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Pull and Push Drivers of Giant-Wave Spectators in Nazaré, Portugal: A Cultural Ecosystem Services Assessment Based on Geo-Tagged Photos

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Abstract: This paper maps the cultural ecosystem services (CES) of a well-known giant-wave hotspot located in Nazaré, Portugal. The paper adopts a qualitative approach combining an auto-ethnographic direct observation of a journey and the content analysis of photos and videos posted on the YouTube and Facebook pages of tourists and operators. A total of 44 geotagged photos from a sample of 6914 photos retrieved from Flickr allowed the classification and spatial distribution of several CES: (1) recreational—surf activities; (2) aesthetic—photography; (3) spiritual—dark tourism and risk recreation; (4) intangible heritage—maritime knowledge; (5) scientific—wave height forecast; (6) sense of place; and (7) social relations. The paper also proposes a theoretical framework that highlights the pull drivers (risk recreation, storm chasing, or spectacular death voyeurism) and the push drivers (e.g., marketing campaigns and wave forecasts alerts) that explain the behaviors of the big-wave spectators/chasers during the experience journey. Public decision-makers, destination marketing organizations, tourism operators, and business entrepreneurs must acknowledge the relevance of journey mapping in order to identify the moments of stress and the touchpoints associated with peak/positive experiences generated by these CES. This study confirms some push and pull factors assessed by previous studies.

Keywords: cultural ecosystem services; coastal tourism; risk recreation; spectacular death voyeurism; storm chasing; geotagged photos; Praia do Norte (Nazaré, Portugal)



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1. Introduction

The coastal town of Nazaré in Portugal became the “mecca” of giant waves (see Figure 1) when, on 1 November 2011, Garret McNamara rode a giant wave¹. The process of adaptation and training started two years before (2009), when the Nazaré Municipal authorities challenged the surfer to test the uniqueness of their waves. The international recognition of the waves was achieved through several world Guinness records and World Surf League (WSL) awards. The whole story is portrayed in the HBO documentary “One hundred-foot wave”².

The awareness of Nazaré as a surf tourism destination exponentially increased with the publication of photographs of surfers riding the waves and beating Guinness records³. Since then, the international media has been highlighting the shift in the strategic positioning of this small fisherman’s town, from a (summer) beach destination to a (winter) giant-wave surfing/chasing destination⁴.

Table 1 shows the evolution of the number of hotel guests from 2010 (before the buzz marketing around Nazaré) and 2019 (the year before the COVID-19 pandemic). It increased 295% in this nine-year period, from 44,931 to 132,466 tourists per year. The highest increase occurred among USA tourists. This positive effect on tourism for Nazaré is a direct consequence of Garret McNamara’s accomplishment in November of 2011 [1]. Nevertheless, according to Statistics Portugal, Nazaré’s population has decreased from

14,383 inhabitants in 2009 to 14,180 in 2018. However, during the big wave periods, the town's population increases ten-fold, to almost 100,000 people [2].



Figure 1. Nazaré, Portugal (location map): surfer riding a big wave, the rescue team of water bikes and the spectators/big-wave chasers. Source: Facebook page of “Praia do Norte”⁵.

Table 1. Comparative evolution of the number of hotel guests, according to their home countries: in 2010 (before Garret McNamara’s first famous giant wave ride) and 2019 (the last available data without the effect of the COVID-19 pandemic).

	Portugal (2010)	Portugal (2019)	Oeste (2010)	Oeste (2019)	Nazaré (2010)	Nazaré (2019)	Variation 2010–2019(%)
Total	13,537,040	25,249,904	286,305	650,917	44,931	132,466	295%
Portugal	6,705,460	9,941,747	199,516	361,351	27,389	58,115	212%
UE27/UE28	12,112,682	10,602,067	266,678	194,081	39,934	48,466	121%
Germany	728,784	1,602,066	7469	25,853	1031	6630	643%
Spain	1,375,842	2,069,645	21,066	52,749	4667	11,797	253%
France	574,828	1,641,912	12,156	40,404	2951	13,271	450%
Italy	365,368		6549		1159		
The Netherlands	351,635		2905		351		
UK	1,111,197	2,042,867	5322	12,227	991	1156	117%
Africa		195,954		1258		237	
USA/America	266,248	2,648,454	3647	55,038	741	12,469	1683%
Asia		993,201		20,887		7899	
Oceania		173,699		3309		1000	

Source: Statistics Portugal.

The Nazaré Canyon is an undersea canyon just off the coast of Nazaré, Portugal, in the Eastern Atlantic Ocean. It has a maximum depth of at least 5000 m (16,000 ft) and is about 230 km long [3]. The Hydrographic Institute explains big waves as immense swells emerging from the west and northwest directions entering the coastal region. The wave’s refraction is based on the differences between the canyon’s depth and the continental shelf. This causes a change in the direction through the canyon, which leads to an increase in speed. According to the steep vertical variation of the canyon, the depth reduction causes a shoaling effect, which means that the wave length is reduced while an increase in the wave height occurs [4,5].

This paper maps and evaluates the cultural ecosystem services (CES) of this giant-wave hotspot. *Cultural Ecosystem Services* (CES) are defined as “the non-material and intangible benefits arising from multi-dimensional human-nature relationships, such as cultural heritage, place identity, spiritual enrichment, cognitive development and learning” [6].

The phenomenon of giant waves in Nazaré has received the attention of several researchers [1,2,7,8].

Nevertheless, there is a gap in the literature because the assessment and spatial mapping of the cultural ecosystem services provided by this nature attraction were not investigated in previous studies. Moreover, the extant literature did not analyze the relationship between these CES and the push and pull drivers of several groups of individuals/stakeholders who play different roles and perform different activities in this coastal hotspot. Furthermore, few papers have examined the motivations and behaviors of water sport spectators.

Therefore, this paper provides an innovative contribution to the field and investigates the following research questions:

RQ1. What kind of cultural ecosystem services (CES) are provided by the Nazaré undersea canyon? In particular, this paper will focus on the recreational, aesthetical, and spiritual CES that are imbedded in the surf tourism experience journey.

RQ2. What are the influences of external factors on the spatial distribution of cultural services?

RQ3. What are the push/pull motivations and drivers of the giant-wave chasers/spectators?

Furthermore, research into the customer experience/customer journey has received attention from several authors [9–12], as well as the tourism and hospitality industry [13–16]. Lemon and Verhoef (p. 71) defined *customer experience* as a “multidimensional construct focusing on a customer’s cognitive, emotional, behavioral, sensorial and social responses to a firm’s offerings during the customer’s entire purchase journey” [17]. Moreover, Bolton et al. conceptualized customer experiences within a three-dimensional space, bringing together the digital, physical, and social realms [18]. Therefore, a fourth research question emerged:

RQ4. How is the giant-wave tourist’s experience journey? This paper provides a new tool for destination managers and tourism operators by proposing a holistic theoretical framework that describes the influences of the push and pull drivers at different stages of the tourist’s journey.

The paper adopted a qualitative approach by combining photos taken during auto-ethnographic direct observation and the content analysis of the description of geotagged photos with videos from social media platforms, such as YouTube, Facebook, and Flickr.

2. Literature Review

This section presents the state-of-art of the previous studies regarding the classification and mapping of coastal cultural ecosystem services. This study assesses the pull and push factors of CES that benefit several categories of individuals: (1) big-wave surfers; (2) risk recreationists (non-big-wave surfers); (3) big-wave spectators/storm chasers; (4) local residents; (5) the firms of big-wave surf clusters that provide support services and products of this sport (e.g., hospitality and accommodation, safety, rescue crews, protection clothing, and equipment); (6) cultural heritage tourists. Because the giant-wave season is in the winter, this paper did not consider sun and beach tourists.

2.1. Mapping Cultural Ecosystem Services (CES)

Several attempts were made to map marine and coastal ecosystem services (ES) [19–21]. The literature provides solid theoretical and scientific support for the use of Flickr geotagged photos in order to assess and value recreational and aesthetic CES [22–29].

Moreover, an increasing number of studies are examining the distribution and congruence of ecosystem services, often with the goal of identifying areas that will provide multiple ecosystem service hotspots. There is paucity of data on most ecosystem services and, therefore, proxies are frequently used to map their distribution [30–36].

