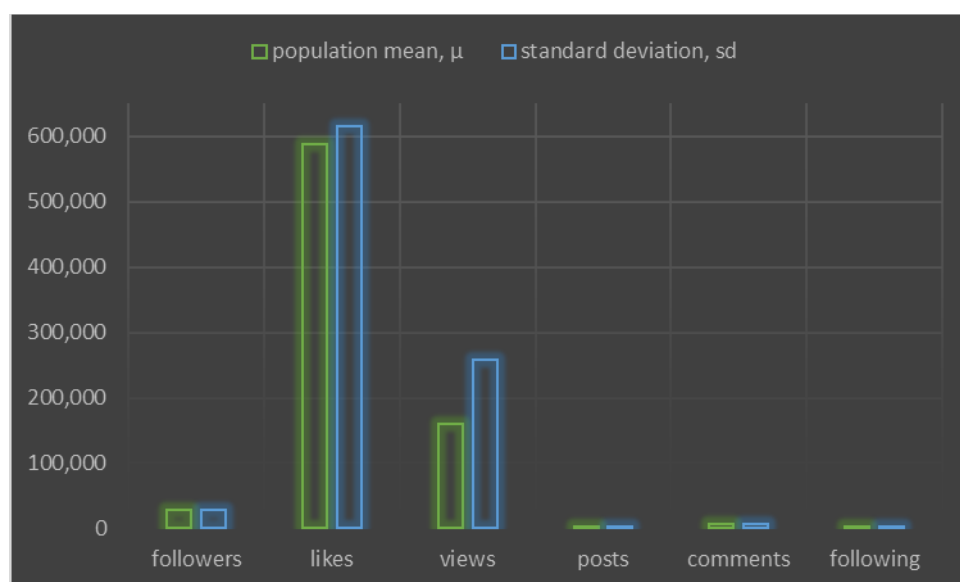

Figure 5. Statistics (mean, standard deviation) of the core Instagram features (followers, following, posts, likes, views, and comments) of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

In Figure 5, are statistics for the important social media features of an Instagram profile. The mean values for all the features besides likes and views are considerably low, ranging

from 624.5 to 27,703.5 actions. The variation of values of the features is very disperse, meaning that the actions in all features' categories are spread out. This dispersion depicts the scattered, fragmented, and ad hoc communication and managerial and strategic choices for the MWH sites, as also discussed in the analysis of the findings.

In analyzing the correlation and association between and among the features of the Instagram profile of the researched UNESCO MWH of OUV protected areas and sites of Europe, the following results are noticed, as Table 3 shows.

Table 3. Correlation matrix of the Instagram profiles of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

	Followers	Likes	Views	Posts	Comments	Instagram Stories	Following
followers	1						
likes	0.762199	1					
views	0.849124	0.30538	1				
posts	0.656706	0.988104	0.160411	1			
comments	0.861712	0.985241	0.463724	0.947846	1		
Instagram stories	0.874126	0.351933	0.998784	0.208771	0.506827	1	
following	0.896876	0.398651	0.993437	0.255805	0.549725	0.997221	1

In a general view, strong relationships are observed between almost among all variables, as anticipated. However, it is worth noting that the strongest and nearly perfect positive linear correlation is between the views and Instagram stories (SD 0.998784) and following and Instagram stories (SD 0.997221). This shows that, when a UNESCO MWH of OUV protected area or site of Europe decides to create a digital social network and to follow other Instagram accounts, those accounts are interested in the public communication profile of their follower. This choice is because they want to know how they relate to the follower, why the follower decided to follow them, and the follower's activity. A schema of multimedia content power might be detectable here and is worthy of further research [120]. The interesting aspect of the forenamed correlation is that they monitor the follower through the instant social media content created by the follower (Instagram stories that disappear after 24 h), not through the posts archived in the account's timeline and the Instagram feed. It can be interpreted that they are interested in the vivid social profile of the follower and the UNESCO MWH of OUV protected areas and sites of Europe. They are drawn explicitly to the audiovisual content and the narrative accompanying it, as it is incorporated within the framework of stories. The reason for that is that Instagram stories are a tool for representing oneself in an online world to get connected virtually, and on top of that, to boost reach and engagement. Moreover, they can be used either for inspiration or quality social media listening. They are vibrant and live and a feature of self-disclosure, self-presentation, perceived collectivism, and new relationship building [121]. Based on the latter, it can be argued that this highly focused interest and interaction reveal, in turn, highly positive attention and thus, a form of content power (influence) [120].

Another finding worth noting is the almost nonexistent linear correlation between the views and posts (SD 0.160411), and the limited correlation between the views and likes (SD 0.30538) and the views and comments (SD 0.463724). It can be argued that this suggests that interactivity is being facilitated through other features of Instagram and not the anticipated and obvious ones. It is possible that other, nonlinear types of relationship between the two can exist and are worth further research, e.g., looking through the lens of the social relevance feedback based on multimedia content power [120].

