

Managing Tourism Flows on Mediterranean Islands with Social Media

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Abstract

The Biosphere Reserve Framework as well as the World Heritage Convention offer excellent opportunities to establish holistic GMS, balancing conservation and sustainable development. The two archipelagos Tuscan Island Biosphere Reserve as well as the Aeolian Islands World Heritage site have been studied by analysis of the social media platforms Instagram, TripAdvisor and Airbnb. The social media analysis conducted, reflects the attractiveness of natural and cultural heritage, the accessibility of the heritage, the visitor perception, the quantity and quality of hospitality businesses and services, visitors distribution and flows in the area, as well as the effectiveness of the governance and management systems, especially with regard to the conservation and protection of cultural and natural assets. A visitor management is realized only in the strictly protected areas, in buffer and transition zones little tourism regulations can be recognized. The tourism development is partly out of control and the use of limited natural resources as well as negative impacts to the natural and cultural heritage are increasing. At present, the management plans of the two archipelagos submitted to the authorities have not yet been approved nor implemented since they must adhere to the endless procedures and bureaucracies required.

Keywords: Social media, island tourism, visitor management, World Heritage site, Biosphere Reserve

1.1 Introduction

Social media and ICT are greatly influencing today's visitor behavior. The role of visual and social media in destination marketing has gained enormous influence on traveler behavior in just one decade. Tourist destinations are increasingly seeking to attract visitors using ICT tools, commercial internet platforms and social media. The combination of visual media (television, movies, short films or music clips on YouTube) and social media presence can boost little or unknown sites periodically or seasonally in short term. Until recent times, the main drivers of a steadily growing tourism sector were improved access with public and private transportation, enhanced hospitality business and services, and decreasing travel costs. Today communication and marketing tools, such as word of mouth, newspapers, glossy travel journals and especially cinema, television and for at least one decade social media like Facebook, Instagram, Twitter, TripAdvisor, Airbnb, Expedia. Social Media paired with good accessibility leads quickly to so-called 'Hit and run tourism', resulting in overtourism, without adding substantial revenues [1].

This development results in uncontrolled and unforeseeable tourism flows, especially in vulnerable ecosystems or cultural sites with often insufficient or no tourism infrastructure and business. Especially numerous overtourism heritage sites permanently or periodically exceed their Carrying Capacity and show impacts from fast

growing visitor numbers. Therefore, such booming visitors flow result in negative impacts to natural and cultural heritage, local economy and population. However, Carrying Capacity has to be considered in relation to the infrastructure, the capacities and the vulnerability of the sites. It refers to the number of individuals a given area can bear within natural and cultural heritage resource limits and without degrading the natural, social, cultural and economic environment for present and future generations. The United Nations World Tourism Organization (UNWTO) is furthermore underlining that the number of visitors should not cause unacceptable decrease in visitor satisfaction [2].

The presence in social media and commercial travel platforms of key tourism spots of selected destinations in World Heritage sites in Switzerland and Italy, such as the Dolomites and Venice, Swiss Alps Jungfrau-Aletsch and Rhaetian Railway were analyzed in 2019 - 2020. Furthermore small destinations endangered by overtourism such as the Verzasca valley in Switzerland, Trolltunga in Norway, and Scala dei Turchi in Sicily, Italy have been studied [3]. Social media analysis show the effectiveness of visitor management strategies. Numbers of hashtags, posts, and reviews are excellent indicators and tools to visualize over- and under-tourism destinations in large areas. Due to the continuously changing numbers of hashtags and posts within hashtags, short term visitor flows can be observed. Social media presence is a cost-effective indicator to monitor and forecast tourism developments [4].

1.2 Social Media and Travel Platforms

Tourist destinations increasingly engage to attract visitors using ICT tools, commercial internet platforms and social media. They offer great opportunities to create expectations and flexibility, to understand the traveler's perception, and to reduce uncertainty. In just one decade, such communication tools and platforms have become the most important features Destination Marketing Organizations (DMO) consider when creating their destination strategy. In tourism marketing the outside view of travelers is decisive. Especially young tourists have more trust in other travelers' opinions using social media rather than official marketing advice [5]. When scrolling through Instagram feeds, travelers look to see how 'Instagrammable' the destination is, which nowadays is decisive of their decision-making. Instagrammable means "a picture which is worth posting on Instagram" [6]. Therefore eye-catching and attractive posts of colorful landscapes, wild nature, cultural heritage or an impressive city scape is worth sharing with friends and the public.

The content of the platforms is user-generated and public - using hashtags on Instagram, providing reviews on TripAdvisor or owner-visitor interactions on Airbnb. Instagram, TripAdvisor and increasingly Airbnb are obtaining leading roles as interactive travel platforms. Instagram is an open source for visual visitors' experience, instead TripAdvisor and Airbnb are commercial providers, offering travel information and products by private business or public.

Instagram has been operating since October 2010 and enables its users to share pictures or stories, hence more than 70% of the content of the web platform is travel-related. TripAdvisor was launched in 2000 as travel guide and platform for tourism related business. Since the introduction of "add your own review", TripAdvisor has advanced to the world's largest travel platform and social network, enabling users to share their

experiences by posting travel-related content on their own ‘Activity Feeds’, creating a two-way communication [7]. TripAdvisor relates to the reviews on accommodations, restaurants and local attractions and thus narrows the users circle in contrast to Instagram.

Airbnb acts as broker and online marketplace, launched as web platform “AirBedandBreakfast.com” in August 2008, offering one-of-a-kind activities hosted by locals. The online marketplace is today in competition with the traditional hospitality industry and facilitates not only accommodation but also adventures, experiences, restaurants. Hosts and guests have the ability to interact, to post reviews about their experiences and to chat through a secure messaging system.

ICT tools, enhanced visual communication and interactive social media are increasingly determinant for the tourism development. Visual communication encourages emotions, coming from travelers’ past experiences or those they expect to be part of, and are drivers of the travel decision-making process. Communication has more and more a key role motivating and inspiring, and supporting well-known as well as unknown and badly developed destinations. Its influence causes positive and negative impacts, especially in fragile natural and cultural heritage sites. Unforeseen and exponential growth of tourist flow results progressively in negative impacts on natural and cultural assets in a short period.

1.3 ICT and Social Media in Heritage Destinations Management

Social media communication is especially useful for under-tourism destinations with the need for enhanced tourism development. Without, destinations are running a risk of not reaching their audience and tourism segments. It is crucial to reach the target groups to interact with this audience properly. It is important to design and offer products according to the visitors destinations want to attract (localization, customization).

Overtourism instead is seen as a dramatic scenario of high visitor numbers, endangering extraordinary heritage sites and tourism destinations [8]. However, mass tourism is directly linked to overcapacity in tourism business and infrastructure, and the vulnerability of the sites. Simultaneously the quality of visitor experiences should be guaranteed and the benefit of local population assured. Visiting communities, groups and individuals (CGIs) should have positive effects on the well-being of people, both residents and visitors and thus foster social cohesion [9]. Heritage sites frequently face visitor flows exceeding the Carrying Capacity, attracting far more visitors they can bear. Tourism Carrying Capacity refers to the number of individuals a given area can support within natural and cultural heritage resource limits and without degrading the natural, social, cultural and economic environment for present and future generations [3]. In large natural heritage sites or heritage cities, Carrying Capacity may differ locally - some places might be overloaded while others may need tourism enhancement. Negative impacts have to be avoided, by regulating “hit and run” tourism, or to better balance visits geographically. Overtourism needs to be prevented at an early stage to reduce pressure on heritage, and adequate tourist flow management measures defined.