The classification taxonomy of marine and coastal CES, developed by the Common International Classification of Ecosystem services (CICES) v5.1 [37], comprises the following eleven categories: (1) recreation and leisure; (2) aesthetic; (3) cultural heritage and identity; (4) spiritual, sacred and/or religious; (5) educational; (6) inspiration for culture, art and

design; (7) sense of place; (8) social relations; (9) scientific; (10) existence; and (11) intellectual and representative interactions (group). Garcia Rodrigues et al. made an exhaustive list of all the terms and labels that were found in the literature concerning the coastal CES for each category [38].

2.2. Motivations and Segmentation of the Demand for Coastal and Marine Destinations

This paper examines other specific motivators and segmentation criteria that explain the demand of the coastal CES. Carvache-Franco et al. (2019, 2020) identified six motivational factors for choosing coastal destinations: authentic coastal experience, heritage and nature, learning, novelty and social interaction, physical activities, and sun and beach [39,40]. These authors showed the existence of two segments of visitors: (1) “Beach lovers” formed by tourists who have high motivations in such aspects related to the sun and the beach; (2) “multiple coastal motives”, i.e., grouped tourists who have high values in all the motivational dimensions. Moreover, Nagy et al. made a segment analysis of water sport tourism and the cluster analysis yielded four clusters based on sports and tourism motivations, namely: sports-oriented, leisure-ignoring, leisure-oriented, and social-oriented groups [41].

2.3. Recreation and Leisure

2.3.1. Risk Recreation (Big-Wave Surfers and Active Risk Recreationists)

According to Fluker (p. 7), *surf tourism* can be defined as [42]: “the act of people traveling to either domestic locations for a period of time not exceeding six months, or international locations for a period of time not exceeding twelve months, who stay at least one night, and where the active participation in the sport of surfing, where the surfer relies on the power of the wave for forward momentum, is the primary motivation for destination selection” [43].

Nazaré is a destination for giant-wave surfers, who may be classified into the category of active (extreme) risk recreation tourists. Boudreau et al. defined adventure recreation as “self-initiated nature-based physical activities that generate heightened bodily sensations (e.g., vestibular sensations arising from quick acceleration in varying dimensions of space) and require skill development to manage unique perceived and objective risks (p. 2)” [44].

At the ‘extreme’ end of the nature sport spectrum (e.g., activities such as B.A.S.E. (buildings, antennae, space, earth) jumping, big-wave surfing, waterfall kayaking, rope-free climbing), the most likely outcome of a mismanaged error or accident is death. Thus, many psychologists view this behavior as irrational and deviant, resulting from ignorance or the inability to self-regulate [45]. This extreme sport is not only performed by men; in Nazaré, it is common to see female surfers, such as Maya Gabeira (Brasil), Joana Andrade (Portugal), and Justine Dupont (France) [46].

According to systematic literature reviews by Boudreau et al. [44] and Gstaettner et al. [47], there are several explanations for participation in adventure recreation (e.g., opportunities for mastery, overcoming fear, socializing, identity construction, connecting with nature) [48–50]. Giddy and Webb compiled nine push factors that are determinants of the conditions and significance of the environment, which in turn are positively correlated with the satisfaction in adventure tourism: thrill, risk, physical challenge/skills development, enjoying nature/nature appreciation, overcoming nature, environmental education, novelty, escapism, and socialization [51].

Risk recreation activities also foster hedonic, eudaemonic, and therapeutic aspects of subjective well-being (SWB) by supporting the satisfaction of basic psychological needs for autonomy, competence, relatedness, and beneficence [44,52,53], or the search for freedom [54].

Giddy and Webb claimed that a recent probing of risk/thrill-seeking notions surrounding motivations and experiences has led to the identification of a wider range of psychological states, such as ‘rush,’ ‘edgework,’ or ‘flow’ [49,51,55,56]. Boudreau et al. proposed that experiencing a flow state (i.e., an effortless and enjoyable state of feeling

deeply in control and fully immersed in an activity) may provide a strong motivation for continued participation in adventure recreation [44,57–59]. This theory is similar to the adventure experience paradigm (AEP) of Martin and Priest [60], which predicts peak adventure as a consequence of a balance in perceived risk and competence [61]. Flow—since its conception—has been studied in adventure recreation contexts and it is a particularly important motive for big-wave surfers [62–65].

Moreover, Clough et al. and Buckley claimed that some self-achievement experiences involve potential physical risks; they may awake the euphoria related to heroic overcoming of challenges and the encounter with natural primitiveness [66,67].

The “absorption” factor established by Magyaródi et al. includes the other dimensions of the original concept (items about engagement, the quality of the experience, change of time perception, or forgetting about the environment) [68].

2.3.2. Sensation Seeking, Gaze, and Spectacular Death Voyeurism (Passive Big-Wave Spectators)

This paper extends the understanding of risk recreation motivation to those who enjoy watching others performing risk recreation activities (see Table 2). For example, commercial adventure tourists, although drawn to an activity for the sake of risk, fear, and excitement, simultaneously felt safe and protected within commercial operating settings [69] and admitted that ‘it’s more like watching an exciting but consequence-free film of [an adventure activity] than being in one’ (p. 18) [70].

Table 2. Giant-wave surf tourism segments: characteristics, push and pull drivers, and cultural ecosystem services.

	(Active) Giant-Wave Surfers	Surf Tourists (Non-Big-Wave Surfers)	Risk Recreationists	(Passive) Giant-Wave Chasers/Spectators
Major characteristics	(Professional) surfers and their rescue teams who are specialized in giant-wave riding	Active participation in surf sport activities in non-big-wave swell	Tourists who participate in risk activities, such as riding giant waves in boats or water bikes with driver	Spectators who enjoy watching surfers and/or giant waves
Push factors (internal motivators)	Extreme risk recreation thrill, risk, flow, physical challenge, skills development, overcoming nature and fear, euphoria, seeking for adrenalin, imminent death risk	Sense of belonging to the surf lifestyle/community, connection with nature, socialization, identity construction	Risk/adventure recreation hedonic, eudaemonic and therapeutic aspects of subjective well-being (SWB) ‘peak’, ‘transcendent’, or ‘cathartic’ experiences	Connection with nature, sensation seeking, gaze, spectacular death voyeurism, thanatopsis, storm chasing, and awe-inspiring experiences
Pull factors (external motivators)	Organized events and advertising campaigns	Organized events and advertising campaigns Films and documentaries Nazaré ambassadors (e.g., Garret MacNamara)	Tourism operators who provide risk recreation experiences	Giant-wave forecasting/alerts Advertising campaigns Films and documentaries
Cultural Ecosystem Services	Recreational Sense of place Social Relations Scientific	Recreational Social Relations Sense of place Educational	Recreational	Recreational, aesthetic, spiritual, sacred and/or religious Social relations Sense of place

Source: Author’s elaboration.

The act of watching in tourism is associated with the concept of “tourist gaze” introduced by the sociologist Urry, who argued that the centrality of the visual in contemporary culture is mirrored in tourism, and that our desires to visit places and the ways we learn to visually appreciate those places are not merely individual and autonomous but are socially organized [71]. Moreover, the act of watching is also in the definition of *sport tourism* of Gibson (p. 10): “leisure-based travel that takes individuals temporarily outside of their home communities to play, watch physical activities or venerate attractions associated with these activities” [72].

There are few studies that investigate sporting events from the perspective of spectators [73]. Horbel et al. found that the context of value creation is positively associated with the “service ecosystem of a sport event” [74]. Sporting events offer immersive “servicescapes” [75], experiencescapes, or sensoryscapes [76], which can enhance the value of the experience [77,78].

For example, Wang et al. [79] studied the phenomenon of tidal bore-watching activities in China, which is a phenomenon caused by the leading edge of the incoming tide forming a wave of water that travels up a river or narrow bay against the prevailing current [80]. Regarding tide-watching, visitors tend to believe that it involves relatively low risk, because most people watch tidal bores by standing along the riverbank. Such perceptions, however, ignore the strong power and unpredictability of a tidal bore, which may open up the possibility of tourists being hurt or whirled away by “tsunami-like” tides.

The motivation to watch surfers riding giant waves can be explained by the seeking for adrenalin and thrill sensations triggered by the imminent death risk of this extreme sport spectacle [81,82]. Zuckerman defined *sensation seeking* construct as: “a personality trait defined by the seeking of varied, novel, complex and intense sensations and experiences, and the willingness to take physical, social, legal and financial risks for the sake of such experience” (p. 27) [83].

