

Exploring social media as a tool for disentangling cultural ecosystem service values of whale watching to inform environmental judgments and ethics: The case of Húsavík, Iceland

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## **Abstract**

The explorative study wants to contribute to developing methods using social media data and social network theory in tourism studies. Focused on the case of Húsavík, in Skjálfandi Bay, Iceland, an emblematic village for whale-watching activity, this study explores the values of individuals expressed through social media (TripAdvisor and Instagram) related to the practice of whale-watching. The aim is to document the cultural ecosystem service values and environmental judgments as information that could be used in future marine planning efforts. For this, 650 entries from 2721 posted between 2020 and 2021 on TripAdvisor were analyzed, together with 100 images posted on Instagram between 2021 and 2022. The Social Network Analysis enabled visualization of the interconnected hashtag networks underscoring human-nature interactions. Instead of environmental and conservation values, the results show that they relate instead to “ocular consumption” and “aesthetic consumption”. The lack of conservation values, cultural heritage values, or even spiritual values is likely a reflection of the Instagram and TripAdvisor platforms. We conclude that social media data should always be complementary to narrative and qualitative data.

## **Keywords:**

Whale-watching values, nature-based tourism, social media data, cultural ecosystem services, sustainable management.

## **1. Introduction**

Whale-watching is an activity that attracts visitors from a wide range of localities and cultural backgrounds. Hence a range of cultural comprehensions of the human-nature relationship encapsulated in the whale-watching visitor experiences exists (Cook et al., 2020). Whale-watching is thereby a fundamentally cultural activity in experiencing and understanding the environment and thus provides an interesting platform to study cultural ecosystem services (CES) (Cook et al., 2020). Cultural ecosystem services as a concept explore the ways in which benefits of nature are transferred to society and human well-being through values such as spiritual enrichment, aesthetic experiences, and recreation (Hirons, Comberty and Dunford, 2016; Cook et al., 2020).

As such nature-based tourism, whale-watching experiences are represented and mediated through photographs and social media platforms. On these platforms people post their pictures, link hashtags, and share comments reflective of their experience. Using social media posts as data to explore emotions and values has proven to be a useful tool in tourism studies (Hale et al., 2017, Prakash et al. 2019, Teles Da Mota and Pickering, 2022, Calcagni et al., 2019). By exploring such expressions of personal experiences, we can better understand value in nature-based tourism (Mandic, 2022). This study therefore explores values of individuals expressed through social media related to the practice of whale-watching in order to shed light on cultural ecosystem services dynamics. As part of a larger study on marine governance and value systems related to marine space (See Zoghbi et al in prep, Wilke in prep, Chambers et al in prep), this research aimed to document the cultural ecosystem service values of visitors to Húsavík in order to add to information that could be used in future marine planning efforts. With this pilot study, the results can be extrapolated to other whale-watching cases and the data can be scaled to inform protected area managers in different European regions. This study also contributes to the development of methods using social media data and social network theory in the context of tourism studies.

## **2. Materials and Methods**

### **2.1 Study Area**

The study is focused on the case of Húsavík, in Skjálfandi Bay, Iceland, an emblematic village for a whale-watching activity dubbed the “Whale-watching capital of Europe” (Einarsson, 2009). Since its inception in 1995, the whale-watching activities have transformed Húsavík from a primarily fishing-based community to a tourism hot spot (Figure 1). These developments, along with other growing activities in the bay, prompted the local municipality to launch the application for official coastal and marine planning of the area in 2020 (Sveitarstjórn Norðurlands, 2020), although at the time of writing this official process has not commenced (See Wilke in prep for a description of marine planning in Iceland).