Social media and ICT applications will have significant roles in new destination models, supporting the distribution of tourist flows, balancing overloaded and less visited areas and to promote a responsible, sustainable tourism. ICT tools, their

applications and social media could be used more frequently and effectively to manage both. They provide tools to lower impact on heritage and to increase the visitor's experience simultaneously. They will foster communication and disseminate information among local actors and stakeholders, increase awareness regarding heritage values and respect towards residents, and influence tourist behavior. ICT tools may include online platforms for information exchange among actors, smartphone applications or GPS-based and GIS systems for tracking tourism movements and simultaneously informing visitors about limits, obstacles and alternatives before and during their visits. Information regarding crowded places, best visiting hours, availability of parking spaces, closure of restaurants and hotels, or other obstacles can be disseminated on the spot with ICT applications. Considering that 85% of leisure travelers decide about activities, itineraries and the tourism spots to be visited after arriving at the destination [10], it is likely that many travelers will adapt their travel to the circumstances at the place and time.

Social media analyses show the traveler's perception and are effective instruments to balance over- and under-tourism. The number of hashtags, posts, and reviews are excellent indicators and tools to visualize tourism development. Observing social media presence is fast and cost-effective, and therefore ideal instrument to monitor and forecast tourism developments [4]. ICTs - in particular, mobile technologies - are significant forms of assistance to World Heritage sites' managers in promoting responsible and sustainable tourism. More and more travelers will exclusively use smartphones and applications together with social media sources in all the phases of their travel experience: pre-trip, on-trip and post-trip. Visualization of travel destinations will increasingly determine the travel behavior and visually oriented travel planning applications will help to choose the most attractive or 'Instagrammable' places for the trips [11].

Benefit of Social Media and ICT in Tourism Development

- raise awareness regarding heritage values and respect towards residents
- improve education and behavior of tourists visiting a heritage site
- promote alternative visits or events in periods of high pressure
- increase communication among local actors and stakeholders from conservation and tourism
- provide ICT platforms and community WIFI networks to facilitate the interaction among indigenous people, actors, visitors and destination management

1.4 New Paradigms and Governance Models for Tourism Destinations

Tourism growth results from transformation of travelling due to increasing business and leisure travels, new mobility and travel behavior (e.g. cruise travel, low cost flights, fast trains). Over- and under-tourism consequently reflect human ambiguity between quantity and quality in tourism. Optimizing, respecting limits of tourism related business and creating benefit for local people will be key, instead of increasing infrastructure and services, attracting even more tourists and boosting revenues of investors. Recent studies show the consequences of single sites getting exponentially

more visibility and attraction, often without having adequate hospitality infrastructures available [3].

Measures to balance over and under tourism and to foster quality tourism in stewardship destinations have to be related to governance and management of heritage sites [12]. In a Webinar of the George Washington University on overtourism with Jonathan Tourtellot the following recommendations were summarized:

- Recognize the tipping point: More is not always better. Define maximum capacity and monitor social media to determine traveler hot lists.
- Plan ahead: Make tourism part of comprehensive urban, regional and destination planning.
- Stay flexible and adaptable: What works for historic sites does not necessarily work for beach destinations. Needs differ and change over time.
- Rethink good governance and management: DMOs have a vital role to play and need to participate in the sustainable management of destinations.
- Redirect visitors: travel smarter, seek out hidden gems and contribute to the protection of the places.

Heritage tourism strategies seek to bridge the “destination management perception gap” and create new paradigms, introducing a “stewardship approach” [13]. The targets have to focus on optimizing tourism, not maximizing it. Responsible tourism means to conserve and protect tangible and intangible heritage and avoid negative impacts instead of increasing infrastructure and business attracting even more tourists and boost revenues of investors [14]. New place based governance and management systems should be introduced. UNWTO published in 2019 the “Guidelines for Institutional Strengthening of Destination Management Organizations (DMOs)” to facilitate the change processes of destinations with regard to the future challenges of tourism [15].

Changed tourism paradigms for heritage destinations have to respect local evidences and involve all actors in co-developing and co-deciding, thus leading to the creation of a corporate and positive image of destinations. A “heritage stewardship destination” model, focusing on quality tourism which creates benefits for local people and visitors, offers opportunities to jointly engage in the conservation of their heritage, to improve their own living standards and experiences, and to share equally costs and benefits. UNWTO elaborated strategic frameworks to better use culture tourism synergies and to fight overtourism, and to improve travel experiences and hospitality in tourism destinations [16]. Measures to improve visitor management will be of little effect if they are not part of an integrated tourism strategy including social media. ICT and social media will be driver to boost tourism, but also take a decisive role in the paradigm change, supporting destination concepts focused on local evidences and challenges as well as guaranteeing quality instead of quantity. They may help to review and adapt regulations and to set monitoring and response measures.

2 Social Media Analysis

The study was conducted in the period from April 7–24, 2020 in the Tuscan Islands Archipelago and from May 6–18, 2020 in the Aeolian Islands Archipelago. Lists of key tourism spots were created – one for each archipelago. They were used to examine the

archipelagos' presence on social media – on Instagram, TripAdvisor, and Airbnb. Two languages have been considered in the study: Italian, as the language of the two archipelagos, and English. Structural differences between analyzed platforms require different approaches to the analysis of their contents.

The list contains:

- Tuscan Islands Archipelago: Total 86: 16 islands, islets, and skerries, 18 municipalities within, 52 tourist spots
- Aeolian Islands Archipelago: Total 93: 13 islands, islets, and skerries, 11 municipalities, 69 tourist spots

Two islands with the highest presence on social media have been compared in detail - Elba and Lipari:

- Elba: 8 municipalities and 18 tourist spots
- Lipari: 1 municipality, divided into six places and 11 tourist spots

2.1 Instagram Analysis

The Instagram analysis with its hashtags provide insights into the number of posts within each tourist spot, island, and municipality listed. Totally 179 hashtags were analyzed: Tuscan Islands 86, Aeolian Islands 93.

Of all spot-related hashtags, only those containing the highest number of posts have been sampled, and Spots without hashtags were extracted. This is to prevent duplicate values since User Generated Content (UGC) shared on Instagram often contains more than one hashtag related to the same spot – e.g. #MonteCapanne (8.174 posts) and #MonteCapanne1049m (220 posts). Sampling aims to deliver data without the multiple meanings – i.e. data referring only to the analyzed spots. Multiple-meaning posts are posts related to a place located in another locality, e.g. the hashtag Monte Saraceno in Vulcano relates mostly to the mountain in Puglia with the same name.

The total number of spot-related posts used for visualization, results after extracting the percentage of multiple meaning from the total number of the post's hashtags. The maps of the two archipelagos and of the islands with highest population and tourism activities, Elba and Lipari, serve to visualize the results, created with the ArcGIS software (Figures 3, 5, 7, 8).