2.4. Spiritual, Sacred, and/or Religious: Storm-Chasing and Awe-Inspiring Experiences

The proneness to watch the dangerous performances of big-wave riders can be associated with lighter dark tourism theories and motivators, such as [84]:

- (a) The concept of “thanatopsis,” defined by Stone [85] as “the reflection and contemplation of death and dying” usually present in dark tourism also related with the notion of “death drive” [86,87].
- (b) The psychoanalytical notion of “voyeurism” of the spectacular death and death desire [88–91].
- (c) The notion of “mortality salience”, defined by Gordillo et al. as the “awareness of the inevitability of one’s own death . . . ” (p. 286) [92–94].
- (d) The terror management theory, which states that human beings are uniquely aware of their own mortality leading, in turn, to fear or terror of death. Consequently, various strategies are used within everyday life to manage such terror [85,86,95].

The giant-wave phenomenon is usually associated with winter storms and hurricanes in the Atlantic Ocean. Therefore, there is an overlap between risk recreation and storm-chasing tourism. Part of the motives that attract people to Nazaré is the unique combination of nature elements that is enhanced by the storms season in the winter. Several studies aimed to understand the interest in severe weather that spur people to embark on storm-chasing tourism [96,97]. Boulais focused on the ways severe weather was depicted in participants’ discourse and on storm-chasing companies’ websites [98]. Data revealed six non-mutually exclusive depictions of severe weather: passion, a spectacular sight, a dangerous encounter, a rewarding challenge, a treat, and a reminder of humanity’s powerlessness.

Giant waves can trigger stimuli for extraordinary, ‘pure’, ‘peak’, ‘transcendent’, or ‘cathartic’ episodes/experiences, because awe emotions can be generated when individuals confront natural wonders, inspired by the sacred or mystic aura of the place [99–101].

Pearce et al. defined *awe* as an intense (and usually positive) emotion often experienced by individuals visiting nature-based tourism destinations; it has the potential to nurture strong connections between individuals and their environment [101]. Bonner and Friedman [102] provided a conceptual clarification of the complexity and multifaceted nature of the concept of awe proposed by Schneider [103]. They identified ten themes that helped to explain the concept of awe: profoundness, connectedness, numinous, vastness, existential awareness, openness and acceptance, ineffable wonder, presence, heightened perception, and fear.

2.5. Sense of Place and Social Relations: Socioeconomic Implications for the Local Community (Local Residents and Firms/Investors of the Surf Cluster)

The giant-wave phenomenon also leverages CES related with the sense of place and the identity building of Nazaré residents, who have social interactions/relations with visitors, in particular giant-wave chasers and surf tourists. Surfing, as a lifestyle, has been grounded in surf culture, which is recognized as a potential attraction factor for certain surf destinations. The perceptions of the surf culture contribute to a better overall destination image and a higher loyalty towards the destination [104].

In order to understand the transformation of Nazaré from the anthropological and sociological perspectives, Ferreira made an ethnographic film⁶ of the daily life activities and imaginary activities after the big-wave “boom” [105]. This documentary captures the emotions, the sense of place, and the identity traces of Nazaré local people and how their pride and self-esteem have increased since the town started to attract international tourists.

On the other hand, Cunha-e-Sá et al. estimated the economic impact of a three-year media campaign involving private and public institutions to promote big waves and tourism, launched by Nazaré Qualifica and the municipality of Nazaré [8]. After this marketing media campaign, the site became a more popular tourist destination by providing the required “informational media infrastructure” campaign that allowed for the worldwide recognition of the value of big waves.

Cunha-e-Sá et al. estimated that the number of domestic visitors (42,161) and international visitors (35,500) whose average expenditures per visitor and trip were, respectively, EUR 72 and 92. According to an optimistic scenario, the economic impact for the four-year period (2010–2014) was about EUR 10 million. Overall, the total reported expenditures related to big waves were EUR 283,847 during 2010–2013, of which, EUR 26,948 were public expenditures; that is, investments of the local municipality [8].

Nevertheless, Wieser [2] and Bradsahw [7] also addressed some negative consequences of the tourism boom in Nazaré, especially in terms of the social impacts in residents’ quality of life and the potential negative environmental implications. Bradshaw rose the question: “When the weather systems give the green light for big waves, surf enthusiasts flood the town head to the cliff tops in the hope of witnessing goliath waves, but at what cost are these new visitors on Nazaré’s social carrying capacity?” [7]. Crowding and exceeding carrying capacity are factors that threaten the sustainability of surf tourism destinations [106].

2.6. Other Types of Cultural Ecosystem Services: Aesthetic, Cultural Heritage, Inspiration for Culture, Art and Design, Scientific, and Educational (Cultural Heritage Tourists)

Furthermore, there are other CES that benefit the cultural heritage tourists and the local community. According to Iliev [107], there is a strong motivation on the side of the tourists to engage in the pleasure of aesthetics that allow simulation and encourage emotion. Nazaré also inspires projects related to culture and art, such as the Nazaré Criativa project, which promotes local cultural heritage, particularly, living traditions and unique places, going far beyond what is offered in terms of experiences and activities in Nazaré [108]. All activities revolve around stories, traditions, presentations, places, and people of Nazaré.

Regarding the scientific and educational CES, Carapuço et al. claimed that selecting the adequate communication trigger effectively boosts scientific knowledge transfer and raises the predisposition conditions for the audience to be receptive of non-trivial ocean-related scientific topics [109]. “The Nazaré Wave: a trigger for learning” was revealed to be a highly successful initiative and similar strategies may be adopted in other projects aimed at increasing coastal and ocean literacy. The cluster of the surf, which comprises several products (surf boards, wetsuits, and big-wave gear items) and services (schools of surf, water bikes rescue teams, etc.), has been increasing as a direct consequence of this scientific development.

3. Methodology

This paper assesses and maps the deep motivations/pull drivers of giant-wave spectators. Therefore, this study adopts an interpretivist/constructivist paradigm by combining different qualitative methods, such as an auto-ethnographic direct observation and the content analysis of videos and geotagged photos retrieved from social media platforms, such as YouTube, Facebook, and Flickr. Flickr is a major image-sharing website, with more than 60 million monthly active users (in 2022) who upload 1 million photos worldwide daily, according to Yahoo reports. Using Flickr's API method, called *flickr.photos.search*, the author was able to extract 6914 public photos taken in a 5 km radio around Nazaré's lighthouse building, located at a latitude of 39.60698 and longitude of -9.08402 . These photos were taken by 165 photographers who traveled from 30 different countries. The majority came from Portugal (19.3%), followed by Spain (15.1%), the USA (11.4%), France (9%), and Italy (9%).

The method extracted the following relevant information: photo ID, owner ID, taken date of photo, title, tags, latitude, longitude, accuracy, number of views, text description, and URL. Here is the link of the API method used. In order to access the metadata of the photos, the reader must ask Flickr a researcher API Key code and replace the string "[researcher API key]" in the formula:

[https://www.flickr.com/services/rest/?method=flickr.photos.search&api_key=\[researcherAPIkey\]&user_id=&content_type=1&lat=39.60698&lon=-9.08402&radius=5&radius_units=km&extras=description%2C+date_taken%2C+owner_name%2C+tags%2C+views%2C+url_o&format=rest](https://www.flickr.com/services/rest/?method=flickr.photos.search&api_key=[researcherAPIkey]&user_id=&content_type=1&lat=39.60698&lon=-9.08402&radius=5&radius_units=km&extras=description%2C+date_taken%2C+owner_name%2C+tags%2C+views%2C+url_o&format=rest) (accessed on 31 October 2022)

The use of visual anthropology, (including visual auto-ethnography and photo elicitation) as research methods is well supported in the literature [110–115]. Visual research methods usually collect: (1) 'found' images (pre-existing photographs and film); (2) researcher created images; and (3) respondent-created or user-generated images.

4. Discussion of Results

Section 4.1 presents the author's auto-ethnographic journey that allowed the assessment of the push and pull factors of giant-wave spectators/storm chasers linked to recreational, aesthetic, and spiritual CES. The content analysis of the Flickr photos presented in Section 4.2 complements the assessment of the CES that benefit the residents, the firms of the surf clusters, and the cultural heritage tourists.