*Fig. 1 (a) View of the town of Húsavík and Skjálfandi Bay beyond, with snow-capped mountains across the bay in the background, as seen from Húsavíkurfjall mountain. The harbour walls, houses of the town and wide expanse of sea are clearly visible. (b) View of Húsavík harbour from aboard the whale watching sailing boat Opal. There are ropes and railing of the boat in the foreground. The focus is on the anchored fishing and whale watching boats, the harbour buildings and the church of Húsavík in front of Húsavíkurfjall mountain in the background. Photos by author Maria Wilke*

## 2.2 Data Collection and analysis

Social media used in this study focused on TripAdvisor comments and Instagram posts. TripAdvisor comments offer an immediate satisfaction valuation of tourism activities where early thoughts and perceptions issued from users' momentary judgments provide valuable insights on nature-based tourism. On the other hand, Instagram has been suggested as a good platform for analyzing images (Angradi et al., 2018; Tenkanen et al., 2017), and hashtags that express emotions and context.

### **2.2.1. TripAdvisor data analysis**

Around 650 entries from a total of 2721 entries on TripAdvisor commenting on whale-watching in Húsavík from three different companies offering such trips were analyzed case by case. In total 160 posted reviews between 2019 and 2022 were found to contain aspects that could be analysed for value indicators. These "value indicators" were associated with "related values" according to the Millennium Ecosystem Assessment (MEA) for the classification of CES (Hirons, Comberti, and Dunford, 2016). These values include: Spirituality, beauty, pleasure, and wisdom. "Spirituality" was expressed through comments related to the connection with nature and identified through metaphors referring to the "spiritual" sensations of sailing and contact with the sea and the landscape. "Beauty" was expressed through comments referring to the beauty of the landscape and animals. While "pleasure" includes all comments expressing enjoyment, opinions about the service of the whale-watching companies, and the valuation of the activity as an attraction. Finally, "wisdom" was found to be expressed through comments that make some reference to the knowledge of whales transmitted by the companies, the knowledge acquired, environmental assessments, and cultural heritage (e.g., references to the history of fishing). The 160 Trip Advisor quotes were categorised through Excel and coded according to the above value indicator descriptions.

### **2.2.2. Instagram data analysis – Social Network analysis**

User posts from Instagram were collected through the Apify web scraping tool, specifically the Instagram Hashtag Scraper<sup>1</sup> module. The dataset covers posts from 09/28/2021 till 10/03/2022. We obtained the last 100 images from public accounts posting about whale watching under the hashtag #Husavik and #Whalewatching. The content of the photographs was also classified and categorized, paying particular attention to those images related to the sea and maritime and coastal aspects. The general classification was as follows: animals, architecture, boats, gourmet (food), landscape, museum, thermal, people, selfie, and off-topic.

Analyzing social media data using Social Network Analysis (SNA) is a novel approach that enables visualization of the interconnected social media data underscoring human-nature interactions, as pointed out by Ruiz-Frau et al. (2020). The network that results is a static photograph of a certain moment, although it is not representative, it is a useful map to show the type of conversations that arise on social network sites and how people associate images and words. The goal of using SNA was to explore what cultural ecosystem values may have been present in the hashtags and how they related to each other. To visualize the hashtag networks, a database was created that included the first ten hashtags of each image. It should be noted that some photos have a single tag while others may contain more than ten. Once the data matrix was established according to its frequency of appearance and its connection with other labels, it was visualized and calculated with the Gephi (Bastian, M. Heymann, S. Jacomy, 2009) network visualization software.

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<sup>1</sup> <https://apify.com/zuzka/instagram-hashtag-scraper>

### 3.Results

#### 3.1 Trip advisor analysis

The analysis of values associated with whale watching in the TripAdvisor comments shows the most related value entry was "pleasure" with 105 entries, connected to value indicators such as "seeing the whales" and "fun" and "excitement" (Table 1). The value indicator of "sustainable tourism" was classified within the related value "pleasure" since it is associated with the "carrying capacity" of the boat and therefore contrary to "mass tourism" (Table 1). On the other hand, 17 entries referred to the related value "beauty" commenting on sailing as a nice activity, how nice the whales are, a sunset, or simply the trip by boat (Table 1).

