invtur2024
conference

Proceedings of the INVTUR Conference 2024
8-10 May 2024, University of Aveiro, Portugal

Pages
833 – 848

Visual sensory experience secret behind the museum's visitor photos:
The Portuguese cod fishing museums

BÁRBARA MATEIRO

Contacting author: barbaramateiro@ua.pt

Abstract | This research examines online codfish museums published on Flickr by visitors to analyze the visual sensory dimensions of the visitor experience. The importance of analyzing online photos posted by visitors, in a pos-visiting context, is an excellent way to understand the profile of the visitors and their visual sensory experience. The study aims to identify codfish museums worldwide and analyze the visual dimensions of codfish museum visitors' experiences by typologies. The case study findings are particularly valuable for museum management in understanding visitor profiles and visual experiences to better tailor the experience to the visitors.

Keywords | Museum, cod fish museums, visitor experience, visual sensory experience, sight, tourism, photography, Flickr data

1. Introduction

In the current tourism and marketing literature, the economic experience emphasizes the idea that visitors want to have an experience in different contexts. Among researchers, experiences are viewed from different perspectives and dimensions. Moreover, in the last decade, sensory dimension experiences, such as visual, touch, smell, hearing, and taste have been studied and used in the tourism context (Agapito, 2020) to better understand the tourist experience and to provide guidance to managers, marketing professionals and destinations. This paper aims to present and discuss techniques to identify museums in the same context by visual sensory visitors and to understand the visual visitor experience in the museum context through photo sharing on social media (Flickr).

We have structured the article in the following way: firstly, we present the theoretical basis of visual sensory experience, and how it is adapted to the tourism concept. Secondly, we discuss the chosen methodology in application content analysis based on the visitor photos published on Flickr. Thirdly, we present the results of the content analyses for visual sensorial experience. Finally, we discuss the contribution of the article, its limitations, and future research opportunities.

2.   Theoretical background

2.1.   Visual dimension of the tourist experience

Different sensory experiences result from the five elementary senses – visual, touch, hearing, smell, and taste. One experience is created by each sense, and the combination of all five senses generates the sensory experience (Hultén, Broweus, & Dijk, 2009). Therefore, goods, services, and service landscapes can be visualized because a group of expressions creates an individual visual experience (Hultén et al., 2009). The same occurs in tourism where an individual visual experience is made up of a visual sense expression of the tourist experience.

According to Pradeep (2010), emotions and feelings are a result of the senses. Although every sense is extremely important and provides people with a lot of input, the visual sense involves one-fourth of the human brain and 70 percent of the body's sense receptors are in the eyes. This sense is considered the most important sense for many people and tourists, as seen in different studies (Agapito, Valle, & Mendes, 2014; Diţoiu & Căruntu, 2014; Mateiro, Kastenholz, & Breda, 2018). Humans trust the visual sense to create images or pictures of day-to-day moments (Dissabandara & Dissanayake, 2019), so the visual sense should be analyzed to create a visual sensory experience in the tourism industry.

In tourism experience research, the visual experience, according to the different phases of the experience, was explored using tourist brochures, postcards, and tourists' photographs, which they can select to share as best reflecting their experiences or simply provide to the research analysis (Scarles, 2010). However, nowadays, photos can provide more information than visitors could imagine, serving as an important source of insights that could explain in more detail the visitor's experience or their interests (Vu, Luo, Ye, Li, & Law, 2018).

2.2.   Studies on visitor experience using photos

The sensory dimension of the tourism experience has recently been considered an important part of the tourism experience. Some authors have tried to analyze the five senses, visual, hearing, touch, smell, and taste - to explain the sensory dimension of the experience (Lee & Jan, 2019; Lee & Kim, 2016; Lv., Li, & McCabe, 2020; Åstrøm, 2018; Ballantyne, Packer, & Sutherland, 2011). In this case, the researcher focused on the visual sense and studies that used photos to explain the visual sensory dimension of the tourist experience.

Different methods have been used to analyze the visual dimension of the visitor's experience, which have been growing and more used in the last two decades (Scarles, 2010). Some authors used photos of the visitors (Fung & Jim, 2015) and used photos from a web database (Pan, Lee, & Tsai, 2014). Others, apart from photos, interviewed visitors or gave them a diary to understand more about the photo experience (Balomenou, Garrod, & Georgiadou, 2017). Scarles (2010) suggests that visual autoethnography is a good technique for understanding the visual experience

and suggests that the study with this technique can include some other types of materials (such as video, diaries, or scrapbooking) to better understand the visual experience.