2.2 TripAdvisor Analysis

The TripAdvisor analysis aimed to provide insights into the number of reviews related to each tourist spot on the lists and to examine the number of reviews which relates to tourist facilities within islands and municipalities. The facilities were divided into two groups: attractions (sights and landmarks, nature and parks, museums) and businesses (restaurants, hotels, vacation rentals, tours).

After the examination of the spots with or without reviews, the total number of reviews is calculated. Tourist spots have been grouped to geographical areas and visualized on maps (Figures 4, 6, 7, 8). The data used for the visualization is the total number of reviews of all tourist facilities (attractions and businesses).

2.3 Airbnb Analysis

On the Airbnb platform, both guests and hosts are encouraged to write reviews and opinions. However, only guests' reviews have been examined. It intends to provide insights into the relation between the frequency of rentals and reviews per lodging rental. The analysis aimed to examine the culture of communication of tourist segments within each of the two archipelagos.

The Airbnb analysis relates to the municipalities of the islands. First, the total number of lodging rentals within each municipality were calculated and places without Airbnb rentals extracted. Among the lodging rentals, some showed higher presence – i.e. higher number of reviews – and others were without reviews. The total number of reviews listed, includes all reviews.

3 The study areas in the Ligurian Sea

The Italian "Framework Law on Protected Natural Areas" no. 394/1991 (Italy 1991) outlines the fundamental principles for the establishment and management of protected areas regarding their mission, classification and governance. It also defines the legislation for national and regional protected natural areas. The Law 426/1998 establishes the public-law personality of the Park Authority, legal and administrative offices in the territory and is subject to the supervision of the Ministry of Environment and Protection of the Land and Sea (MATTM). With regard to Regional Parks, the Law 394/1991 establishes fundamental principles through framework rules for the Regions, attributing to local authorities relevant roles and functions, such as the participation of Provinces, Mountain Communities and Municipalities to the procedures for the establishment of protected areas [17].

3.1 Tuscan Islands Biosphere Reserve

The Tuscan Islands Biosphere Reserve, endorsed in 2003 and extended in 2015, overlaps with the Tuscan Archipelago National Park established in 1996, with 79.160 hectares the largest marine park in Europe (Fig. 1). The National Park corresponds to IUCN category II PAs, which are "large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities" 18 . The BR covers an area of 1.079.540 hectares, composed of seven main islands and is characterized by its high natural value, as well as by intensive tourism activities. The protection of its core areas is guaranteed by the National Park. The coexistence of priorities conservation and tourism generate an exceptional opportunity to study the influence of governance and management of the islands to local development. The Tuscan Archipelago belongs administratively to the provinces of Livorno and Grosseto with a population of about 34.000 inhabitants. The recent increase of tourism has generated enormous pressure on the natural environment for instance on the Elba Island where the presence of over 30.000 permanent residents increases up to 200.000 people on a typical summer day [19].

Table 1: Tuscan islands and their characteristics, places and tourism hot spots

Island	Places	Cultural Heritage /Hot spots	Characteristics
Gorgona Municipality: Livorno		Chiesa di San Gorgonio Villa Margherita Torre Vecchia pisana Torre Nova medicea Cala dello Scalo	Surface: 2,23 km ² , Tourism limited to guided visits: 75 visitors per day for 4 days a week
Capraia Municipality: Capraia		Lo Stagnone Torre dello Zenobito Cala Rossa Monte Castello Monte Arpagna	Surface: 20 km ² Inhabitants: 120
Elba 8 Municipi- palities which correspond to the localities	Portoferraio Porto Azzurro Capoliveri Campo nell'Elba Marciana Marciana Marina Rio Elba Rio Marina	Lacona Monte Capanne Monte Orello Cima del Monte Punta Nera Capo Pero Eremo di Santa Caterina Orto dei Semplici Castello del Volterraio Santuario delle farfalle Villa della Linguella Museo di Napoleone Villa dei Mulini Villa San Martino Fortezza San Giacomo di Longone Santuario della Madonna del Monserrato Sassi Ritti, Menhire Spiaggia Barbarossa	Surface: 223,5 km ² Inhabitants: 32.000
Pianosa Municipality: Campo nell'Elba		Bagni di Agrippa Catacombe di Pianosa Isolotto della Scola La Scarpa Punta del Marchese Forte Teglia Mura del Porto Palazzo della Specola	Former security prison Island completely protected Surface: 10,2 km ² Limited guided visits
Montecristo Municipality: Portoferraio		Villa Reale Grotta di San Mamiliano Monte della Fortezza Ruins of the monastery San Mimiliano Villa George Watson Taylor	Island completely protected Surface: 10 km ² , Population: Not inhabited Guided visits: limited to 1000 visitors/year
Giglio Municipality: Giglio	Giglio Porto Giglio Castello Giglio Campese Arenella Villaggio Grotte	Rocca pisana a Giglio Castello al Giglio Medici Torre Fortezza Aldobrandeschi	Surface: 21,21 km ² Inhabitants: 1420

Giannutri Municipality: Giglio	Punta Secca Punta del Capel Rosso Poggio Capel Rosso Poggio del cannone Monte Mario	Villa Romana Faro di Capel Rosso Porto Romano Monte Adami Cala dello Spalmatoio Cala Maestra Cala dei Grottoni	Public access only in the summer season Surface: 2,60 km ² Inhabitants: 10
9 small islands and skerries	Palmaiola Cerboli Scoglietto di Portoferraio	Formiche di Montecristo Formiche di Capraia, Formiche di Palmaiola Formiche della Zanca Formiche di Grosseto Scoglio d' Africa	uninhabited