Looking more thoroughly into the research findings, the nexus of the social media footprint through the Instagram profile of the researched UNESCO MWH of OUV protected areas and sites of Europe and the social media engagement and Instagram features is depicted in Figure 6. Instagram classifies the following feature categories: posts, likes, followers, profile information, following, views, comments, and other information. In this way, it is shown which are the fundamentals in heritage communication and management

regarding raising the visibility of the MWH "lifeworld" and its "voice", the digital one, via engagement and interactivity.
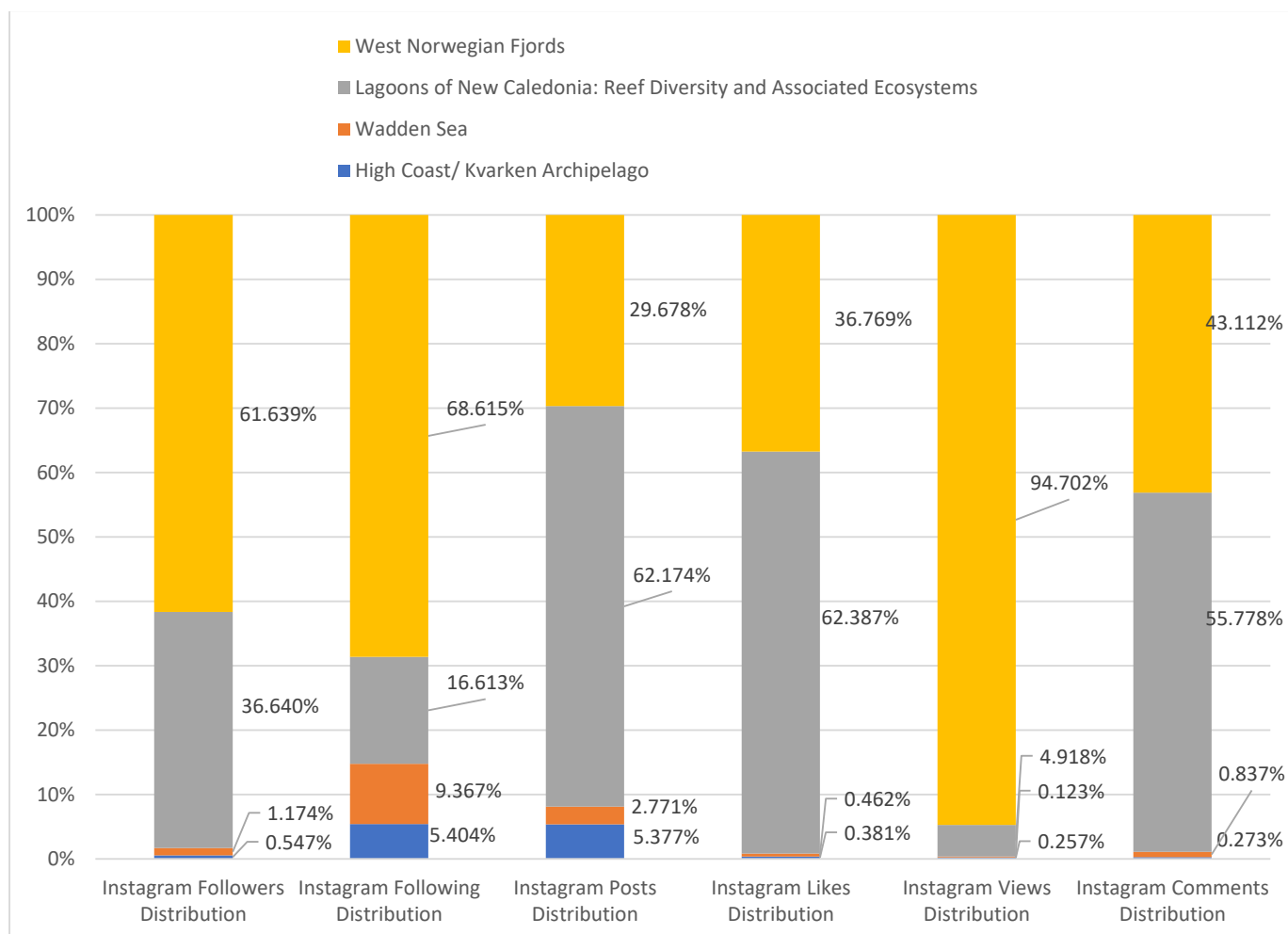

Figure 6. Instagram follower, following, post, like, view, and comment distribution chart of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

Of the total 4223 posts of UNESCO MWH of OUV protected areas and sites of Europe (Figure 6, 3rd bar), the Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems Instagram account is leading the communication praxis as they have created the most posts (62.174%), then the West Norwegian Fjords—Geirangerfjord and Nærøyfjord Instagram account follows, with 29.678% and, lastly, the High Coast/Kvarken Archipelago and the Wadden Sea Instagram accounts, with 5.377% and 2.771%, respectively.

A consequence of this finding, and the active presence on social media via Instagram posts, is that the public appears to interact, via its likes, mostly with the Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems marine heritage site and then with the West Norwegian Fjords—Geirangerfjord and Nærøyfjord marine heritage site, whereas the two transboundary UNESCO MWH of OUV protected areas and sites of Europe (High Coast/Kvarken Archipelago; Wadden Sea) are nonexistent in terms of public engagement and interaction, with no likes at all (Figure 6, 4th bar). Therefore, only two out of four UNESCO MWH of OUV protected areas and sites of Europe enhance the public's awareness and experience with world marine heritage. This finding also relates to the fact that social media is used little by European entities for the exchange of views or knowledge and, thus,

for interaction or collaboration, and is used in a more linear way and only for obtaining or harvesting opinions [109–111,122,123].