*Table 1: Cultural Ecosystem Service value coding system. The coding and classification system was adapted from a larger project (JUSTNORTH, Horizon 2020, grant agreement n° 869327) to which this part of the research belongs. The original table was prepared to collect different overarching value groups, among them the cultural ecosystem services on which this paper focuses<sup>2</sup>.*

Values	Value indicators	Example quotes
Spirituality	Connection to nature	"Where the dark black of the sea becomes heterogeneous...where the sudden swell makes you feel like a free bird" (C40_ 082019).
Beauty	Physical beauty of the experience	"A qualified guide with a lot of information but leaving moments without comment to let us enjoy the landscape" (C126_ 072019).  "I also enjoyed the beautiful scenery of the snow-capped mountains" (C133_ 082022)  "A first-class trip in a beautifully colored wooden boat" (C84_ 072019).
Pleasure	Fun, weather, excitement, sustainable tourism, seeing whales, safety	"It was an exhilarating experience; great fun and we really enjoyed the thrill of looking for and being the first to spot a whale to follow" (C60_ 072019).  "Few people on the ship, few ships at sea" (C12_ 072019).

<sup>2</sup> See: Wood-Donnelly, C, Sidortsov R and Sigeman, G. (2021) D8.5 JUSTscore Design Sketch, JUSTNORTH (GA 869327) and deliverable D8.5 JUSTscore Design Sketch (<http://justnorth.eu>)

		<p>“Despite a bit of rain, the staff made our experience really enjoyable” (C27_ 092019).</p> <p>“Viewing of a large number of whales in magnificent weather” (C52_ 072019).</p>
Wisdom	Respect for nature, knowledge, cultural heritage	<p>“I also felt that this company respects nature and the whales, which is very important to me” (C118_ 072019).</p> <p>“Seeing whales is as much a priority as not disturbing them. The captain was excellent in getting us close to the whale without disturbing the animal. The tour guide's information about the whales was an added bonus” (C157_ 092022).</p> <p>“They are very respectful of the animals as they leave enough distance so as not to disturb them” (C105_ 052019).</p>