However, nowadays, new technologies and the desire to share photos on social media have led tourists, residents, and public entities to update and share photos. People want to share photos with friends, family, and with the public (Vu et al., 2018). Apart from that benefit, metadata could be used to provide and understand some issues that were inferred from the tourist movement or outbound, to understand the visitor profile (Liu et al., 2013) and visitor experience in museums (Vu et al., 2018), for demand estimation (Karayazi, Dane, & de Vries, 2021) and to plan a route (Mor, Fisher-Gewirtzman, Yosifof, & Dalyot, 2021) or multiple itineraries (Sarkar & Majumder, 2022). Nevertheless, using travel photos and their metadata to analyze the visual sense could also be a way of understanding what was more appealing to different types of visitors in the museum context.

3. Methodology

3.1. Study Context

The study was conducted at six Portuguese museums - Maritime Museum of Ílhavo, Ship-Museum Santo André, Maritime Religious Centre, Gil Eannes Hospital Ship, Sea Museological Nucleus, and Palheiros de Mira Museum, to explore the same culture, cod fishing culture, in different Portuguese places. The codfish symbolizes Portugal due to its traditional cooking and historical significance in the country's social, economic, and political context for decades (Garrido, 2016). The study also focused on the cultural, economic, and gastronomic traditions of salting the codfish.

The first part of the study involved a global search to identify the main cod fishing museums in the world. A second phase focused on codfish museums in continental Portugal. The most important cod fishing museum was identified by the photos that were published by visitors. However, because the photos that were identified did not represent all museums in continental Portugal with an exposition related to cod fishing, another three museums were considered. Therefore, in our study, a convenience sample was used to determine the number of Portuguese museums, and this may limit generalization. The study of the photos was conducted systematically (Figure 1).
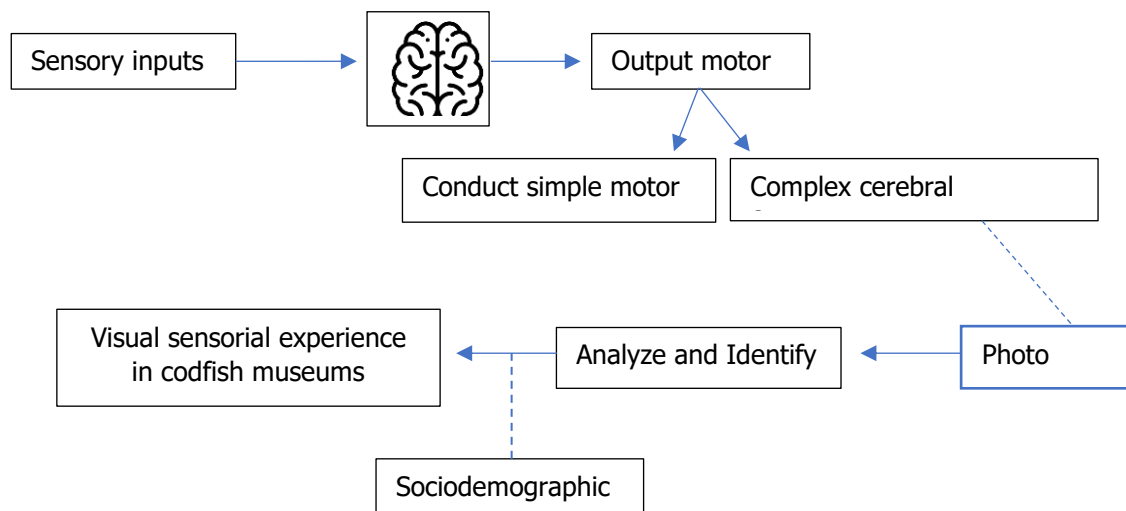
Figure 1 | Model of investigation

Source: Own elaboration.

The study aimed to answer the following questions:

i. What are the dominant museums related to cod fishing in the world considering the visual context? Is there any Portuguese museum in this context?

ii. Is there a visual content connection regarding codfish museums?

iii. Is there a connection between sociodemographic variables and the visual content of codfish museums?