4.1. Auto-Ethnographic Study: Mapping Journey of "Giant Waves" Chaser Tourists

On 25 February of 2022, the author traveled to Nazaré to watch the "giant waves" phenomenon. The journey started several weeks before, with the daily monitoring of several websites⁷ that forecast the significant wave heights. There are also webcams⁸ that allow tourists to confirm the quality of the swell before traveling to Praia do Norte.

Mach et al. described this journey using the term 'surgical strike' that has been co-opted into the surfing vernacular to differentiate a particular surf trip, which can be domestic or international, where a surfer targets a specific surf-break based on detailed forecasting data and a deep understanding of the variable factors that lead to the best possible conditions at that surf-break [116]. Real Watersports describes them this way: "'Surgical strikes' are when you travel specifically for perfect weather conditions (swell/wind or both) rather than on a calendar like most humans do... Recreational enthusiasts should partake in at least one surgical strike in their lifetime—and probably many more . . . If you only have two weeks off a year and you miss the epic score during your break, then you have to wait another year to roll those 2/52 odds again. Strike out too many years in a row and it starts to really eat at you" [117].

Then, on 21 February, four days before, the forecast for the wave height according to several sources was about 10 m (which can increase three-fold due to the canyon effect), reaching the maximum rating of 10 points (See Figure 2). Because most hotels in Nazaré

only allow free cancellation of the booking until three/four days before the date of arrival, tourists have to make the decision to travel based on the odds that the forecast is correct.

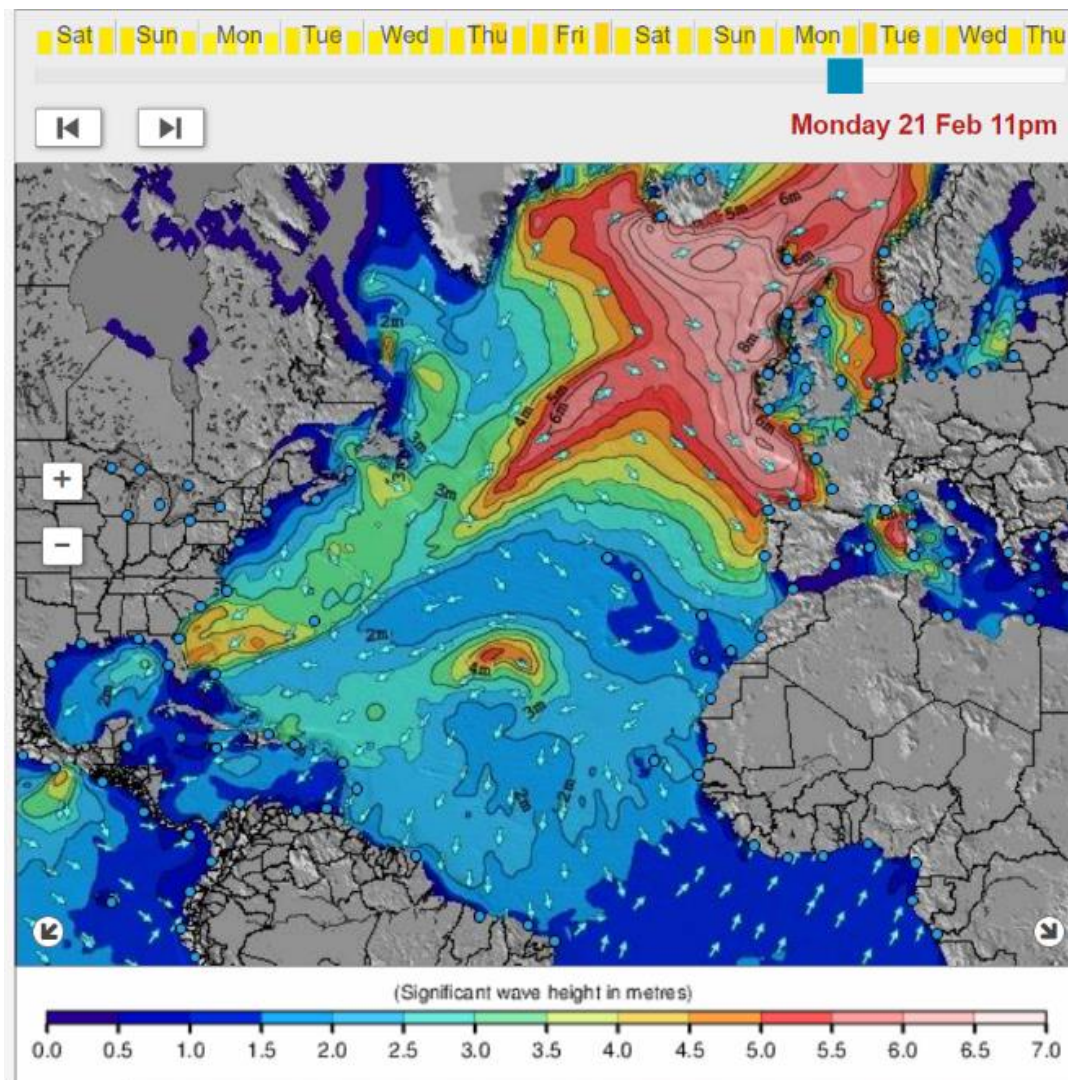


Figure 2. Print screen of the wave height forecast published on the website pt-surf-forecast.com.

Early in the morning on 25 February, hundreds of “giant-waves” pilgrims walked to the surroundings of the Praia do Norte beach in order to obtain the best spot to watch the waves. Figure 3 presents four photos taken by the author during the ethnographic trip, showing the crowd that patiently waited for the “biggest” one, hoping that a surfer in the water rode it, and earned applause, similar to an acrobat in the circus. A successful (sometimes epic) riding excites the crowd and triggers peak emotions, as portrayed in some videos shared on social media ⁹.

For example, the Facebook page of Praia do Norte ¹⁰ published several photos of that day, which complemented the analysis of the journey. Those photos and videos shared by the spectators to YouTube that day (see Table 3) are examples of the electronic word-of-mouth during the advocacy/post-experience stage. During the journey, it was possible to confirm the influence of some push factors (waves forecasting; social media alerts) that ignited the pull factors that emerged in the literature review, such as willingness to connect with nature, sensation seeking, awe, or spectacular death voyeurism (see Table 2).