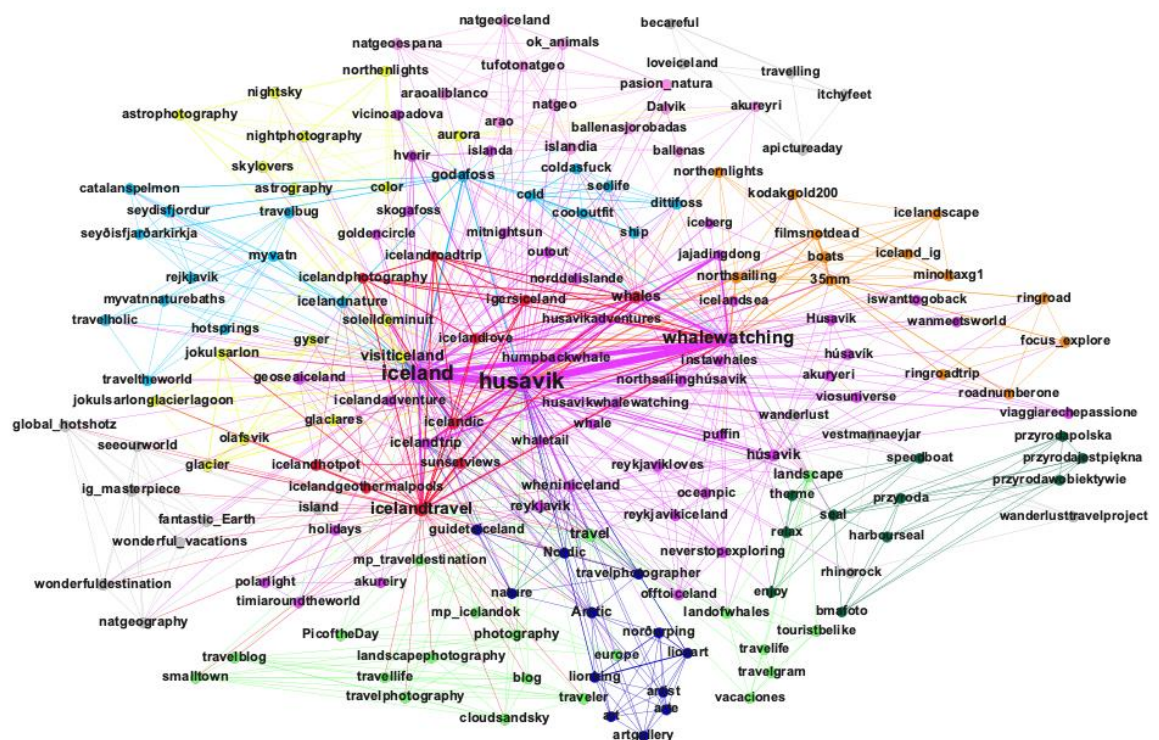
The value-related to “wisdom” accounts for 34 entries. Most of them referred to education and environmental awareness with a special focus on the distance kept between the boat and the whales and appreciation for cultural heritage (Table 1). Interestingly, only one comment refers explicitly to the ethical aspect of whale-watching activity: *“It's as important to me that the tour is ethical, doesn't disturb the whales, as it is to see them. The captain was great. We got close. The tour guide (...) was informative & interesting. We thoroughly enjoyed the whale & the boat journey”* (C153\_ 092022). And it should be noted that several comments were critical, accompanied by some disappointment: *“...This is a business in which for seeing the tail of a whale after chasing it for an hour, they make more than 1,500 euros on the way out. And the torn and disgusting suits that you have to wear, that's another chapter. (...)”* (C139\_ 062022).

Only eight comments associated with the category “wisdom” mentioned some aspect related to cultural heritage. For example: *“To be on a traditional fishing vessel made the experience really authentic and after donning thermal hooded overalls and a safety briefing, we went off in search of whales”* (C59\_072019). And in the final category, four comments were classified as “spirituality”, as they express the feeling of connection with nature blurring the division between humans and nature (Table 1).

### 3.2 Instagram hashtag analysis



The social network results from Instagram hashtags show that the hashtag #Whalewatching features more times than photographs of whales (Fig. 2). Five relevant nodes stand out, showing how a close relationship is formed between the three main nodes, but how there is a core that is strongly linked. 295 hashtags that are related through 1018 links were collected. Figure 3 shows the 174 hashtags that co-appear the most times in Instagram images joined by 961 links. Those that appear occasionally are filtered out, leaving the core more interconnected.