Regarding the followers of the UNESCO MWH of OUV protected areas and sites of Europe, the picture remains the same as presented previously (Figure 6, 1st bar). The only differentiation is the interchange in the first place between the Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems and the West Norwegian Fjords—Geirangerfjord and Nærøyfjord marine heritage sites. As shown in Figure 4, from the number of followers, first is the West Norwegian Fjords—Geirangerfjord and Nærøyfjord marine heritage site, although it is not the first in terms of the number of posts or likes. One explanation for that may be that the West Norwegian Fjords—Geirangerfjord and Nærøyfjord Instagram account is run by the official tourism board of Fjord Norway, whereas the Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems Instagram account is the official account for tourism to New Caledonia. This means that being an official account holder of heritage whose official name is nature-specific (fjord), together with place specificity (Norway), and not only toponym based (new Caledonia), is more effective communication-wise, as someone has to know the name of the area and toponym to search for an Instagram account and follow it.

The communication identity sketched in the profile information in the Instagram accounts is also noteworthy. The High Coast/Kvarken Archipelago marine heritage site introduces itself to the public by emphasizing its locality, although it is a transboundary property and heritage (e.g., "we are the Finnish part"). Thus, instead of being entangled with its statement of "world heritage" in its logo (Figure 3), it moves away. The Wadden Sea marine heritage site adopts a different communication frame. In its profile information, it points out its unique marine characteristics (e.g., "the largest tidal flats system in the world"), validating its world marine heritage nature that is also stated in its logo (Figure 3). It also goes a step further by designating unity and validating its universality through saying that, although it is shared among three countries as heritage, it is one sea (e.g., "Denmark—Germany—Netherlands. ONE Wadden Sea"). Therefore, one could infer that collective framing can be identified, which can act as a fundamental feature of a "common, single voice". Yet, it should be researched further whether this principle is also transferred to and runs through the whole management and communication strategy.

According to the number of the accounts that every UNESCO MWH site follows on Instagram (following), it is evident, as Figure 6 (2nd bar) shows, that the effort to cultivate a network of relationships and influence is being made by the West Norwegian Fjords—Geirangerfjord and Nærøyfjord heritage site (68.615%). Again, one explanation could be that its Instagram account is being run by the official tourism board of Fjord Norway; this could make it easier for it to approach interlocutors, and for that purpose, following the path of locating actors and stakeholders and Instagram members that can relate to it and its mission.

Taking a look at the views and comments (Figure 6, 5th and 6th bar), it is discerned that followers and following, in other words, the digital social network around a heritage site, bring more views and, thus, amplify the visibility of the MWH site. However, the more conversant an MWH site is in the digital and social media world through posts, the more engagement and interactivity it cultivates, as the number of the comments and likes shows.

In a deeper quantitative and qualitative look at the research findings, the digital communication profile of each one of the researched UNESCO MWH of OUV protected areas and sites of Europe is sketched out. In tandem, the response to *RQ1*: "How are the UNESCO MWH of OUV protected areas and sites of Europe promoted and communicated through social media nowadays? (What is their digital narrative footprint?)/Subquestion: Are participation, ocean literacy, and sustainability triggered and facilitated?" is shaped as follows, and as shown in Figure 7.
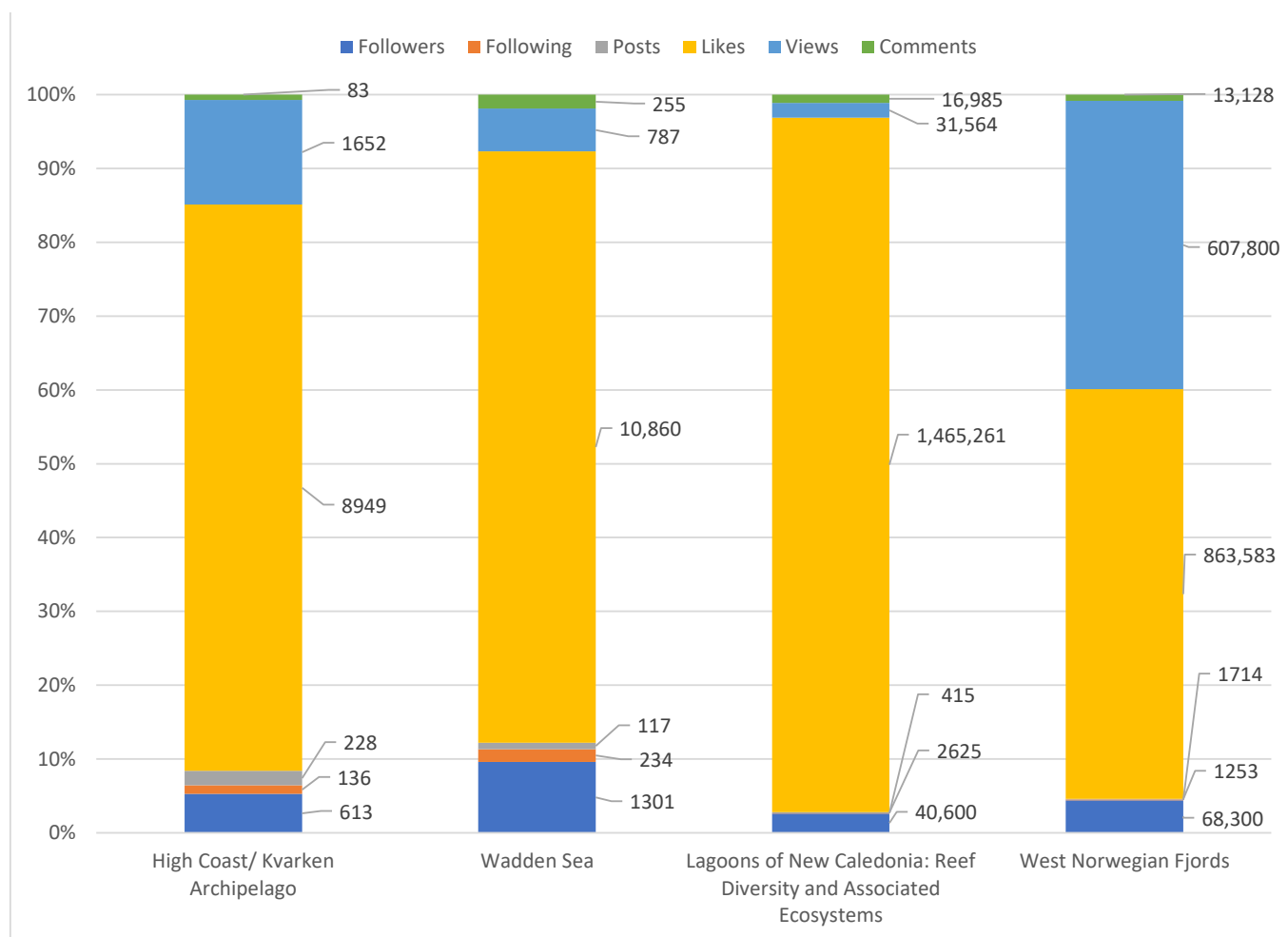
Figure 7. Instagram profiles of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