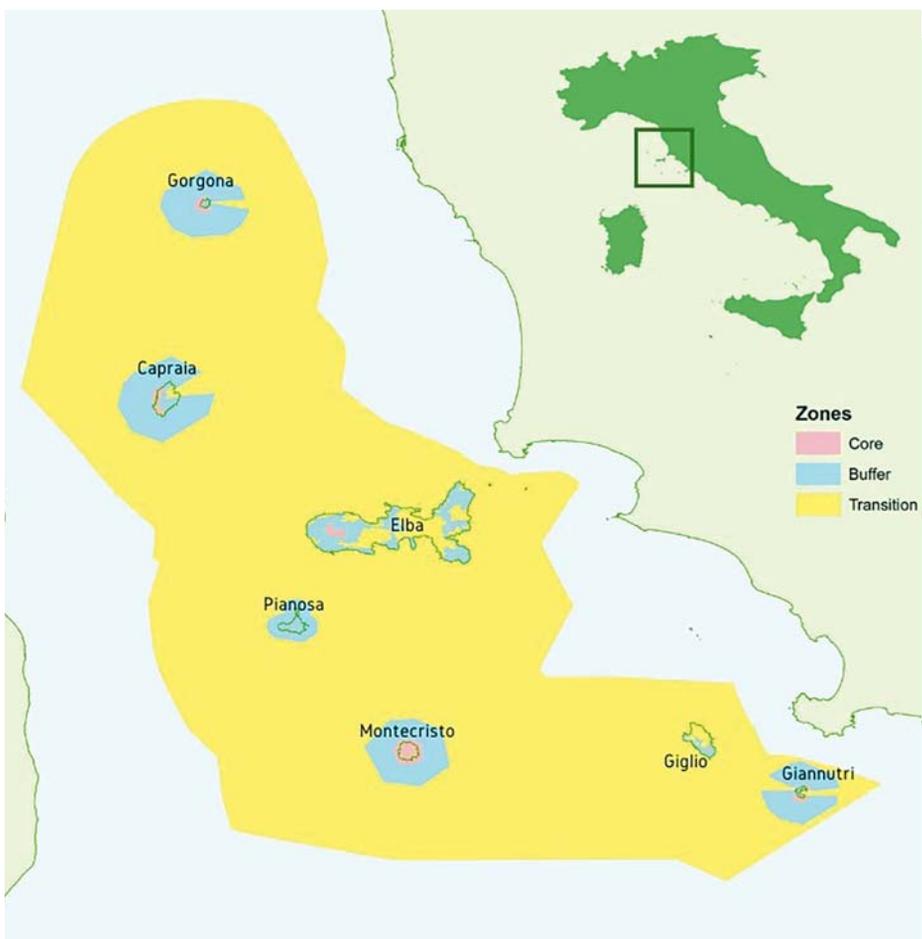


Fig. 1: Zonation of the marine and terrestrial zones of the Tuscan Islands Biosphere Reserve (Source: Riserva della Biosfera Isole di Toscana [20]).

The President, the Governing Council, the Executive Committee, the Board of Auditors, and the Park Community constitute the governing and management bodies of the National Park. The Director is responsible for the management of the Park and consequently for the BR. The Park Community is an advisory body constituting the interface with the local communities and includes the President of the Tuscan Region, the chairmen of the provinces of Livorno and Grosseto and the mayors of the 11 municipalities of the Park. It articulates its opinion on the fundamental acts of the Park plan, the regulations, and the budgets. The participation process is required by the mentioned Framework Law and is ensured by the Park Community but there are no legal provisions for direct citizen involvement because the members of the Park Community are representatives of the local bodies and not citizens. A study of the Italian legal framework shows that it is very specific and rigid regarding who can legally participate [21]. The participatory process encompasses the involvement of local actors in evaluating the impacts produced by the Park's activities, the engagement of municipal, provincial and regional councils with the necessary elements of knowledge to set up and verify the policies of protection and development of the territory and a structured dialogue with economic operators for co-design of itineraries and tourist packages [17].

A management plan for the BR was elaborated in 2015 but it has not yet been approved [22]. According to this document, the GMS will include: (i) Coordinator (President of the Park), (ii) Management Committee composed by representatives of research institutions, associations and other authorities; (iii) MaB Office composed by personnel of the Park and professionals, organizing the MaB participatory workshops aimed at enhancing the participation of local communities in the BR management; (iv) Permanent Consultative Assembly composed by the President of the Park, the representatives of the 11 municipalities, the State Forestry Corps and Port authorities which has to ensure the participation and involvement of local authorities, and approve and monitor the effectiveness of the program management. The BR budget is part of the Park budget, financed mainly by the MATTM. In 2015, the Park budget was 4.9 million Euros (State 94%, Region and other public bodies 0.19%, own revenue 4.6%, other funds 1.2%) [23].

3.2 Aeolian Islands World Heritage Site

The archipelago of Aeolian Islands, located in the low Tyrrhenian Sea in the north of the north eastern coast of Sicily, is made up of seven islands (Lipari, Vulcano, Salina, Stromboli, Filicudi, Alicudi and Panarea), all of volcanic nature, five islets (Basiluzzo, Dattilo, Lisca Nera, Bottaio and Lisca Bianca) near Panarea, and many seamounts. It is administrated by the province of Messina and is divided into the municipalities of Malfa, S. Marina Salina and Leni in Salina, and Lipari, which include all the other islands. From the sixties, the Aeolian Islands economy passed from activities linked to fishing, agriculture and mining extraction, to a set of tourist activities by developing a tourism destination of national and international dimension. Since, the archipelago has become a popular tourist destination and attracts up to 300.000 visitors annually, whereas around two third in summer and one third in fall and spring [24].



Fig. 2. The Aeolian Islands in the low Tyrrhenian Sea, north of the north eastern coast of Sicily. Copyright © 2020 Esri and its licensors [31].

The “Lipari Reserve”, created in 1966 and the “Landscape protection” decree for Salina from 1979 launched the nature and landscape protection programs encompassing all islands. In 1991, the Sicilian Regional Authorities designated the islands Alicudi, Filicudi, Panarea and Stromboli as natural reserves. In 1998 a heritage management consortium was founded by the municipalities Lipari and Salina [25].

Table 2: Aeolian Islands, their characteristics, places and tourism spots (natural and cultural heritage (sources Province Messina [26] [27]). The islands belong mainly to the Municipality of Lipari, Salina counts three Municipalities: Malfa, Leni, Santa Marina Salina

Islands	Places	Tourism spots/Cultural Heritage	Description
Lipari	Acquacalda Quattropiani Pianoconte Canneto Lipari Monte Gallina Spiaggia Valle Muria Belvedere Quattrocchi Porticello Terme di San Calogero San Salvatore	Capo Milazzese Chiesa di San Pietro Museo Archeologico Regionale Eoliano Chiesa Vecchia di Quattropiano Ex Cave Pomice Cattedrale di San Bartolomeo Belvedere Quattrocchi Castello di Lipari Chiesa di Maria Santissima della Purità Chiesa di Maria Santissima della Purità Cave di Caolino Punta della Crapazza Foglia Vecchia	Surface: 37,29 km ² Inhabitants: ca. 10.700 Conservation area: 16, 6 % (ca 6 km ²). Municipality: 12.821 inhabitants per 31/12/2018 WH property: Core zone: 12km ² Buffer zone: 3,8 km ²

Stromboli	Ficogrande Ginostra Piscità San Vincenzo San Bartolo Stromboli Punta dell'Omo Punta Lena Punta dei Corvi Pertuso	Scari Ciminiera Chiesa di San Vincenzo Ferrerri Calcara Scalo dei Balordi San Bartolomeo Grotta d'Eolo Pizzo sopra la Fossa Punta dei Corvi Pertuso Punta Lena Stromboli volcano Forgia Vecchia	Stromboli is actually the most active volcano Surface: 12,2 km ² Inhabitants: 400 Conservation area: 19% (ca 2,3 km ²) WH property: Core zone: 7,2 km ² Buffer zone: 3,3 km ²
Panarea	Ditella Panarea San Pietro	Cala Junco Capo Milazzese Chiesa di San Pietro Cala degli Zimmari Villaggio preistorico Punta Corvo Spiaggia della Calcara	Surface: 3,4 km ² Inhabitants: 240 Conservation area: 25% (0,8 km ²) WH property: Core zone: 1,5 km ² Buffer zone: 1,3 km ²
Salina M: Malfa, Leni, Santa Marina Salina	Pollara Malfa Valdichiesa Leni Rinella Lingua Santa Marina Salina	Spiaggia di Pollara Punto panoramico semaforo di Pollara Palazzo Marchetti Villaggio preistorico di Portella Museo Eoliano Dell'Emigrazione Chiesa dell'Immacolata Monte Fossa delle Felci Area Balneabile di Pollara Centro Storico Marina Di Salina	Surface: 26,4 km ² Inhabitants: 2.300 Conservation area: 22,2% (ca 5,5 km ²). WH property (estimated): Core zone: 17 km ² Buffer zone: 8 km ²
Filicudi	Capo Graziano Punta Ariella	Capo Graziano Le Punte Chiesa Parrocchiale di San Giuseppe Serra di Rando Le Piramidi di Zucco Grande Riserva Naturale dell'Il Faraglione Siccagni Grotta del Bue Marino Costa dello Sciarato Solarium Lidalina Parco Archeologico di Filicudi Museo di Filicudi	Surface: 9,49 km ² Inhabitants: 250 Conservation area: 25% (2,3 km ²) Riserva Naturale Orientata: "Isola di Filicudi", WH property: Core zone: 5,6 km ² Buffer zone: 0,7 km ²