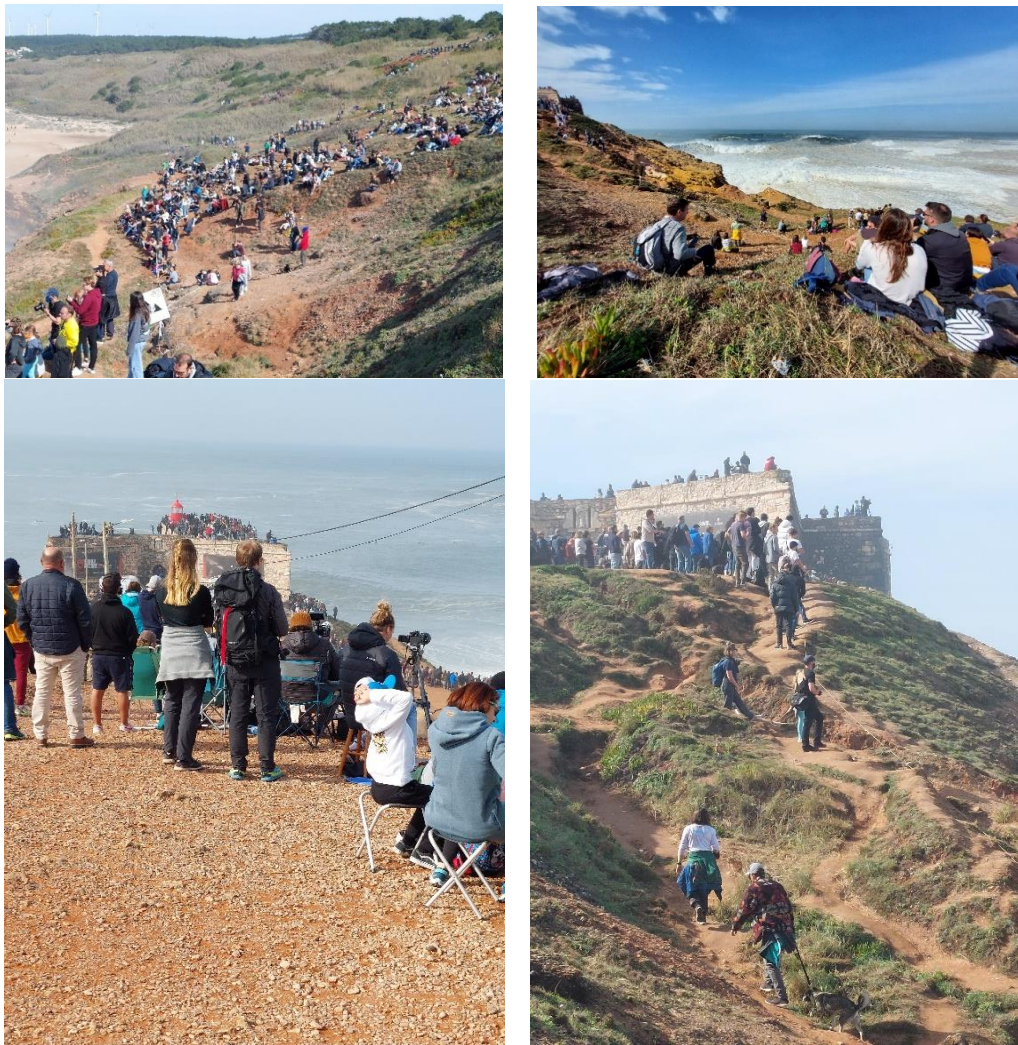


Figure 3. Authors' photos taken on the ethnographic trip showing the spectators of giant waves.

Table 3. Examples of the videos posted on YouTube less than 24 h after (accessed on 26 February 2022).

	24 h after Views	24 h after Comments
https://www.youtube.com/watch?v=HFvtuZe_yG0	2470	0
https://www.youtube.com/watch?v=fHxG5cGrwtc	1281	0
https://www.youtube.com/watch?v=i8VfVs9D2IY	20863	24
https://www.youtube.com/watch?v=PRIs6pTIpKI	2388	4
https://www.youtube.com/watch?v=TLFZ0QSMM6M	1244	6
https://www.youtube.com/watch?v=0nGbRrVw8sA	19	

4.2. Content Analysis of Photos Extracted from the Flickr Platform (User-Generated Content)

Then the author selected 44 photos from a sample of 6914 photos retrieved with Flickr's API method, called *flickr.photos.search*. The selection of the photos was based on the content analysis of the photo, on the significant content of the title, tags, and text descriptions (see Table 4). The major criterion included every new portrayed cultural ecosystem service, thus aiming for maximum diversification of the CES inventory. The classification of CES was based on the classification taxonomy of marine and coastal CES provided by the Common International Classification of Ecosystem services (CICES) v5.1, as detailed in Section 2.1 in the literature review [37].

Table 4. Cultural Ecosystem Services (CES1 and CES2) depicted in the selection of photos retrieved by the Flickr API method flickr.photos.search (all accessed on 31st October 2022).

Legend	Photo ID	Date Taken	Views	url_o	Description	CES 1	CES 2
A1	30644542680	2016-09-15 19:29:20	67	https://live.staticflickr.com/5490/30644542680_e7c0420bb6_o.jpg	Beach at sunset	Aesthetical	Photography
A2	30559157036	2016-10-12 13:08:03	1571	https://live.staticflickr.com/5767/30559157036_05891a1a45_o.jpg	Windows architecture	Aesthetical	Immaterial heritage
A3	49309306977	2018-06-09 21:23:43	556	https://live.staticflickr.com/65535/49309306977_e8220593fe_o.jpg	Fisherman at the beach	Aesthetical	Social relations
H1	23442799314	2015-09-29 12:03:32	52	https://live.staticflickr.com/5749/23442799314_33cd5fb436_o.jpg	Museum	Heritage	
H2	35499908875	2016-05-08 18:03:47	1444	https://live.staticflickr.com/4254/35499908875_11e5de01a1_o.jpg	Traditional fishing boats	Heritage	Sense of Place
H3	27324003121	2016-05-10 20:27:11	2634	https://live.staticflickr.com/7418/27324003121_4867c51b2b_o.jpg	Old traditional boats	Heritage	Photography
H4	31096429260	2016-06-17 14:28:32	1459	https://live.staticflickr.com/5556/31096429260_aee2133724_o.jpg	Lighthouse	Heritage	
H5	30464527935	2016-10-10 16:29:50	800	https://live.staticflickr.com/5333/30464527935_7d079741ec_o.jpg	Nazaré, Portugal	Heritage	Religious
H6	35867788775	2017-06-15 13:52:01	609	https://live.staticflickr.com/65535/35867788775_2c24644592_o.jpg	Old Chapel	Heritage	Religious
H7	40443397174	2018-03-28 09:11:32	27,568	https://live.staticflickr.com/789/40443397174_b217c32347_o.jpg	Old traditional boats	Heritage	Photography
H8	45275272174	2018-11-16 15:08:21	69	https://live.staticflickr.com/4825/45275272174_f66ffdb179_o.jpg	Nazaré	Heritage	
H9	51853849021	2021-07-08 14:41:21	120	https://live.staticflickr.com/65535/51853849021_d1cde46804_o.jpg	The XIX century elevator	Heritage	Industrial tourism
H10	51385715125	2021-07-08 19:12:48	232	https://live.staticflickr.com/65535/51385715125_1f7dd7d9fa_o.jpg	Fort of Sao Miguel Arcanjo and Lighthouse	Heritage	Sense of Place
H11	51708646208	2021-11-23 17:57:57	188	https://live.staticflickr.com/65535/51708646208_70179d3964_o.jpg	Praia do Norte and Forte de Sao Miguel Arcanjo	Heritage	Photography
H12	51711091674	2021-11-26 14:02:00	40	https://live.staticflickr.com/65535/51711091674_3bd7abdc3e_o.jpg	Traditional Gastronomy (Octopus, Squid and Cod)	Heritage	
H13	52065438755	2022-05-10 17:42:17	371	https://live.staticflickr.com/65535/52065438755_c255ec11c2_o.jpg	Traditional women costume	Heritage	Social relations
H14	52065438755	2022-05-10 17:42:17	371	https://live.staticflickr.com/65535/52065438755_c255ec11c2_o.jpg	Local woman with traditional costume	Heritage	Social relations

Table 4. Cont.

Legend	Photo ID	Date Taken	Views	url_o	Description	CES 1	CES 2
I1	51517746386	2016-05-10 21:44:40	1907	https://live.staticflickr.com/65535/51517746386_893630dfa4_o.jpg	Traditional folklore dancers	Inspiration for art	Immaterial heritage
I2	51545291535	2016-05-10 21:45:45	3406	https://live.staticflickr.com/65535/51545291535_165ab27249_o.jpg	Folklore, traditional dancer	Inspiration for art	Immaterial heritage
I3	33172810631	2016-05-10 22:09:45	2580	https://live.staticflickr.com/686/33172810631_070d5bf8bc_o.jpg	Folklore, traditional dances	Inspiration for art	Immaterial heritage
I4	51354506906	2021-07-08 19:01:27	270	https://live.staticflickr.com/65535/51354506906_57fc33932a_o.jpg	The Dear Statue (Religious Tales and Legends)	Inspiration for art	Immaterial heritage
IR	31821785883	2015-09-26 15:57:17	316	https://live.staticflickr.com/562/31821785883_ac60b142d9_o.jpg	Dry fish	Intellectual Interactions	Immaterial heritage
K1	52303308475	2019-11-05 18:07:13	7588	https://live.staticflickr.com/65535/52303308475_6aebfcdf1_o.jpg	Rescue water bikes	Local knowledge	Intellectual Interactions
K2	51970578966	2022-03-30 01:10:37	9537	https://live.staticflickr.com/65535/51970578966_1440ef6c84_o.jpg	Rescue water bikes	Local knowledge	Intellectual Interactions
R1	33104397152	2017-02-21 10:16:50	2093	https://live.staticflickr.com/593/33104397152_ccb4fe5c4c_o.jpg	Surf	Recreational	
R2	32396344154	2017-02-23 11:47:54	1231	https://live.staticflickr.com/3699/32396344154_a8aab87912_o.jpg	Surf Museum	Recreational	Intellectual Interactions
R3	34932097764	2017-06-12 13:25:52	1263	https://live.staticflickr.com/4023/34932097764_18fde34226_o.jpg	Nazaré Beach	Recreational	
R4	49598254706	2018-02-10 11:30:29	82	https://live.staticflickr.com/65535/49598254706_8577f26e55_o.jpg	Giant-wave watching	Recreational	Sense of Place
R5	51852851952	2021-07-08 15:42:18	154	https://live.staticflickr.com/65535/51852851952_2_686aac1472_o.jpg	Beach	Recreational	
R6	51916354356	2021-10-22 17:08:46	146	https://live.staticflickr.com/65535/51916354356_455accacfb_o.jpg	Surf Museum	Recreational	Intellectual Interactions
R7	52234045249	2022-07-22 17:49:43	1595	https://live.staticflickr.com/65535/52234045249_f50abfd0b8_o.jpg	Nautical/Water Sports	Recreational	
Sc1	51722296037	2021-07-28 16:59:49	167	https://live.staticflickr.com/65535/51722296037_b2281a64df_o.jpg	Local flora at the dunes	Scientific	Educational
Sc2	52228935753	2022-07-18 11:28:31	9	https://live.staticflickr.com/65535/52228935753_6f328a25d3_o.jpg	Local flora	Scientific	Educational
P1	18825114028	2015-05-19 21:38:12	373	https://live.staticflickr.com/288/18825114028_c751c0947e_o.jpg	Nazaré 's houses	Sense of Place	
Sr1	24259959260	2012-11-01 17:00:39	114	https://live.staticflickr.com/1469/24259959260_e6ac23bcd_o.jpg	Local saleswoman	Social relations	Sense of Place
Sr2	23885164329	2015-09-29 13:53:30	237	https://live.staticflickr.com/1699/23885164329_96738aab3a_o.jpg	Square in Sitio	Social relations	Sense of Place
Sr3	22503253129	2015-11-07 15:31:16	11	https://live.staticflickr.com/633/22503253129_571316c7a1_o.jpg	Local drink ("Ginja")	Social relations	Heritage