3.2.   Data Collection

The study was structured into three main parts, as shown in Figure 2. Firstly, the photo data used in this study consisted of images from Flickr (www.flickr.com) based on 'all', as it is a popular photo-sharing platform. This platform was created in 2004 and is considered one of the best online applications for managing and sharing photos. Secondly, a spatial distribution of the cod fishing museums was considered to identify the main cod fishing museums. Then, these two parts of the analysis were repeated, but only with museums that are in Portugal individually. The last part was to analyze the visual dimension of the visitor experience in museums that correlated with cod fishing in Portugal.
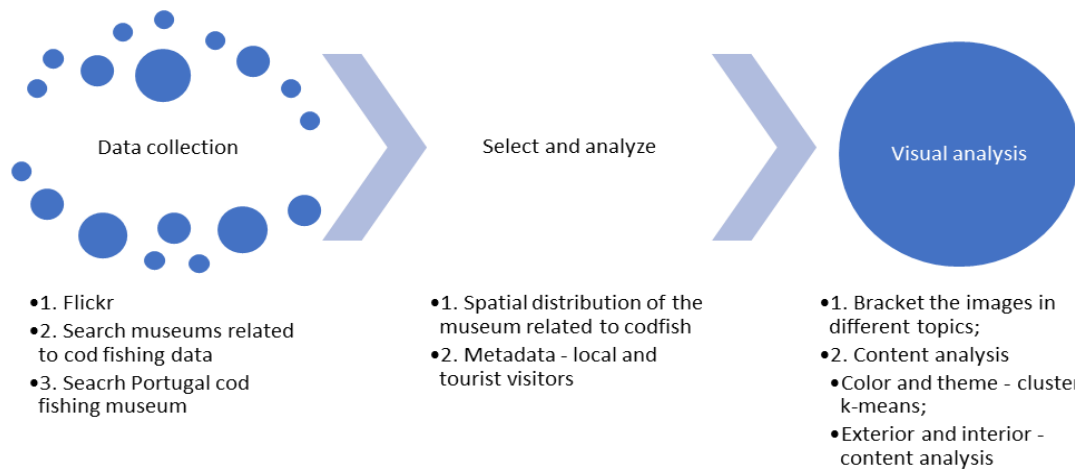
Figure 2 | Methodological flow chart used in the data process

Source: Own elaboration.

The photos we downloaded were analyzed using visual content analysis, a method in which empirical data – the different photo images – determine the final categorization. This methodology has been adopted by some authors in photography studies, such as Dorwart, Moore, and Leung (2006), Garrod (2008), and Markwell (1997). To determine the percentage of each color in the photos, we also used Python. We opened the photos with OpenCV, which provides a real-time optimized Computer Vision library, tools, and hardware. Then we calculated the percentage of each color in the photos using a library called scikit-learn with the cluster K-Means. With this analysis, we identified five colors that represent our five clusters. After obtaining the RGB color codes, we approximated the colors to those available in a database of CSS Colors to easily determine the name of the color.

3.2.1. Identifying the cod fishing museum in the world

In the first instance, we decided to collect all the photos with the words 'codfish museum' because no prior studies and information had been published regarding the analysis of spatial cod fishing museums and the visual content of the visitor experience in codfish museums. The researcher's search yielded 65 photos related to the topic. However, some photos were not exactly related to the codfish museum and others did not have a location identified by the metadata or the user. Thus, a second-round analysis was necessary. Instead of removing these photos, a total of 29 photos were considered in this analysis.

As we can see in Table 1, fifteen locations were identified The Casa dos Bicos is a codfish shop in Lisbon; therefore, for this study, we did not consider it. Canada is the country that has the most museums, one of which is about codfish, namely the Fisheries Museum of the Atlantic. The

museums that have a higher number of photos were the Maritime Museum of Ílhavo (n=10), Fisheries Museum of the Atlantic (n=5), and Sangus Iron Works National Historic (n=5). In addition, we could identify three Portuguese museums, in particular the Maritime Museum of Ílhavo, Gil Eannes Hospital Ship, and Ship-Museum Santo André.