Alicudi		Chiesa di San Bartolo Filo dell'Arpa Chiesa del Carmine Pianicello Colle Alicudi Spiaggia Bazzina Scoglio Galera	Surface: 5,10 km ² Inhabitants: 100 Conservation area: 44,4% (circa 2,3 km ²) WH property: Core zone : 2,8 km ² Buffer zone : 0,9 km ²
Vulcano	Vulcano Porto Vulcano Piano Vulcanello	Scalata al Cratere Cratere di Vulcano Terme di Vulcano Spiaggia dell'Asino Capo Grillo Riserva Naturale Orientata Isola di Vulcano Monte Saraceno Piscina di Venere Valle dei Mostri	Surface: 20,87 km ² Inhabitants: 300 Conservation area: 14,7% (circa 4 km ²). Construction activities with negative impact on nature WH property: Core zone: 10 km ² Buffer zone: 3,5 km ²
Lisca Nera	Panarea forms with the tiny islands of Basiluzzo, Spinazzola, Isola Bianca, Dattilo, Bottaro, Lisca Nera and the boulders of Panarelli and Formiche, its own minuscule archipelago.		uninhabited WHS Core zone
Bottaro			Not inhabited Surface: 0,0073 km ² WHS Core zone
Isola di Basiluzzo			uninhabited Surface: 0,3 km ² WHS Core zone
Scoglio la Nave			uninhabited Surface: 4.200 m ² WHS Core zone
Isola di Lisca Bianca			uninhabited Surface: 0,0413 km ² WHS Core zone
Le Guglie Dattilo			uninhabited Surface: 0,0287 km ² WHS Core zone

At present, the Territorial Landscape Plan (Piano Territoriale Paesistico delle Isole Eolie P.T.P.) issued in 2001 ensures the protection of the archipelago of the Aeolian Islands. The Framework Program Agreement of the Isole Minori, initially stipulated in 1999, was signed by the Region Sicily and by the Ministries of Economy, of the Finance and Productive Activities on 31 March 2003. Its main purpose was the programming of a useful strategy to safeguard the nature, for the promotion of a sustainable development and the adaptation of the infrastructure of the Minor Islands system, according to the European Union directives.

The Aeolian Islands were recognized as a World Heritage site in 2000, with a surface area of 1216 ha assigning the islands Alicudi, Filicudi, the islets, skerries as well as the protected areas of the other islands to the core zone. The statement of outstanding universal value summarizes: "The islands' volcanic landforms represent classic features in the continuing study of volcanology world-wide. With their scientific study from at least the 18th Century, the islands have provided two of the types of eruptions (Vulcanian and Strombolian) to volcanology and geology textbooks and so have

featured prominently in the education of all geoscientists for over 200 years. They continue to provide a rich field for volcanological studies of on-going geological processes in the development of landforms” (Criterion viii).

The Expert mission in 2007 summarized the main impacts to the outstanding universal value of the islands, among them pumice-pit mining, construction of ports and hospitality infrastructures as well as tourism [28]. In 2008 the Sicilian region and all the municipalities of the Aeolian Archipelago approved the institution of a sole management entity identified in a public Consortium among municipalities by signing a formal protocol. In the Management Plan finalized and submitted to UNESCO in 2010, a governance and management body has been defined, involving the UNESCO Sicily Foundation – promoted by the Regional Department of Cultural Heritage and Environmental and Public Education and by the Italian National Commission for UNESCO – with the tasks, to enhance and promote Sicilian sites designated as World Heritage [29]. The WH site was intended to coincide with the National Park, to be established in 2007, which is declared responsible for the management and budget of the site. The destination marketing is coordinated by a local tourism system “STL-Eolie”.

The institution of the National Park of the Aeolian Islands is considered highly important and would solve the management problems, but up today nothing has been implemented. According to the WH Periodic Report issued in 2014 by the national and regional authorities, the management situation of the islands is very difficult due to the following obstacles [30]:

- The foreseen management body has not been constituted, no management of the WH property is visible and the Management plan has not been implemented
- Local communities have no influence in management decisions
- No budget, human resources, management equipment or facilities have been assigned for an effective management of the WH property
- There are no programmes dedicated to education, awareness raising or capacity development
- Professional support is not available and visitor management is not existing or poor
- The WH property does not deliver any economic benefits and little or no contacts with industries have been established
- No annual work or action plans exists and no monitoring is taking place
- Little or no information is available about the WHS

At present the managing body seems to exist only on paper and the Sicilian Regional Council of Environment and Territory is empowered to act as management body. The site is governed under the overlapping authorities of national, regional, provincial and municipal jurisdictions, including 20 governmental and non-governmental stakeholders responsible for different aspects of the property, but there is little or no coordination between them.

Further constraints were related to the pumice-pit mining, which was definitively suspended in 2007, and the excessive, uncontrolled tourism development. The tourist numbers vary considerably according to the source of information and the fact that the statistics are split according different administrative levels (Municipalities, Province) and thus difficult to separate for the single islands. However in the Management Plan

approximate figures for 2005 have been calculated [29]. The data lists 187 tourist accommodation facilities on the islands (45% on Lipari) with a total of 4.009 beds, of which 79% in hotels and 21% other accommodations. The official visitor numbers are indicated with almost 410.000 presences/year, of which 68% in summer season, 12% in spring and 19% in autumn, in winter tourists are almost absent. It is estimated that in the three summer months, additional 200.000 not registered visitors are present on the islands. On Lipari, the estimations for August 2003 are indicated with over 1 million visitors, among them 126.000 registered and 917.000 “hidden” visitors. The authors of the Management Plan worry about this alarming situation, since in the period with the highest frequencies, the effective numbers of visitors are almost 10 times higher than the official numbers of registered visitors, which is also due to boat and cruise ship tourists which did not appear in the statistics [29].

The status as a World Heritage Site was furthermore threatened by Italy's failure to prevent the building of 4 new harbors. However, the islands are currently still on the World Heritage List without establishing services and facilities to uphold the WH site integrity.

4 Presence of Tuscan and Aeolian Island's on Social Media

The Results of the Analysis are presented in the tables 3 - 6 as follows:

- Instagram: Total numbers of posts,
- Trip Advisor: Total number of reviews related to: tourist hotspots and overall tourist facilities (e.g. attractions and businesses),
- Airbnb: Total number of: lodging rentals in each locality, lodging rentals without reviews, reviews.

4.1 Presence of Tuscan Island Biosphere Reserve on Social Media

The presence of islands, islets, and skerries within the Tuscan Islands Archipelago on three analyzed social media platforms is presented in Table 3. Visualization of the analysis outcome is presented in Figure 3 (Instagram) and Figure 4 (TripAdvisor).