Analyses of the digital communication profile of each one of the researched UNESCO MWH of OUV protected areas and sites of Europe, per criterium relating to more information, are shown in Table 4 (complete profile data) and Table 5 (top 10 most popular posts according to the number of likes).

In more detail, as Table 4 shows, the High Coast/Kvarken Archipelago (transboundary property: Finland, Sweden) marine heritage site does not have a significant digital social media footprint. Its Instagram account had 613 followers, 8949 likes, 1652 views, and 228 posts, with 83 comments in the research period (April–May 2020). There have been no Instagram Stories produced and published. There is very rarely a response to the followers' comments although, at first, interaction seems to be welcomed, as all three (3) buttons facilitating it (follow; send a message; send email) are there. The metadata used in the posts created by the account holder include emoticons, geoinformation with regard to the region, the place, the landscape and the protection area, hashtags (#), with an average of seven to eight hashtags per post, and tags (@), with an average of two tags per post. Yet, there is no significant network of relationships and interlinkages cultivated, as the account follows only 136 other Instagram members.

Table 4. Instagram profiles of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

Instagram Profile	High Coast/Kvarken Archipelago (Transboundary Property: Finland, Sweden)	Wadden Sea (Transboundary Property: Denmark, Germany, Netherlands)	Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems (France)	West Norwegian Fjords—Geirangerfjord and Nærøyfjord (Norway)
followers	613	1301	40,600	68,300
likes	8949	10,860	1,465,261	863,583
views	1652	787	31,564	607,800
posts	228	117	2625	1253
comments	83	255	16,985	13,128
Instagram stories	0	0	5	50
interaction	all 3 buttons (follow; send email; send a message)	all 3 buttons (follow; send email; send a message)	2 buttons (follow; send a message)	all 3 buttons (follow; send email; send a message)
emoticons	yes	yes	yes	yes
geoinformation	yes: the region, the place, the landscape, and the protection area	yes: the country, the region, and the place	yes: the region, the place	yes: the region, the city, and the place
hashtags	average 7–8 per post	average 7–8 per post	average 15 per post	average 7–8 per post
tags	average 2 per post	average 1 per post	average 1 per post	average 1 per post
following	136	234	415	1714

In a more qualitative analysis of the top 10 most popular posts of the account in the research period, as Table 5 shows, it is observed that the posts are supported only by photos (an average of two images per post) that reveal the site's nature in equal terms as either nature/landscape heritage or mixed (nature and culture) heritage. There are no videos at all, the text has an average of 28–29 words, and its style and expression are framed mostly as positive/normative critique, and hopeful/optimistic rhetoric. There are references to current generation/present/now, there are no emoticons or geoinformation used. They are accompanied by an average of 10 hashtags per post relating to the country, region, place, and activity/action message, with the message being like a statement, and almost no tags per post. Every post of the top 10 most popular ones of the account in the research period generates one comment at the most, including emoticons and a tag, and it gets almost no reaction or reply from the account holder.

Hence, to conclude, it is observed that this particular site not only does not have a significant social media footprint, but it also appears to the public as only a nature/landscape heritage site. Its digital narrative footprint states positivity and hope, yet it does not relate to multimodal knowledge, engagement and participation, ocean literacy, and sustainability. Therefore, it does not build solid marine knowledge with a sustainable view.

The Wadden Sea (transboundary property: Denmark, Germany, Netherlands) marine heritage site, as Table 4 shows, does not have a significant digital social media footprint like the other transboundary property of Finland and Sweden of the High Coast/Kvarken Archipelago, although in comparison to it, it appears to be a bit more active. On its Instagram account, there are 1301 followers, 10,860 likes, 787 views, and 117 posts with 255 comments in the research period (April–May 2020). There have been no Instagram stories produced and published. Occasionally, there is a response to the followers' comments, although, at first, interaction seems to be welcomed as all three (3) buttons that facilitate it (follow; send a message; send email) are available. The metadata used in the posts created

by the account holder include emoticons, geoinformation with regard to the country, the region, and the place, hashtags (#), with an average of seven to eight hashtags per post, and tags (@), with maximum of one tag, if any, per post. Additionally, there is no significant network of relationships and interlinkages cultivated as the account follows only 234 other Instagram members.