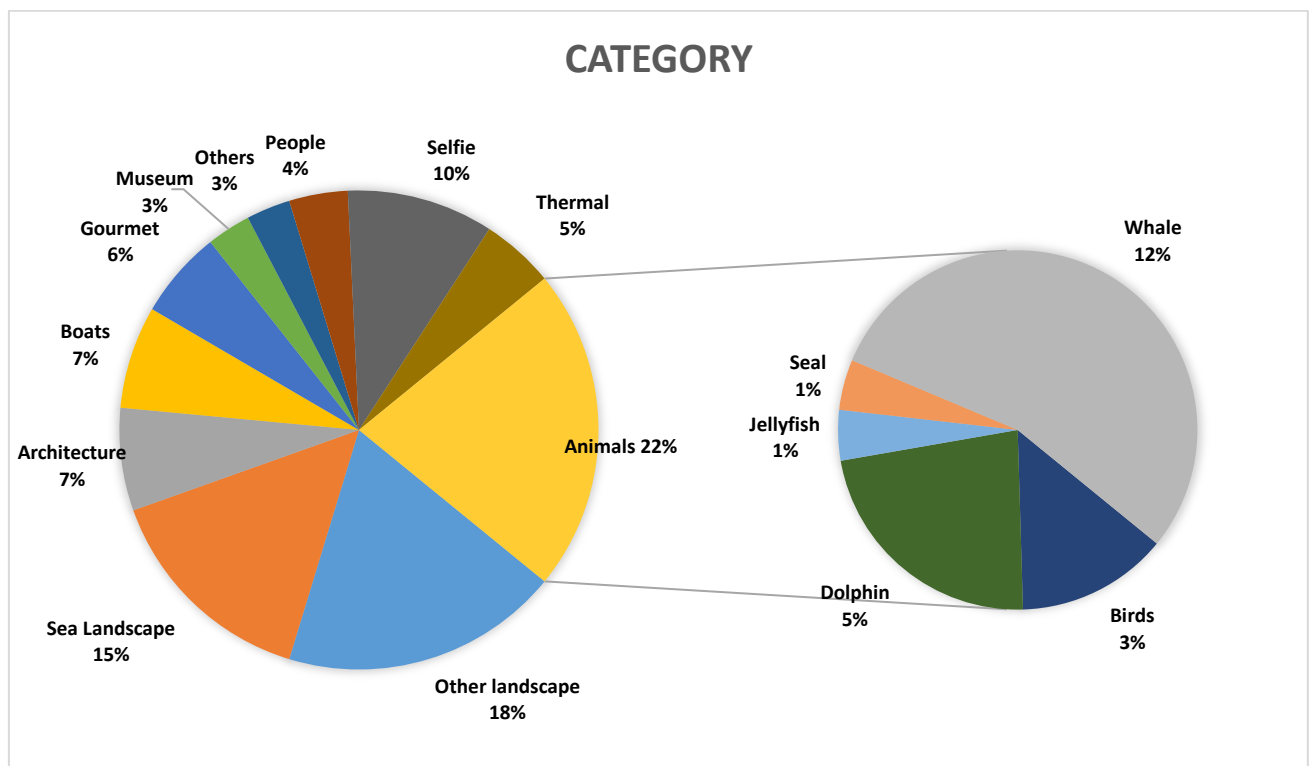


*Fig. 2. Size of nodes indicates the degree. The color and thickness of ties indicate higher co-appearance in different images.*

There are six relevant clusters inside the filtered network (Fig. 2). Although modularity is normally used for very large networks, in this case, it allows for the review of way in which the hashtags are associated and the formation of small narrative units around the images. The violet cluster was the main cluster (25.29%), that brings together terms associated with tourism and the most emblematic places and attractions (e.g., #Husavik, #Whalewatching, #Whales, #Icelandsea). Whereas the cluster in light blue (10.34%) positions Iceland as a destination specially chosen for its nature and Arctic climate attracting travellers, containing miscellaneous topics weather and nature stand out (e.g., #cold, #icelandnature, #traveltheworld). Interestingly, there is a specific cluster, yellow (9.2%) dedicated to northern lights (e.g. #aurora, #skylovers, #northernlights). The cluster in light green (11.49%) shows the hashtags that have directly to do with photography, such as #travelphotography and #landscapephotography, together with

the cluster in orange (7.47%) representing the hashtags that comment on technical aspects of photography (e.g. #kodak, #35mm, #minolta). Another interesting finding is the pink cluster (4,4%), representing a grouping of hashtags based on the users' language which indicates specific communities using hashtags in their local language. Future research could focus on this aspect of the specific perception of speakers of different languages.

For analysis of the elements within the pictures, animals represent the highest percentage but there are also several landscape and cultural categories (Figure 3). As to be expected, the majority of animal photographs were of marine mammals: whales, dolphins, and seals (Fig. 3).