Since the islands Montecristo, Scoglietto di Portoferraio, Cèrboli, Palmaiola, Grosseto, Gorgona are almost uninhabited and do not have any tourism infrastructure, they are not present on TripAdvisor and Airbnb. The visitor numbers are limited and/or it is possible to visit them only on guided tours. Tourism has little negative impacts since it is completely organized and controlled. Therefore, they are scarcely present on Instagram. Skerries such as Formiche della Zanca, Montecristo, Capraia, Palmaiola, Scoglio d’Africa are not present on social media due to the lack of both inhabitants and visitors. They are protected and therefore managed by the National Park authorities.

Pianosa is the island with the former security prison and agricultural penal colonies. Today, the island is completely protected with limited access to tourists on guided tours. Therefore, there are no Airbnb lodging rentals on the island. The existing businesses and attractions result in higher presence on Instagram as well as on TripAdvisor. Giannutri is open for public access only in summer season and with a few inhabitants. Therefore, it is visible on all three social media platforms – although with low numbers.

Table 3. Presence of islands, islets, and skerries of the Tuscan Islands Archipelago on Instagram, TripAdvisor, and Airbnb (April 7 – 24, 2020).

Islands and skerries	Instagram	TripAdvisor		Airbnb			
	N° posts	N° reviews (hotspots)	N° reviews (facilities)		N° rentals	w/o reviews	N° reviews
			Attraction	Business			
<i>Elba</i>	734.378	2.967	23.072 (12 %)	160.789 (88 %)	2.714	1.069	16.904
<i>Giglio</i>	90.728	63	2.291 (16 %)	11.310 (83 %)	109	28	1.561
<i>Capraia</i>	27.208	5	132 (3 %)	3.705 (97 %)	33	6	438
<i>Giannutri</i>	12.136	104	80 (67 %)	39 (33 %)	12	5	56
<i>Pianosa</i>	8.715	5	410 (88 %)	51 (11 %)	0	0	0
<i>Montecristo</i>	1.730	0	0	0	0	0	0
<i>Scoglietto di Portoferraio</i>	1.529	0	0	0	0	0	0
<i>Cèrboli</i>	1.194	0	0	0	0	0	0
<i>Palmaiola</i>	1.191	0	0	0	0	0	0
<i>Grosseto, Gorgona</i>	396-691	≤8	≤8	0	0	0	0
<i>Others*</i>	≤10	0	0	0	0	0	0

*Formiche della Zanca, Montecristo, Capraia, Palmaiola, Scoglio d’Africa.

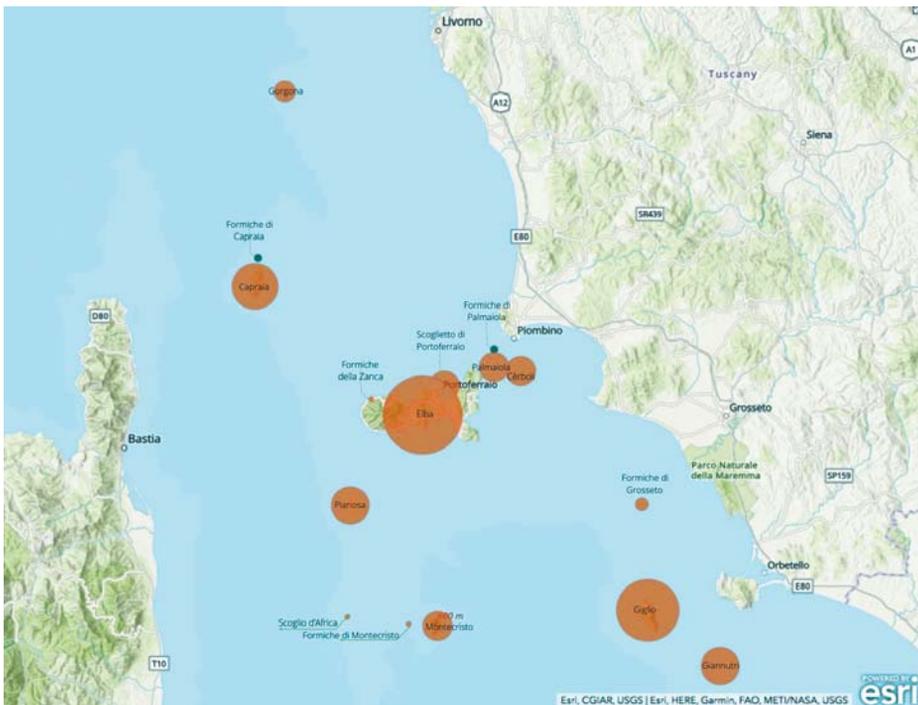


Figure 3. Presence of islands, islets, and skerries within the Tuscan Islands Archipelago on Instagram (April 7 – 24, 2020), Copyright © 2020 Esri and its licensors [31].



Figure 4. Presence of islands, islets, and skerries within the Tuscan Islands Archipelago on TripAdvisor (April 7 – 24, 2020) Copyright © 2020 Esri and its licensors [31].

More than a half of Airbnb lodging rentals in Elba and Giannutri do not have any reviews (with Elba having much broader offering). It can be interpreted that there is a lower demand for these particular lodgings or as an increase of Airbnb lodging offers only recently – especially, in Elba.

Elba, Giglio, and Capraia are inhabited and islands with vivid tourism activities. The presence of the mentioned islands on social media platforms is rather high – on TripAdvisor, it mainly relates to the high number of businesses. The three islands are governed by the municipalities, and the authority of the National Park is limited to the protected areas. In addition, they are the only islands within the archipelago with official and active profiles on Instagram followed by the profile of Pianosa where lesser activity can be observed.

4.2 Presence of Aeolian Islands World Heritage Site on Social Media

Islands and skerries such as Lisca Nera, Bottaro, Isola di Basiluzzo, Scoglio la Nave, Isola di Lisca Bianca, Le Guglie are all inside the core zone of the World Heritage Site and have rather low presence on Instagram with no presence on other platforms.

Filicudi, Alicudi, and Panarea are protected and inside the World Heritage core zone. They have rather small number of inhabitants – less than 250. However, their presence on social media is high which could be related to the visitors.

Table 4. Presence of islands, islets, and skerries within the Aeolian Islands Archipelago on Instagram, TripAdvisor, and Airbnb (May 6 – 18, 2020).

Islands and skerries	Instagram	TripAdvisor		Airbnb			
	N° posts	N° reviews (hotspots)	N° reviews (facilities)		N° rentals	w/o reviews	N° reviews
			Attraction	Business			
Lipari	264.343	2.664	3.942 (8 %)	46.196 (92 %)	646	203	6.707
Stromboli	166.194	2.113	1.870 (15 %)	10.568 (85 %)	222	50	3.894
Salina	148.400	46	811 (4 %)	18.715 (96 %)	324	100	2.187
Panarea	142.877	440	527 (6 %)	7.717 (94 %)	85	28	503
Filicudi	43.989	174	189 (11 %)	1.556 (89 %)	66	36	263
Alicudi	28.632	12	18 (4 %)	400 (96%)	51	5	689
Vulcano	15.652	3.265	4.102 (18 %)	19.120 (82%)	194	74	1.327
Others*	≤159	≤4	≤4	0	0	0	0

*Lisca Nera, Bottaro, Isola di Basiluzzo, Scoglio la Nave, Isola di Lisca Bianca, Le Guglie.