Table 5. Instagram profiles of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe, according to the top 10 most popular posts (number of likes). Own elaboration by authors.

Instagram profile (Top 10 Most Popular Posts, According to Likes)	High Coast/Kvarken Archipelago (Transboundary Property: Finland, Sweden)	Wadden Sea (Transboundary Property: Denmark, Germany, Netherlands)	Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems (France)	West Norwegian Fjords— Geirangerfjord and Nærøyfjord (Norway)
photos	average 2 per post	average 1 per post	average 1 per post	average 1 per post
marine heritage type	nature/landscape heritage, or mixed (nature and culture) heritage	nature/landscape heritage	nature/landscape heritage	nature/landscape heritage
videos	0	0	average 1 per post	0
words/text	average 28–29 words	average 22–23 words	average 14–15 words	average 16 words
frames	yes, styles of expression	yes, styles of expression	yes, styles of expression	yes, styles of expression
rhetoric	hopeful/optimistic	hopeful/optimistic	hopeful/optimistic	hopeful/optimistic
critique	positive/normative	positive/normative	positive/normative	positive/normative
generation	current generation references/present/now	current generation references/present/now	current generation references/present/now	current generation references/present/now
emoticons	no	some	no	yes
geoinformation	no	some: country, region, city, and place	no	yes: country, region, place, and landscape
hashtags	average 10 per post relating to country, region, place, activity/action message, the message is like a statement	average 3 per post relating to place, feelings, message revealing mindset	average 3 per post relating to country, region, place, activity/action message, the message is like a statement	average 8 per post relating to country, place, activity/action message, the message is like a statement
tags	0 per post	average 13 per post	average 16–17 per post	average 1 per post
comments	generation of 1 comment that might include emoticons and an average of 1 tag	generation of 50 comments with an average of 8 hashtags, 13 tags and 38 likes	generation of 3–4 comments that might include emoticons and an average of 1 tag	generation of 2–3 comments that might include emoticons and an average of 1 tag
responses	no reaction or reply to the comments generated	average 61 replies to the comments generated	almost no reaction or reply to the comments generated	max 1 reaction or reply to the comments generated

In a more qualitative analysis of the top 10 most popular posts of the account in the research period, as Table 5 shows, it is observed that the posts are supported only by photos (a maximum of one photo, if any, per post) that reveal the site's nature as a nature/landscape heritage site, there are no videos at all, the text has an average of 22–23 words, and its style and expression is framed mostly as positive/normative critique, and hopeful/optimistic rhetoric. There are references to current generation/present/now, and there are some emoticons or geoinformation used, particularly related to the country,

region, city, and place. They are accompanied by an average of three hashtags per post relating to place and feelings, a message revealing mindset, and almost no tags per post. Every post of the top 10 most popular ones of the account in the research period generates an average of 50 comments, that might include emoticons, and an average of eight hashtags and 13 tags, an average of 38 likes, and it has an interaction and exchange of comments with an average of 61 replies per post.

Therefore, it can be concluded that this particular site not only does not have a significant social media footprint, but it also appears to the public simply as a nature/landscape heritage site. Its digital narrative footprint states positivity and hope, yet it does not relate to multimodal knowledge, engagement and participation, ocean literacy, and sustainability. Therefore, it does not build solid marine knowledge with a sustainable view. However, it enhances the unity of the world marine heritage site, and it comes forward as "one voice" geographically and not geo-socially. Therefore, responding in part to *RQ3:* "Can Europe's UNESCO MWH protected areas and sites be interlinked in a unified nature-human ecosystems frame, viewing nature and people as an undifferentiated whole, and be promoted and communicated in "one voice" (the blue digital narrative footprint), highlighting their sustainable and biocultural value (sustainability and biocultural framework)?", it is apparent that "one voice" is framed and communicated in terms of property rights of the MWH and not of its sustainable and biocultural value.

The Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems (France) marine heritage site, as Table 4 shows, has a significant digital social media footprint. Its Instagram account has 40,600 followers, 1,465,261 likes, 31,564 views, and 2625 posts with 16,985 comments in the research period (April–May 2020). There were limited Instagram stories produced and published (five in total), and there were rarely responses to the comments of the followers, at first, although interaction seems to be welcomed, as two (2) buttons facilitating it (follow; send a message; no "send email") are there. The metadata used in the posts created by the account holder include emoticons, geoinformation with regard to the region and the place, hashtags (#), with an average of 15 hashtags per post, and tags (@), with an average of one (1) tag per post. Yet, there is a minimal network of relationships and interlinkages cultivated as the account follows only 415 other Instagram members.

In a more qualitative analysis of the top 10 most popular posts of the account for the research period, as Table 5 shows, it is observed that the posts are supported by both photos (an average of one photo per post) that reveal the site's nature as only a nature/landscape heritage and videos (an average of one video per post), the text has an average of 14–15 words, and its style and expression is framed mostly as positive/normative critique, and hopeful/optimistic rhetoric, there are references to current generation/present/now, there are emoticons and geoinformation used, and they are accompanied by an average of three (3) hashtags per post relating to the country, region, place, and activity/action message, the message is like a statement, and there are 16–17 tags per post. Every post of the top 10 most popular ones of the account in the research period generates three to four comments, including emoticons and a tag, and they almost never get any reaction or reply from the account holder.