*Fig. 3 Categories of photograph contents within Instagram #Husavik posts*

#### 4. Reflection on the method, discussion, and conclusions

As a complement to traditional data sources, content analysis of social media posts enables researchers to overcome spatial and temporal limitations and collect data less intrusively and at less cost. However, social media data should always be considered as complementary to narrative and qualitative data due to unreliability of social media data. There are also important differences in the platforms: whereas TripAdvisor presents information about an experience in the frame of an organized activity by a company, Instagram aspires to represent what people want to project through the global public virtual window. For example, in this case, not all users who employed the



hashtag #whalewatching might have actually been on a whale-watching tour. Hashtags are a slice of reality, a stated preference, although not necessarily representative of experiences or values. Nevertheless, hashtags can be indicative of aspirations and desires and further research will analyse values of the visitor in comparison with local stakeholders in Skjálfandi Bay.

Scholars note that it is necessary to value tourism activities by assessing trade-offs between tourism drivers and social, economic, and environmental results according to each activity's specificity. As complementary data, our results show that social media could be a good potential tool to document baseline data about environmental judgments that are projected on social media (for more on visitor perceptions and experiences of marine mammal watching in Iceland (see Henderson, 2020; Bertulli et al., 2016; Chauvat et al., 2021). Our results indicate that 21% of the TripAdvisor comments analyzed are concerned with environmental impacts and animal disturbance by whale-watching activities. Concerns about maintaining an appropriate distance from the animals drive visitors' evaluations of the companies regardless of the transportation means offered, contrary to that stated by Verbos et al. (2018), who pointed out that these concerns were reflected in the kind of transportation chosen.

Although 34% of TripAdvisor comments were classified as values related to "wisdom", "beauty" and "spirituality", it is obvious that the primary driving value in the comments was pleasure. This is similar to previous studies exploring whale ecosystem services (Cook et al., 2021; Malinauskaite et al., 2021), although in visitors the aesthetic values are slightly more pronounced. This is not surprising given the nature of the whale-watching operation as documented in our hashtag analysis, and this is identified in tourism literature as "aesthetic consumption" (Pace et al., 2015) or even "ocular consumption" involving proximity to wildlife (Higham et al., 2015). In the Instagram hashtag analysis, we expected to be able to find direct evidence of cultural ecosystem service values similar to the Trip Advisor coding analysis. However, there was a notable absence of hashtags related to cultural heritage, personal connection to nature, or even sustainable tourism. The hashtag network, although consisting of 5 distinct nodes, seemed to be mainly representing values of pleasure related to "ocular consumption" and capturing photographs for the Instagram platform. Even under the beauty category, there was less of a context of personal experience of the beauty of the landscape, rather hashtags that simply reflected the landscape subject of the photo. This was a surprising finding in the study, because we expected to find hashtags representing conservation values, cultural tourism, or even spirituality values related to the experience of seeing the whales. However, the absence of these values is likely a reflection of the Instagram platform and it should be noted that the pleasure and aesthetic values can be critically important because it resonates with the interests of environmental groups and organizations, the media, and much of the population (Pace et al. 2015: 17).

The rise of whale-watching tourism may shift ecotourism principles towards a mass tourism orientation which should be considered in management decisions. This balance of consumption and conservation in whale-watching tourism should also consider the

cultural diversity of environmental values that can differ from society to society. Conciliation of needs usually focuses on the satisfaction of Western cultural values, which has been also highlighted in other recreational activities in the Mediterranean (Gómez, 2022), especially attractive due to its marine protected areas (Gómez, Carreño, Lloret, 2021). Whale-watching can be classified as nature-based tourism involving values that are closely dependent on nature, thus enhancing the appreciation of nature in various cultural ecosystem service indicators (Hoarau-Heemstra and Heide, 2016). This study has offered an example of how management of sustainable whale-watching activities might be informed by these cultural ecosystem service values held by visitors and expressed in social media posts.

## **5. Declaration of interest statement**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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