The other islands – Lipari, Stromboli, Salina, and Vulcano - encompass between 15-25% of conservation areas with above 300 inhabitants and a high social media presence. They have a high number of Airbnb lodging rentals compared to the other islands. Presence of Salina on TripAdvisor is high but with a few tourist attractions.



Figure 5. Presence of islands, islets, and skerries of the Aeolian Islands Archipelago on Instagram (May 6 – 18, 2020). Copyright © 2020 Esri and its licensors [31].



Figure 6. Presence of islands, islets, and skerries of the Aeolian Islands Archipelago on TripAdvisor (May 6 – 18, 2020). Copyright © 2020 Esri and its licensors [31].

Around $\frac{1}{3}$ of Airbnb lodging rentals in Lipari, Salina, Panarea, and Vulcano has no reviews. It means that the demand for these lodgings is lower compared to others or that there is an increase of lodging offers on these islands. Stromboli and Vulcano are mainly visited by those interested in activities of volcanos – e.g. adventure tourists, geoscientists.

The data from 2005 shows that there were 187 tourist accommodation facilities within the whole archipelago – Lipari 85; Stromboli, Panarea, Vulcano, Salina ≤ 25 ; Filicudi and Alicudi ≤ 6 [29]. Construction of new facilities has been denied in 2007 since it was not compatible with the Territorial Landscape Plan [28]. However, 13 years later, there is an exponential increase of tourist accommodation offers within the archipelago which can be related to the inhabitants and second-home owners who saw an opportunity in increased tourism demand. In 2014 were reported already 261 accommodation facilities [32]. In the meantime, Airbnb has been launched which gave hosts an opportunity to connect with potential visitors.

In regard with the official presence of the Aeolian Islands on social media, there is an active profile on Instagram which relates to the whole archipelago. Other profiles relate to the Vulcano and the Salina Island (the latter has been inactive for a couple of years). Lack of official social media presence results in the lack of communication of cultural and natural values of a protected area.

4.3 Comparison of Elba and Lipari Islands

The data used to visualize the analysis outcome is the total number of posts (in Instagram) and the Total number of reviews-overall tourist facilities (Table 5 and 6).

Table 5. Presence of the localities within the Elba Island on social media – Instagram, TripAdvisor, and Airbnb (April 7 – 24, 2020).

<i>Isola d'Elba - localities</i>	<i>Instagram</i>	<i>TripAdvisor</i>		<i>Airbnb</i>			
	N° posts	N° reviews (hotspots)	N° reviews (facilities)*		N° rentals	w/o reviews	N° reviews
			Attraction	Business			
<i>Portoferraio</i>	74.639	735	8.057 (20 %)	33.028 (80%)	335	134	2.473
<i>Capoliveri</i>	57.817	1.177	3.387 (9 %)	33.399 (91 %)	699	324	3.213
<i>Porto Azzurro</i>	41.870	222	522 (2 %)	20.641 (98 %)	256	76	1.926
<i>Marciana Marina</i>	30.677	1	331 (3 %)	10.372 (97 %)	212	84	1.215
<i>Rio Marina</i>	16.253	40	1.285 (10 %)	11.179 (90 %)	121	40	875
<i>Marciana</i>	15.107	694	2.979 (14 %)	17.682 (86 %)	441	147	3.109
<i>Rio nell'Elba</i>	4.191	98	206 (9 %)	2.144 (91 %)	289	105	1.868
<i>Campo nell'Elba</i>	3.610	0	1.762 (33 %)	3.643 (67 %)	361	159	2.225

*Number of reviews relates to the number of attractions and businesses in each locality that have been listed on TripAdvisor: Portoferraio 43 attractions:146 businesses, Capoliveri 35:182, Porto Azzurro 10:85, Marciana Marina 10:107, Rio Marina 13:85, Marciana 21:66, Rio nell'Elba 5:32, Campo nell'Elba 7:196.

The Municipalities of Portoferraio (Elba Island) and Lipari (Lipari Island) are the most present on social media – especially, on Instagram and TripAdvisor – compared to the other municipalities and localities. The number of businesses listed on TripAdvisor is significantly higher than the number of attractions of both islands. Presence of central parts of the islands on social media is low or almost non-existent, which means that the official communication made by tourism responsible as well as the content generated by the visitors relate mainly to the SSS-based tourism (“Sun, Sand, Sea”).

Table 6. Presence of the localities within the Lipari Island on social media – Instagram, TripAdvisor, and Airbnb (May 6 – 18, 2020).

<i>Lipari - localities</i>	<i>Instagram</i>	<i>TripAdvisor</i>		<i>Airbnb</i>			
	N° posts	N° reviews (hotspots)	N° reviews (facilities)*		N° rentals	w/o review	N° reviews
			Attraction	Business			
<i>Lipari</i>	264.343	1.194	46.262		255	61	3.543
<i>Quattropani</i>	1.717	740	819 (99 %)	6 (1 %)	37	16	201
<i>Pianoconte</i>	601	49	0	198 (100 %)	98	39	982
<i>Canneto</i>	213	681	902 (32%)	1.951 (68 %)	206	71	1.388
<i>San Salvatore</i>	3	0	0	0	28	6	449
<i>Porticello</i>	0	0	0	0	22	10	144

* Number of reviews relates to the number of attractions and businesses in each locality listed on TripAdvisor: Lipari 31 attractions/210 businesses, Quattropani 1/20, Pianoconte 0/39, Canneto 5/101, San Salvatore 0/13, Porticello 0/21.

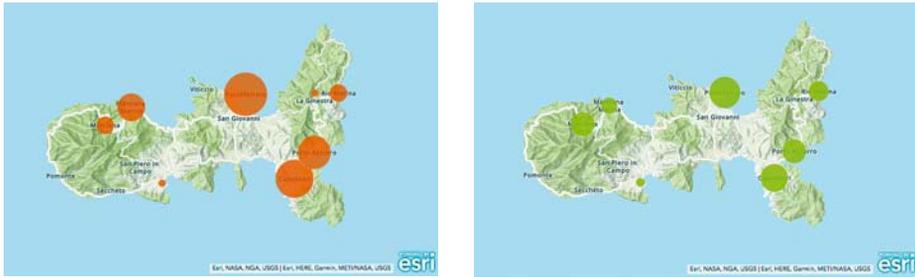


Figure 7. Presence of the municipalities within the Elba Island on Instagram (left) and Trip Advisor (right) (April 7 – 24, 2020). Copyright © 2020 Esri and its licensors [31].