Therefore, in the end, it is observed that this particular site, although it does have a significant social media footprint, appears to the public only as a nature/landscape heritage site with a digital narrative footprint stating "positivity" and "hope", instead of constructing a narrative that relates and amplifies multimodal knowledge, engagement and participation, ocean literacy, and sustainability, building solid marine understanding with a sustainable view.

The West Norwegian Fjords—Geirangerfjord and Nærøyfjord (Norway) marine heritage site, as Table 4 shows, does have a significant digital social media footprint. Its Instagram account had 68,300 followers, 863,583 likes, 607,800 views, and 1253 posts with 13,128 comments in the research period (April–May 2020). There were a few Instagram stories produced and published (50 in total). There is very rarely a response to the followers'

comments, although, at first, interaction seems to be welcomed, as all three (3) buttons facilitating it (follow; send a message; send email) are there. The metadata used in the posts created by the account holder include emoticons, geoinformation with regard to the region, the city, and the place, hashtags (#), with an average of seven to eight hashtags per post, and tags (@), with an average of one (1) tag per post. Yet, although there is an evident attempt to create a network of relationships and interlinkages, there is not a significant one cultivated as the account follows only 1714 other Instagram members.

In a more qualitative analysis of the top 10 most popular posts of the account in the research period, as Table 5 shows, it is observed that the posts are supported only by photos (an average of one photo per post) that reveal the site's nature mainly as a nature/landscape heritage. There are no videos at all, the text has an average of 16 words, and its style and expression is framed mostly as positive/normative critique, and hopeful/optimistic rhetoric, and there are references to current generation/present/now, emoticons and geoinformation are used, particularly related to the country, region, place, and landscape, and they are accompanied by an average of eight hashtags per post relating to country, place, and activity/action message, the message is like a statement, and there is one tag per post. Every post of the top 10 most popular ones of the account in the research period generates two to three comments, that might include emoticons and a tag, which get only the maximum of one reaction or reply from the account holder.

Thus, in the end, it is observed that this particular site, although it has a significant social media footprint, appears to the public simply as a nature/landscape heritage site. Its digital narrative footprint states positivity and hope, but does not relate to multimodal knowledge, engagement and participation, ocean literacy, and sustainability and, therefore, does not build solid marine knowledge with a sustainable view.

Through a bird's eye view, the salient features of the social media and Instagram profile of each one of the researched UNESCO MWH of OUV protected areas and sites of Europe are as represented in Figure 8.

Figure 8. Salient features of Instagram profiles of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe.

Summing up and responding to RQ1, it can be argued that the mosaic of the digital communication profile of the UNESCO MWH of OUV protected areas and sites of Europe is fragmented; each one is pulling in different paths. Although they are of universal value and of common importance for humanity, this is not also the case for their management and communication; no common lines or even principles can be identified strategically, managerially, or communicatively. Instead, they present themselves to the public and the digital and social media environment (whenever they do), in a scattered manner, detached from the core universal values they represent. They do not integrate elements of informativity, diversity, dynamicity, and interactivity that relate to the big data and semantic web era. Further, they do not integrate the key sustainability dimensions, let alone facilitate the interlinkage of authenticity and genuineness, values, community, and the public [39,44,45]. Therefore, they do not constitute "an instrument for all societies' sustainable development" [42].

5.2. Europe's UNESCO Marine World Heritage (MWH) and the Nature-Human Frame

Regarding *RQ2*: "Is MWH framed through a unified, joined-up approach for culture, heritage, landscape and systems, and sustainable livelihoods?", it is made evident from the research findings, as Figure 9 shows, that the only element that unifies the MWH sites is their nature and the physical environment and landscape heritage (71%).
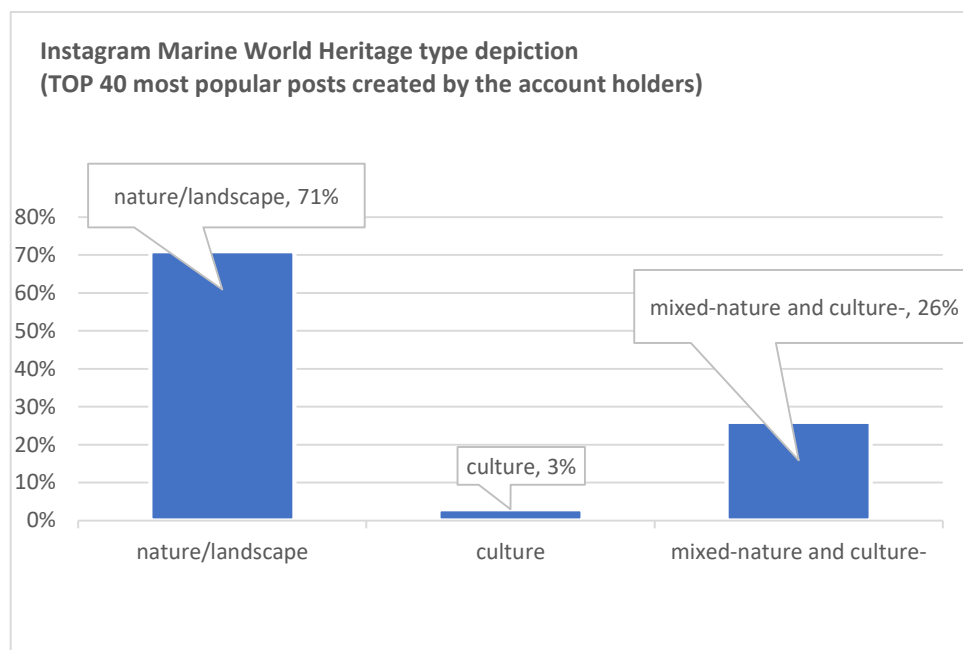