Table 1 | Codfish museums and number of photos

Country	Museums	No of photos
Portugal	**Maritime Museum of Ílhavo**	**10**
	Casa dos Bicos (x)	2
	Gil Eannes Hospital Ship	**2**
	Ship-Museum Santo André	**1**
Canada	Museum of Antropology	1
	Audain Museum	1
	McCord Museum	2
	Arché Musée et Archive de Saint-Pierre-et-Miquelon	2
	Fisheries Museum of the Atlantic	**5**
US	Cape Cod Museum of Natural History	1
	National Museum of American History	1
	Poulsbo Historical Society Museum	1
	Sangus Iron Works National Historic	**5**
UK	New Bedford Whaling Museum	1
Norway	**Norwegian Canning Museum**	**1**

Source: Own elaboration.

Portugal was ranked fifth in the codfish museum, and one of these museums had the highest number of photos. As we explained, codfish is an identity of Portugal, and the cod fishing activity was important at different periods in Portugal's history. This justifies the importance of understanding the experience that people have when getting in touch with this topic.

### 3.2.2. Identifying cod fishing museum in Portugal

Portugal was chosen as a case study, as it is an important reference for cod fishing activity. Codfish and codfishes are a significant part of Portuguese culture and are seen as part of Portugal's identity. The identification of the cod fishing museums in Portugal was divided into two phases. The first phase involved obtaining data from Flickr. The main keyword that entered the research function was 'codfish museum', and this led to the identification of codfish museums in Portugal. The search period covered from 2006 until March 2022, and it returned 368 valid photos from 84 visitors, 3 public entities, and 2 private entities.

Although only three Portuguese museums appeared in the first phase of the study, six museums were considered for this analysis. These included the Maritime Museum of Ílhavo, Ship-Museum Santo André, Maritime Religious Center, Gil Eannes Hospital Ship, Sea Museological Nucleus, and

Palheiros de Mira Museum, as all of them have a permanent exposition related to cod fishing or cod fishers in Portugal.

3.3. Measuring items

The measurement items used for this study were adopted from previous literature and were used to analyze the visual sensory experience. According to Hultén et al. (2009), an individual's visual experience is a combination of several visual sense expressions, including design, packaging and style, color, light and theme, and graphics, exterior, and interior. It is important to highlight that design, packaging, and style are related to goods, not to services, so these sense expressions could not be analyzed in this study (Figure 3).
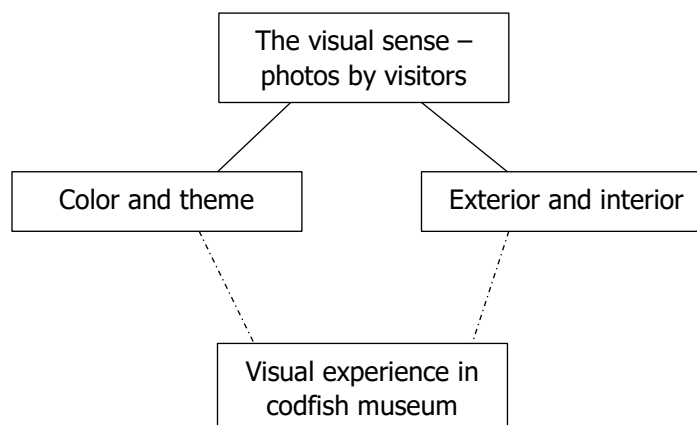
Figure 3 | Visual experience in codfish museum.
Source: Adapted from Hultén et al. (2009)

When analyzing the category of 'graphics, exterior, and interior' the topic of 'graphics' was not included in the analysis because it is related to the logotype. Since the logotype did not appear in the visitor photos, we excluded this topic. Regarding the interior and exterior, it is important to note that everything included in the museum's interior and exterior helps visitors identify and understand the museum's values. For example, from an exterior perspective, the facade, door, and storefront of the museum can communicate the museum's identity and values. From an interior perspective, the objects on display reinforce the visual experience and establish connections with visitors (Hultén et al., 2009).

Similarly, in the category of 'color, light and theme' the topic of light was not analyzed because we could not assess the presence of lights in the visitor photos. Color is important because it affects the central nervous system and the cerebral cortex contributing to the activation and stimulation of memories, thoughts, and experiences. This can also help visitors create or associate

the identity and values of the museum. The theme is represented by the message that the museums aim to convey as a reference to the visitors (Hultén et al., 2009).