Table 4. Cont.

Legend	Photo ID	Date Taken	Views	url_o	Description	CES 1	CES 2
Sr4	31749444817	2016-05-08 18:05:00	2353	https://live.staticflickr.com/4864/31749444817_7f440568d2_o.jpg	Local women	Social relations	
Sr5	28174732962	2016-05-08 18:05:20	9220	https://live.staticflickr.com/7006/28174732962_f9841522ac_o.jpg	Drying fish on the beach	Social relations	Intellectual Interactions
Sr6	30539707936	2016-10-12 12:14:27	811	https://live.staticflickr.com/5543/30539707936_fa6c790d44_o.jpg	Fish Market	Social relations	
Sr7	49203125521	2019-12-05 18:02:48	1150	https://live.staticflickr.com/65535/49203125521_fb62d6ea16_o.jpg	Fishing Boat	Social relations	Sense of Place
Sr8	52229410705	2022-07-18 11:50:40	9	https://live.staticflickr.com/65535/52229410705_da1640f416_o.jpg	Fishing Boat	Social relations	
Sr9	52450403706	2022-07-23 18:11:21	4	https://live.staticflickr.com/65535/52450403706_9c1b141d35_o.jpg	Selling dry fish	Social relations	
Sp	52067734430	2022-02-14 05:28:32	215	https://live.staticflickr.com/65535/52067734430_8f0da3689c_o.jpg	Religious Tales and Legends	Spiritual	Immaterial heritage

Using the classification proposed by Garcia Rodrigues et al. [38], the two most explicit cultural ecosystem services depicted in the photos (CES 1 and CES 2) were reported.

The majority of photos show recreational and leisure activities related with water and nautical sports, in particular, scenes of surfers riding giant waves in Praia do Norte, under the surveillance of the rescue teams. The second category of photos portray the Nazaré beach located on the south side of the cliffs during the summer holidays.

Furthermore, this content analysis identified the other types of CES: (1) aesthetical (e.g., landscape photography); (2) man-made immovable heritage (e.g., the museum, the Fort of Sao Miguel Arcanjo/lighthouse, the elevator of the XIX century or the religious buildings); (3) movable heritage (e.g., traditional fishing boats); (4) immaterial heritage (e.g., the local fish gastronomy or the women traditional costumes); (5) the inspiration for art and design (e.g., folklore and traditional dances); (6) local knowledge as a form of intellectual and representative interaction (e.g., drying fish techniques—see Figure 4, rescue water bikes driving tactics to ride the giant waves); (7) social relations depicted in the fishing activities, in the fish market, and other street shops.

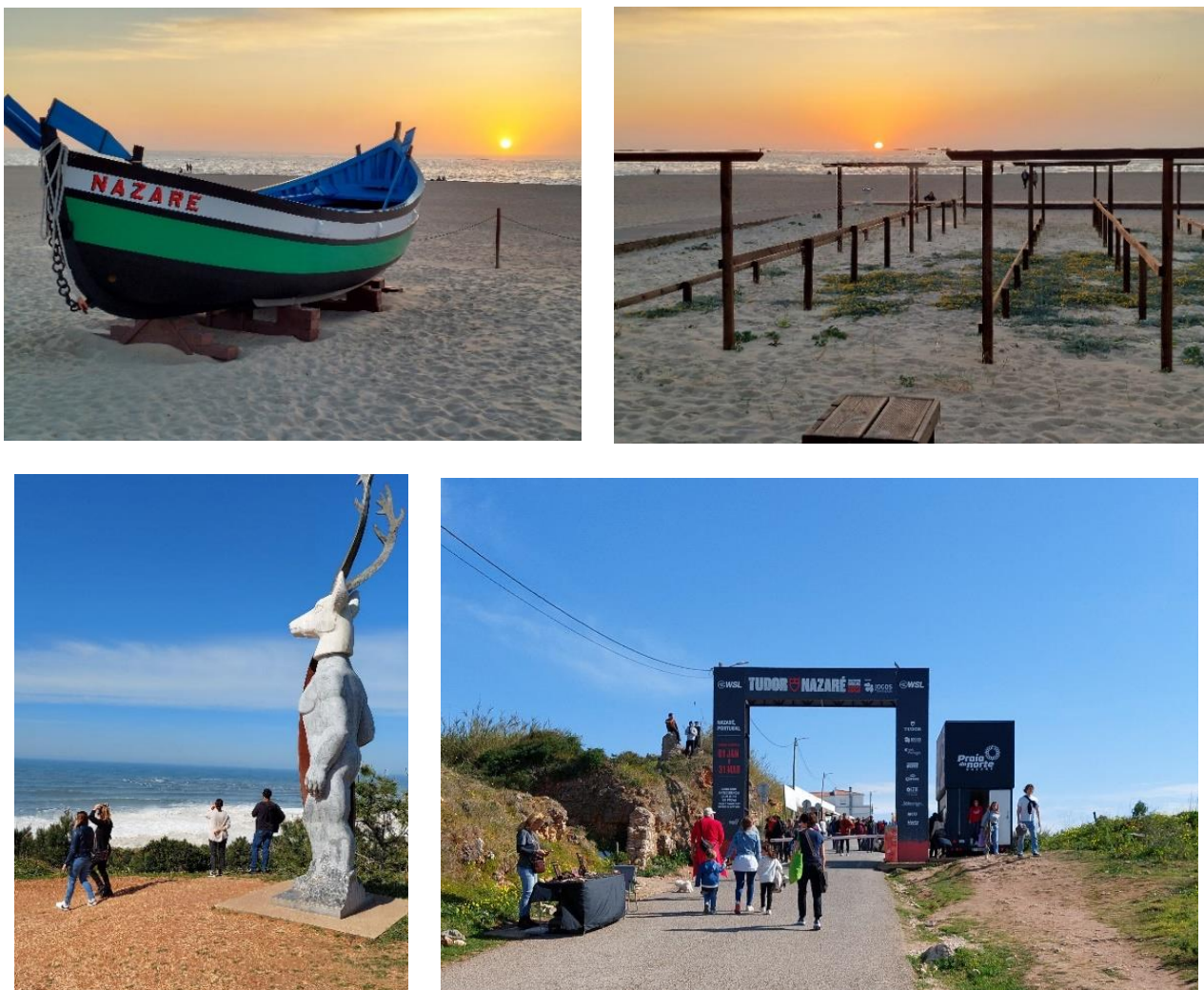


Figure 4. Author’s photos taken on the ethnographic trip showing some examples of cultural ecosystem services of heritage and inspiration for art.