Instagram Marine World Heritage type depiction (TOP 40 most popular posts created by the account holders)

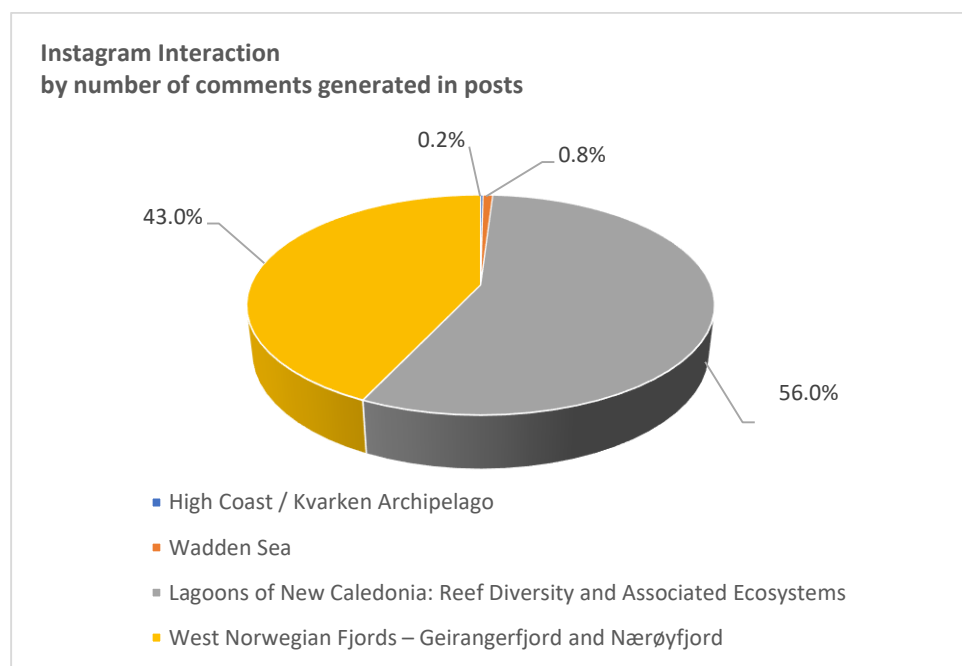**Figure 9.** Instagram marine world heritage (MWH) type depiction chart of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

This is not sufficient and satisfying according to the joined-up approach being looked for to promote MWH through a holistic approach that incorporates elements of culture, heritage, and sustainable livelihoods [55,63,64]. Therefore, no ecosystem-based management approach is activated. Still, there is no capitalizing of the benefits from cooperation, partnerships, open communication, engagement, and interconnectivity that the digital and social environments offer [3–12].

Moreover, in the era of big data and the semantic web, the strategic choice, as shown below in Figure 10, is the element of interactivity with the public that is rare. The technological and media potentials are not exploited since audiovisual articulations and stories are not used to support the heritage sites' posts.

From a managerial and communicative perspective, the purpose of having an official Instagram (and social media in general) account and profile for blue world heritage is to improve awareness, increase interest about it, and enhance its online visibility and findability (1148. Additionally, the nature and size of Instagram (and social media in general) serve to contain a significant volume of heritage information integrated into unique images, videos, hyperlinks, and text with reviews, so that the users/the public can engage with the content while generating real-time behavioral datasets with high velocity [122]. Therefore, the result of the previous strategic choice to have minimal interactivity (Figure 10) is to lose out on all this opportunity (a) of retrofitting their account in Instagram (and social media in general) to an online databank of quantitative and qualitative information, (b) of having user-generated content, and (c) of harnessing it by exploiting big data and semantic web approaches and methods that offer the potential to gather data with volume, velocity, and veracity. Consequently, this restricted interaction and the abundance of user-generated content and data analytics and insights lead to a

very limited potential to have metrics of interaction with heritage content. This leaves out not only metrics but also a chance to better understand the users/the public during the communication and interaction with social media technology and blue heritage [123]. Further, it does not allow the managers and communicators to cover their information needs [122] and to participatorily include them/it in the public communication of MWH and the cultivation of multimodal knowledge for blue heritage.

Figure 10. Instagram interaction chart of the researched UNESCO Marine World Heritage of Outstanding Universal Value (MWH of OUV) protected areas and sites of Europe. Own elaboration by authors.

It is also noteworthy that in the cases where the MWH site is the property of one country and not transboundary (e.g., Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems/France; West Norwegian Fjords—Geirangerfjord and Nærøyfjord/Norway), the locality and the centricity of the importance of the country owning it are salient as they choose to use hashtags that mention the country specifically, and enrich posts with hashtags that relate to the messages formulated, like statements as absolute truths. There are no hashtags revealing mindset, feelings, persons, or activity and actions. Therefore, the human element, which is so sought after and desired, is neglected [55,66–70]. The human-nature frame is not being incorporated. As a result, a shift of the route in the blue marine-scape, from discovery and being listed as a World Heritage site to engagement and expansion of meaning, including other social and ecological contexts, together with informativity, diversity, dynamicity, and interactivity, cannot be ascertained.