4. Results

To analyze the importance and evidence of the visual sensory dimension of the visitor's experience in museums that speak about cod fishing, we first used quantitative analysis to identify the number of photos and the categories of photos.

4.1. Spatial analysis of the six museums

The six most important museums in Portugal related to cod fishing are represented on a simple map showing their locations. The Gil Eannes Hospital Ship is in Viana do Castelo, the Museum Maritime of Ílhavo, Ship-Museum Santo André, and Maritime Religious Center are in Ílhavo, the Palheiros de Mira Museum is in Praia de Mira, and the Sea Museological Nucleus is in Buarcos.

The Gil Eannes Hospital Ship, Maritime Museum of Ílhavo, Ship-Museum Santo André, and Maritime Religious Center all showcase aspects related to cod fishing activities. The Palheiros de Mira Museum and Sea Museological Nucleus also have a section of the museum dedicated to cod fishing activity.

4.2. Visitor profiles

A statistical summary of the number of photos and visitors in different museums is presented in Table 2. As we can see, the Maritime Museum of Ílhavo had a higher level of visitors (n=30) than the others, but it is the Ship-Museum Santo André that had a higher number of photos (n=171). The museum with the least number of photos and visitors was the Maritime Religious Centre. Thus, the most popular museums in terms of visitors and photos were the Maritime Museum of Ílhavo and Ship-Museum Santo André. Although these museums were near each another, the Ship-Museum was a nucleus of the Maritime Museum of Ílhavo.

Table 2 | Museum visitors photo data sets

Museum	No. of visitors	No. of photos
Maritime Museum of Ílhavo	30	122
Ship-Museum Santo André	29	171
Maritime Religious Center	1	1
Gil Eannes Hospital Ship	26	58
Sea Museological Nucleus	2	10
Palheiros de Mira Museum	1	6
Total	**89**	**368**

Source: Own elaboration.

Based on the findings, the Gil Eannes Hospital Ship had a smaller number of photos (n=58), but a similar number of visitors (n=26), compared to the Maritime Museum of Ílhavo and Ship-Museum Santo André, which means that visitors took fewer photos in this context.

According to the demographic profile (Table 3) available on the Flickr platform, most visitors to the cod fishing museums come from Portugal. Other nationalities were found, but in insignificant percentages, such as Spain, Germany, Italy, the United Kingdom, Canada, and Brazil. The Sea Museological Nucleus and Palheiros de Mira Museum did not have 'normal' visitors, only photos of public entities. When we analyzed the cities in Portugal where visitors came from, we can see that the Maritime Museum of Ílhavo received more people from Lisbon (n=6), the Ship-Museum Santo André from Aveiro (n=5), and the Gil Eannes Hospital Ship from Porto (n=2). Apart from the two museums that only received a public entity visit, the others also received residents, but the numbers were slight. The Gil Eannes Hospital Ship had a more international perspective, as it received a higher number of international visitors (n=5) from four different foreign countries.

The Maritime Museum of Ílhavo, Ship-Museum Santo André, and Gil Eannes Hospital Ship have been visited by more men (60%, 76%, and 58%) than women. The Maritime Religious Center was visited by women. The Sea Museological Nucleus and Palheiros de Mira Museum were visited only by public entities.

To understand if women or men, residents, national visitors, international visitors, or public and private entities have taken more photos than others we analyzed the number of photos by typology. We can conclude that residents take on average one photo per visitor, except for the Ship-Museum Santo André. National visitors take more photos than international visitors and residents. Men took more photos in the Maritime Museum of Ílhavo compared to the other museums and women took more photos in the Gil Eannes Hospital Ship. All public entities have taken more photos than the other typologies (Table 3).

Table 3 | Number of photos by typology

Museums	No. Of photos						Public entite	Private Entite
	Residents		National visitors		International visitors			
	F	M	F	M	F	M		
Maritime Museum of Ílhavo	1	2	9	95	2	1	10	2
Ship-Museum Santo André	18	1	3	88	1	4	4	52
Maritime Religious Center	1	0	0	0	0	0	0	0
Gil Eannes Hospital Ship	0	1	22	29	4	2	0	0
Sea Museological Nucleus	0	0	0	0	0	0	10	0
Palheiros de Mira Museum	0	0	0	0	0	0	6	0

Source: Own elaboration.