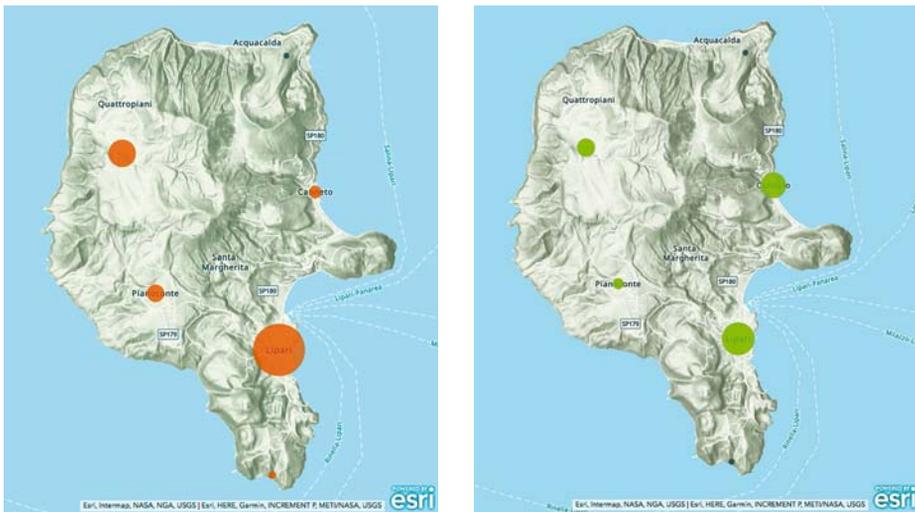


Figure 8. Presence of the localities/geographical areas within the Lipari Island on Instagram (left) and TripAdvisor (right) (May 6 – 18, 2020). Copyright © 2020 Esri and its licensors [31].

As a result of a very dry climate, the south-western part of Elba is less visited by tourists; hence its presence on social media is low.

Although Lipari encompasses six times smaller area with a lower number of inhabitants (three times lower) compared to Elba, presence of certain localities of the Lipari Island on social media is surprisingly high. Especially, on Airbnb – e.g. Lipari and Canneto. Areas of San Salvatore and Porticello, almost completely inside the heritage perimeter, have between 20-30 Airbnb lodging rentals.

The Port of Lipari – one of the three official ports in the archipelago - has been enlarged to accommodate increased tourism demand. In addition, non-official visits have been recorded and are around ten times higher from what has been recorded as official visits to the island and the overall area. Non-official visits are mainly related to nautical tourists that use private boats or cruise ships as both means of transportation and accommodation during their stay. This increases the number of anchorages in the archipelago and this type of tourists consume local resources and spend very little while producing direct and indirect negative effects.

Considering the size of Lipari, the protected area that the island encompasses, the number of visitors, the presence on social media – particularly, the area around the Lipari locality – it can be concluded that tourism activities might be in conflict with the values of protected areas. With an enlargement of the Port of Lipari which provided a better accessibility as well as with uncontrolled visitor flows, the island is threatened by the risk of deterioration of natural and cultural values which may effect and could be diffused throughout all the archipelago.

5 Conclusions

The Biosphere Reserve Framework as well as the World Heritage Convention represent excellent opportunities to establish holistic GMS, balancing conservation and sustainable development. Instead the Tuscan Islands as well as the Aeolian Islands have elaborated comprehensive and excellent management plans, submitted to national and regional authorities and UNESCO respectively, but they are not yet enacted. The social media analysis reflect these circumstances, since a visitors management is realized only in the strictly protected areas of both archipelagos. In areas included in the buffer and transition zones in the preliminary BR and WH management plans, no tourism regulations can be recognized.

The study shows that social media reflect the

- attractiveness of natural and cultural heritage,
- ways in which cultural, natural, and other aspects of destinations or spots are perceived and interpreted by visitors,
- numbers (especially “hidden” or unofficial) of hospitality services,
- quality services of tourism businesses through reviewing processes,
- tourism flows as well as management strategies and plans put into action,
- quality of territorial governance and management and its implementation.

Tourism on the Tuscan and Aeolian Islands is mainly driven by domestic demand. This is visible on social media, since Italian is the main language used for hashtags and reviews, followed by German and English.

The major part of the Tuscan Archipelago is governed and managed by the National Park authority. Therefore the islands of Montecristo, Scoglietto di Portoferraio, Cèrboli, Palmaiola, Grosseto, Gorgona, Pianosa as well as the skerries are completely or almost completely protected, and have very strict visitor management regulations regarding limits and organization, like guided tours and seasonal access, in place. The results of the social media analysis of tourism attractions and businesses confirm that tourism is well-managed and controlled, thanks to the National Park authorities in the Tuscan Islands. The touristic islands Elba, Giglio, and to a less extent Capraia are still managed by the municipalities, and only the protected areas are under the surveillance of the National Park authority. The BR integrated management plan would overstep the NP GMS, help to reduce negative tourism related impacts and foster the sustainable development of the entire archipelago, including the buffer and transition zones.

In the Aeolian Archipelago, the islands Lipari, Stromboli, Salina, and Vulcano show uncontrolled tourism development. They are not governed and managed by WH authorities as foreseen in the NP and WH management plans. In the WH Management

Plan, the authors pointed especially to the conflicts of tourism regarding the island's limited resources and impacts on the socio-economic system and concluded that the resource use has to be planned and assessed carefully in order to achieve a sustainable tourism development [29]. The protected areas in Lipari (Lipari Reserve), Salina (landscape protection) and the islands Alicudi, Filicudi, Panarea and Stromboli (natural reserves) are under the authority of the management consortium established by the municipalities Lipari and Salina. Hence, a consortium with 20 governmental and non-governmental, local, regional and national institutions is almost paralyzed and little effective in implementing the targets of the launched National Park and UNESCO World Heritage site. The result of the social media analysis reveal the intensive tourism activities even within the core area of the WH perimeter (e.g. Alicudi, Filicudi). A study on tourism development in the WHS Mount Etna and Aeolian Islands concluded, that such sites should focus on the "promotion of a destination as an integrated system of goods and services, while reducing seasonality and extending the tourist season" [32].

Uncontrolled tourism contributes to the unsustainable use of resources which, in a long term, will result in limited development of tourism once natural and cultural resources become scarce. Implementing the BR and the WH frameworks and GMS would force especially the Elba and Lipari Islands to introduce sustainable development strategies. For island destinations with uncontrolled tourism and high tourism impacts, social media analysis represent excellent planning and monitoring tools for sustainable tourism development, to balance over and under tourism places, but also to foresight trends and track changes in visitor's perception.

A changed tourism paradigm for the UNESCO designated archipelago sites is urgently needed and should be based on local evidences, giving priority to those services and businesses respecting the values of the place. A "heritage stewardship destination" model, focusing on quality tourism which involves all actors in the decision-making processes could create benefit for locals and visitors, offer opportunities to jointly engage in the conservation of the internationally recognized heritage, improve living standards and visitors experience, and share equally costs and benefits. Social media could be instrumentalized to create community platforms to educate potential visitors and residents and to promote the destination's beauty and particularity while at the same time, serve to raise awareness and capacity building regarding heritage values and conservation.

The World Heritage Centre should seriously consider to assess the state of endorsement and implementation of management plans of World Heritage sites and Biosphere Reserves. Furthermore, the World Heritage Committee should be invited to decide about including properties with a lack of implementation of management plans on the List of WH in danger more rapidly, based on the missing performance in conservation and development. At present, the management plans of the two archipelagos have not yet been endorsed nor implemented since they must adhere to the endless procedures and bureaucracies required. The governance and management systems of the designated areas have to be immediately enacted to allow measures and to avoid negative impacts through environmental changes already started. ICT applications and social media further enable the analysis and monitoring of tourism development, which may become out of control and create additional impacts on the local resources as well as the natural and cultural heritage of the islands.

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Governing Future Challenges in Mediterranean Protected Areas

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