5.3. Europe's UNESCO Marine World Heritage (MWH), and the Sustainability and Biocultural Framework

Regarding *RQ3*: "Can Europe's UNESCO MWH protected areas and sites be interlinked in a unified nature-human ecosystems frame, viewing nature and people as an undifferentiated whole, and be promoted and communicated in "one voice" (the blue digital narrative footprint), highlighting their sustainable and biocultural value (sustainability and biocultural framework)?", the research findings reveal that the "positivity" and "hope" frame prevail in the sites' critique and rhetoric and that the narrative focus is only on the current generation/present/now. Viewing the latter realization in relation to management and communication, it can be argued that the strategic and forward thinking in the fore-

named approaches is exposed as poor and rather fragmented, rather than interlinking. Nature-human ecosystems and, therefore, the sustainability and biocultural framework, are not components of the conceptualization of UNESCO MWH of OUV protected areas and sites of Europe. This is apparent since there are no references to (a) memory, experience, local and indigenous knowledge, practices, living practices, and ontologies [8–12], or (b) knowledge, practices and values that reflect more modernized communities and not only those that adopt traditional lifestyles, or (c) outputs that rely on informativity, diversity, dynamicity, and interactivity, or (d) interactions that relate to different human groups living with biodiversity within different contexts (rural and urban areas) [13]. Thus, further, these components do not also constitute components of heritage management and communication. Having management and communication aims and plans stripped of a future orientation does not facilitate shifting the heritage management and communication towards sustainability and bioculture. Consequently, Europe's UNESCO MWH protected areas and sites are not brought into existence by a unified blue digital narrative having "one voice", viewing nature and people as an undifferentiated whole (biocultural heritage ecology). They do not exploit and capitalize on big data and semantic web opportunities. They cannot be digitally and socially produced and shared in a dialectic and participatory manner, enhancing sustainable heritage management and communication design and praxis.

6. Conclusions and Key Recommendations

The current research aimed to present how MWH is managed and communicated through social media. The paper has sketched the digital narrative footprint of the UNESCO MWH of OUV sites of Europe, on Instagram. With the digital and social media environment as a vehicle and the management and communication approaches as structural guidelines, the study revealed the strategic choices made by the main actors of heritage management and communication in the blue marine environment and for future generations. While this study has not exhausted the topic of whether heritage nowadays can be managed and communicated in a sustainable and biocultural manner, it definitely maps, felicitously and clearly, the picture that Europe's UNESCO MWH protected areas and sites are drawing for themselves and the public eye. A picture and public image that is, apparently, as suggested by the research findings, not in line with ecosystem-based management and communication [8–12]. It does not depict a digital "living" culture [93] and multimodal knowledge, capturing the "lifeworld" and the "voice" of marine heritage, as unified [89–95]. Consistent with the conclusions drawn by recent studies, although the tendencies are identified and the conceptual frameworks are offered to frame the heritage management and communication approaches in a joined-up manner, it is evident that the effort being made is lean. Despite the large volume of data, information, and users/human groups available on Instagram, the utilization of big data analytics for strategic managerial and communication schemas remains in its infancy [123]. UNESCO MWH protected areas and sites of Europe upload content to their official accounts on social media (Instagram), but not enough, and manage it, but not sufficiently in terms of big data, the semantic web, sustainability, and bioculture [6,7]. It should also be pointed out that further uploading, big data management insights, and collaboration are needed in order to lead to further collective intelligence, participation, and collective action for resilient future livelihoods [55,63,64,124].

The research raises important questions about the communication praxis for MWH and its blue digital narrative footprint. It would be fruitful to pursue further research about the public's point of view and the nature-human interlinkage in order to holistically map the conceptualization of marine heritage and its relationship to the public realm, futures literacy, and sustainable livelihoods. Furthermore, in the era of big data and the semantic web, the advancement of computer processing, and the development of sophisticated applications promising multimodal data collection (i.e., electroencephalography—EEG, eye movements, video, keystrokes and wristband data, 4D modeling and transforming

intangible cultural heritage and live expressions into tangible digital objects, the i-Treasures platform incorporating multisensory technology, relevance feedback algorithms, and multi-media content power) [18,19,79,107,122], it would be effective and prolific for leading actors of heritage management and communication to act and move towards the following paths:

- convey synergy from various sources with computational approaches,
- mine information-rich content and predictive analytics,
- utilize generated big data analytics so as to map the heritage–public interaction in a dynamic, nonsequential way.

Then, all this could be converted into actionable insights. Hence, they can be exploited to address challenges like management and communication decision making, strategic planning and performance evaluation, and developing well-informed strategies while adopting novel principles [123] and forward-thinking and incorporating societal and educational values. Moreover, exploiting big multimodal data analytics related to sentiment and emotion could facilitate designing meaningful experiences for the public. Further, it could enable creating strong relationships and trust and engage effectively in multimodal knowledge creation and preservation, and in public communication and resilience with regard to blue heritage.

In conclusion, blue world heritage has to be representative of the social desire to preserve and cross-link the blue heritage legacy in today's world with sustainability and bioculture. Moreover, blue heritage and public interaction traces must be captured and the key aspects and their dynamics must be identified for a broader transformative impact and sustainable biocultural heritage management and communication. In this way, the joint generation of understanding of the past and public appreciation in the present may be catalyzed and be decisive for local and global sustainability [122].

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