4.3. Photo content analysis - Visual dimension of the visitor experience in the Portuguese codfish museums

To analyze the visual dimension of the visitor experience, the photographs were divided into four groups: 'outside', 'inside', 'selfies', and 'other' to determine if visitors took more photos inside or outside the museums. This division was used by Vu et al. (2018) and was in line with Hultén et al. (2009). The majority of photographs were taken in an indoor context at the Maritime Museum of Ílhavo (n=88), Ship-Museum Santo André (n=107), Gil Eannes Hospital Ship (n=26), Sea Museological Nucleus (n=9) and Palheiros de Mira Museum (n=4). Selfies were one of the less prominent groups (Figure 4). The Maritime Religious Center had only one photo representing the outside of the museum.
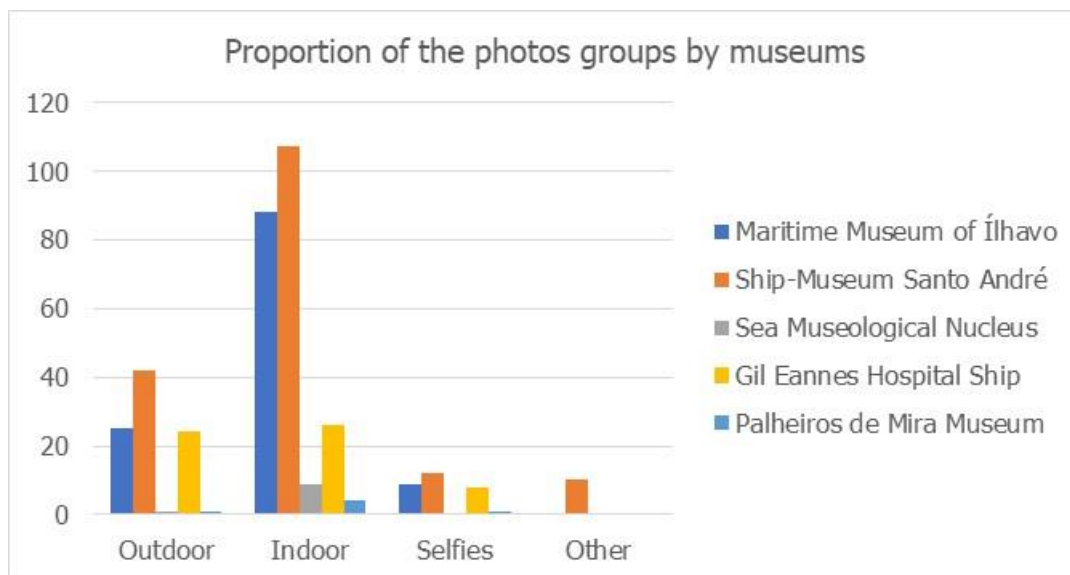
Figure 4 | Proportion of the photo's groups by museums.
Source: Own elaboration.

Before analyzing them in detail, it was interesting to understand what type and number of photos were taken indoors in each museum. Therefore, the museums were divided into rooms, which were used to explain the most important visual contexts. In the Maritime Museum of Ílhavo, the codfish aquarium and cod fishing gallery were the most important scenes.

On the other hand, related to ships, Ship-Museum Santo André and Gil Eannes Hospital Ship were a common scene. Apart from the outdoors during the day (n=39 and n=21), the deck (n=30 and n=7) was the king of the photos. Finally, the Sea Museological Nucleus had more photos related to costumes (n=5) and cod fishing by line (n=4).

A more detailed analysis was necessary to understand the visual dimensions of the visitor experience. For this, we analyzed in-depth the interior and exterior sensory expression. The

interior sensory expression is linked to the products or visual elements that enhance the visual experience (Hultén et al., 2009). Museums should create attractive interiors with various ways of presenting information, as the elements containing this information clarify and mediate the visitor's identity experience.