Nazaré is a land of legends and tales, which are rich sources of CES related to the immaterial heritage and the inspiration for culture, art, and design. The origin of the name “Nazaré” itself is explained by a statue of the Virgin brought from Nazareth (in

present-day Israel) in the 4th century, which was previously lost but was found centuries later. Another famous story says that the Virgin appeared to a local nobleman in 1182 who was hunting deer. He was about to fall off the edge of a cliff on his horse and was miraculously stopped just in time. This legend was the inspiration for the “Dear” Statue ¹¹ (made by Agostinho Pires and Adália Alberto), which combined the legendary origins of Nazaré with giant-wave surfer characteristics. It stands tall on the road to the lighthouse and it has been captured in many tourists’ photos (see Figure 4).

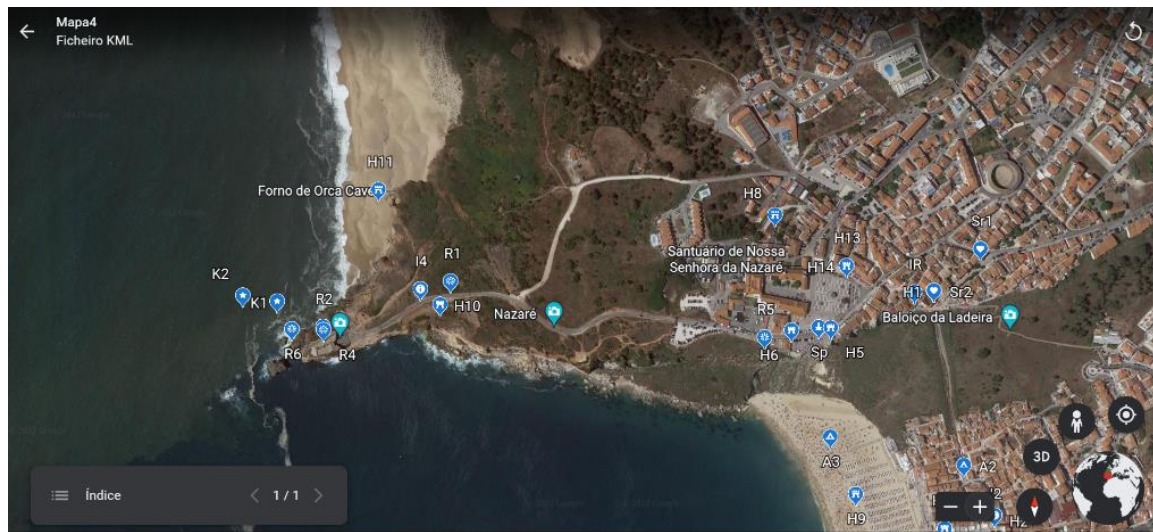
In terms of scientific/educational cultural ecosystem services, besides the study of the biology of the flora and fauna of the region (under and out of the sea), giant-wave tourism has leveraged the scientific study related to the forecasts and measurements of the wave heights. The Hydrographic Institute of the Portuguese Navy ¹² developed several projects that increased scientific knowledge about the Nazaré’s Canyon and the giant-wave formation.

4.3. Analysis of Spatial Distribution of CES Based on Geotagged Photos

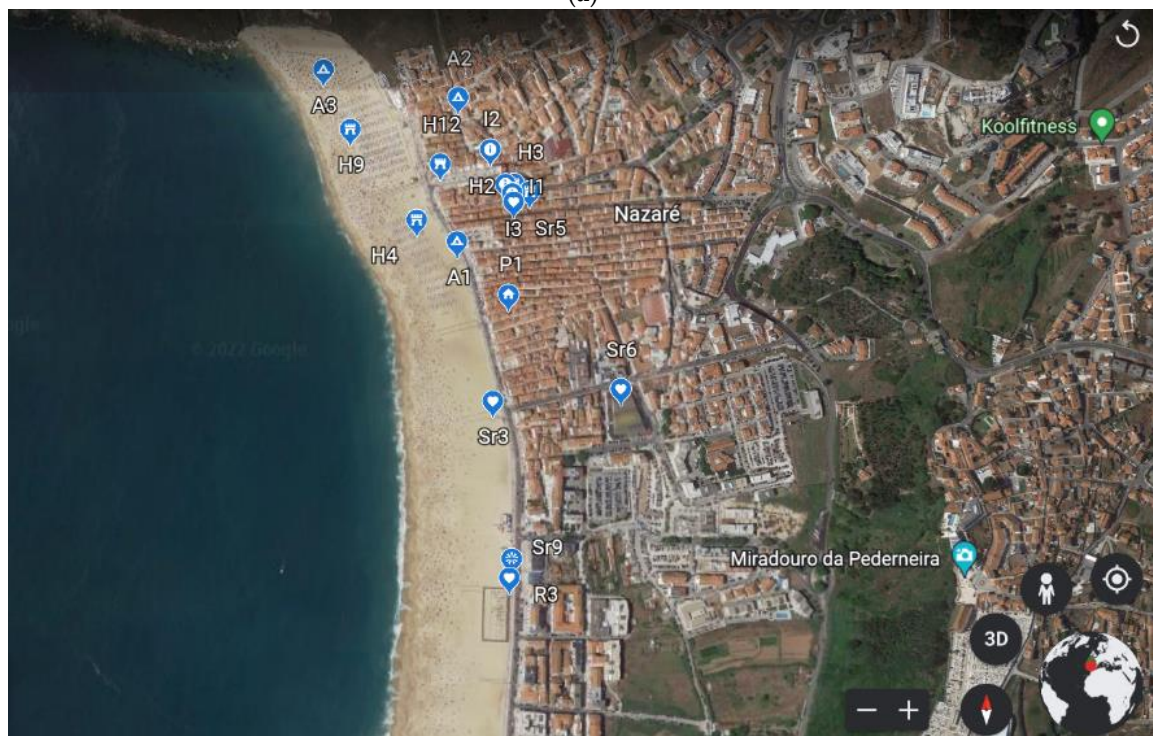
In order to analyze the spatial distribution of the photos, Figure 5 presents a Google Earth map that was built with a kml file on the latitude and longitude coordinates uploaded by photographers. The first column of Table 4 corresponds with the legend code in Figure 5, thus allowing the identification of the dominant CES portrayed in the photo. Figure 6 are amplifications of the partial zones signaled in Figure 5: zone A, around the lighthouse fortress; zone B, in the town center.



Figure 5. Google Earth map of the spatial distribution of the photos.



(a)



(b)

Figure 6. (a) Amplification of Google Earth map Zone A (around the Fortress); (b) amplification of Google Earth map Zone B (Nazaré town center).

The spatial distribution is influenced by the geographic and orographic characteristics of the territory, as the photos that depict recreational (R), and local knowledge (K) ecosystem services were taken in the best spot to watch the giant-wave—the cliffs around the lighthouse fortress, where the undersea canyon is located (see Figure 6). In the urban areas, such as Nazaré’s town center, the photos portray mostly CES related with heritage (H), aesthetic (A), and social relations (Sr). Therefore, the spatial distributions of CES are also influenced by the concentration of inhabitants as suggested by previous studies [36].

Another example of scientific CES, i.e., a direct consequence of the giant-wave boom, involves the innovation and development of a lot of products related with the safety of the surfers in Nazaré. Andrew Cotton describes a list of 14 items of his surf gear that includes,

for example, an impact/float vest for paddling and tow surfing big waves. It has loads of foam on the chest but none on the stomach, which makes it really nice to paddle in; it also has foam side panels and back panels and two side zips with overhead entry, which makes it harder for it to be ripped off in violent wipeouts.

5. Conclusions: Theoretical and Managerial Implications

5.1. Theoretical Framework of a Giant-Wave Chaser's Experience Journey

Based on previous sections of the literature review, this paper proposes a theoretical framework (see Figure 7) describing the push and pull factors that influence the tourist's experience journey of the giant-wave spectator/chaser. Considering the chronological order from the left to the right, this study found that during the awareness stage the giant-wave tourist is exposed to several push factors, such as the Nazaré Municipality advertising campaigns, McNamara stories, or film documentaries. During the consideration and planning stages, the alerts of wave forecasts ignite the pull motivators, impelling the organization of the trip.

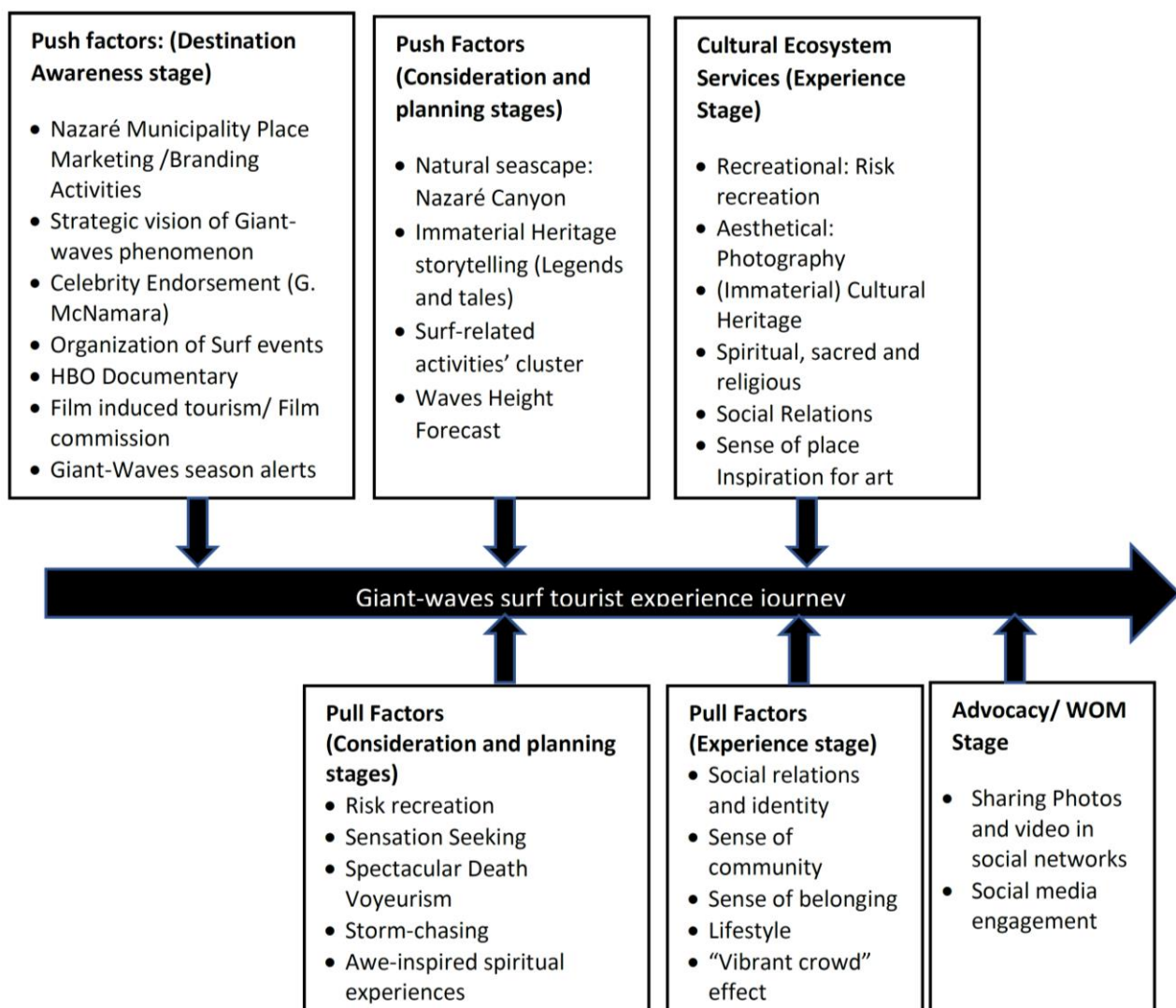


Figure 7. Theoretical framework of a tourist's experience journey of the giant-wave spectator/chaser.

During the experience stage, the giant-wave tourist captures the benefits of all the CES provided by the landscape and this nature attraction, which in turn are moderated by the individual pull factors, such as the propensity to socialize or the sense of belonging to this

“tribe” of giant-wave chasers. At the end of the journey, the tourist shares his/her “peak” moments and emotions on social media, thus promoting the electronic word-of-mouth among family, friends, and peers.

5.2. Managerial Implications

The phenomenon of giant waves in Nazaré leveraged the increase of tourism and the local economy and inspired the strategic shift in the positioning of Portugal’s destination branding. More recently, the website Visitportugal has launched an advertising campaign, i.e., “Portuguese waves”, promoting the country as a (winter) surf destination¹³ and aiming to reduce the tourism seasonality [118,119].

This paper provides useful information for regional public decision-makers, destination marketing organizations, tourism operators, and business entrepreneurs. The geotagged social media photos allowed the researcher to assess the most relevant maritime/coastal cultural ecosystem services in Nazaré, Portugal. Tourism operators and business entrepreneurs can use this mapping tool to support their business location decisions.

For example, risk recreationists (non-big-wave surfers) is a new market niche that is starting to be explored by new businesses (e.g., boat cruises that allow tourists to have closer views of big waves¹⁴).

From a theoretical perspective, this study did not confirm some of the pull factors suggested by previous studies. The comments from the user-generated photos and videos did not provide explicit evidence that giant-wave chasers are conscious of the motivations related to risk recreation and imminent/spectacular death voyeurism. Further research should adopt other methodologies, such as depth interviews in order to capture those unconscious drivers and deeper motivations.

Public decision-makers, destination marketing organizations, tourism operators, and business entrepreneurs must acknowledge the relevance of journey mapping in order to identify the moments of stress and the touchpoints associated with peak/positive experiences generated by these CES. These hotpots also provide the information about tourists’ most frequent journeys, which can feed the design of innovative coastal tourism experiences. Multi-thematic coastal tourism routes or trails may contribute to attract new visitors, to enrich their journeys, to increase the staying time and satisfaction and, ultimately, promote electronic word-of-mouth. Further research may estimate the demand and assess the economic impact of surf tourism for the region.

There a lot of events (such as the Tudor Nazaré Tow Surfing Challenge) that attract more tourists every year. Nevertheless, according to Wieser [2], Bradshaw [7], or Muller [120], crowding and exceeding the carrying capacity may threaten the social and environmental sustainability of surf tourism in Nazaré and in other surf spots in Western Europe.

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Data Availability Statement: Data is available on request.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

- ¹ <https://www.theguardian.com/sport/2011/nov/13/garrett-mcnamara-surfing-record-wave>, accessed on 31 October 2022.
- ² Official trailer of HBO documentary: https://youtu.be/znCNT-9k_Ws, accessed on 31 October 2022.
- ³ (e.g., the front cover of the newspaper “The Times” of 30th January of 2013).
- ⁴ <https://www.nytimes.com/2018/11/11/world/europe/nazare-portugal-surfing-big-waves.html>; <https://www.theguardian.com/travel/2022/nov/04/nazare-portugal-watching-surfers-ride-monster-waves>, accessed on 31 October 2022.
- ⁵ Source: <https://www.facebook.com/praiadonortenzare/posts/10160210246034993>, accessed on 31 October 2022.
- ⁶ <https://vimeo.com/575472527/3476555f3a>, accessed on 31 October 2022.

- 7 https://www.surf-forecast.com/weather_maps/North-Atlantic?over=none&type=htsgw; <https://pt.surf-forecast.com/>; <https://www.ipma.pt/pt/maritima/hs/>, accessed on 31 October 2022.
- 8 <https://beachcam.meo.pt/en/livecams/praiado-norte-canha-nazare/>, accessed on 31 October 2022.
- 9 <https://www.facebook.com/reel/1333419030760250>, accessed on 31 October 2022.
- 10 <https://www.facebook.com/praiadonortezazare/posts/10160210246034993>, accessed on 31 October 2022.
- 11 <https://www.atlasobscura.com/places/veado>, accessed on 31 October 2022.
- 12 <https://www.hidrografico.pt/index/en>, accessed on 31 October 2022.
- 13 https://ie.linkedin.com/posts/visitportugal_portuguese-waves-activity-6990634210155741184-KYGF?trk=public_profile_like_view, accessed on 31 October 2022.
- 14 <https://www.facebook.com/nazarewaterfun>, accessed on 31 October 2022.

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