When analyzing the differences between females and males, based on the research data, we can conclude that in enclosed museums, women tend to take more photos from an outdoor perspective, which is the opposite of men. In the 'open museum' setting, such as a ship, men took more outdoor photos, while women focused on capturing images inside the ship and specific objects, rather than general space photos. An interesting observation was that at the Santo André Ship-Museum, women took more selfies in various scenarios (e.g., hand wheel, corridor, deck), whereas at the Gil Eannes Hospital Ship, men took more photos, particularly in the engine room. Differences between national visitors and resident visitors were identified. Resident visitors took more selfies than national visitors, and in museums with outdoor spaces, a higher number of outdoor photos were taken.

Regarding color analysis, all photos were examined to identify the main colors conveying messages and emotions desired by each museum for visitors. For example, black and gray colors create an overall visual impression, followed by saddle brown. The Maritime Museum of Ílhavo may aim to be perceived as elegant, formal, and modern with the use of black. Gray signifies professionalism, conformity, and seriousness (Hultén et al., 2009). Saddle brown evokes feelings of warmth, comfort, and security, possibly associated with the cod fishing gallery. Dark slate gray emerged as a principal color, possibly due to the codfish Aquarium's prominence or the preference for blue shades by men in the sample, as blue is naturally linked to water and tranquility.

Furthermore, analyzing the photo tags revealed connections to the visual sensory experience. At the Maritime Museum of Ílhavo, tags related to codfish/aquarium, Faina Maior gallery and Ria de Aveiro Gallery were prominent, indicating a focus on maritime themes and museum identity, such as 'ria', 'bacalhau (cod)', 'ship', 'boats', 'aquario (aquarium)' and 'fishing' (Figure 5). For the Ship-museum Santo André the main idea associated with the visual sensory experience was related to the ship trawler because the main tags were 'navio (ship)' and 'arrastão (trawler)' (Figure 6).

Figure 5 | Word cloud of Maritime Museum of Ílhavo

Figure 6 | Word cloud of Santo André Ship-Museum

At the *Gil Eannes Hospital Ship* the visual sensory experience was related to the ship itself ('ship', 'boat' and 'navio'), as well as other elements of the experience, such as the museum's landscape, including 'sunset', 'water', and 'sea'. The main tags related to the *Maritime Religious Centre* did not provide any visual evidence of the experience. Finally, regarding the *Sea Museological Nucleus* and the *Palheiro de Mira Museum* the word clouds did not suggest any ideas about the visual sensory experience, as the main words related to museums, culture, roadmap, and other categories associated with tourism in Portugal. This occurred because the photos were associated with public entities.

5. Discussion and conclusion

5.1. Discussion

This study aimed to understand if it is possible to identify codfish in Portuguese museums based on photos published by visitors. We can understand that the photos published by visitors were an excellent way of understanding the importance of a museum in the world context. With this article, the main three Portuguese museums related to the codfish museum were identified. However, in a world context, the smaller museums were not identified, maybe because they represent other aspects of Portuguese culture apart from the codfish context.

The second objective was to understand if the visual sensory experience was different in different museums in the same context. Here we could understand that similar contexts, such as Santo André Ship-Museum and Gil Eannes Hospital Ship offered a similar experience with similar visual experiences considering the particularity/ theme of both museums. However, we can conclude that the visual experience lived in the Maritime Museum of Ílhavo was different from the other museums, where visitors associate the cod fishing theme and architecture of the building theme. Finally, the third objective was to understand the sociodemographic variable change in the codfish museum's visual content. This study enabled us to detect a difference between the supplies (public touristic entities) and visitors. The findings suggest that men take more photos than women in the national context. However, in the international context, women tend to take more photos than men. In addition, in a national context, men take more photos in the wide view and exterior perspectives while women take more photos of objects or specific things, and in the interior context. The residents take fewer photos than the other visitors, and public entities take more photos than the visitors. No conclusion can be drawn about the selfies in the different museums because in the 'normal' museum women take more photos, but in the ship museums, men take more selfies. The photos taken by the public entities were cleaner in terms of colors, people, and wide view perspective that appeared in the photos compared to visitors. This was evidence that the visual dimension of the visitor experience is different according to the sociodemographic characteristics.

5.2. Theoretical contributions

The present study has several theoretical contributions. First, the study used photographs to explicitly examine the visual sensory experience regarding cultural differences in the codfish museums, a context that has not previously been explored. Secondly, this study incorporated online secondary data that have been used to explain another topic but never to explain a visual visitor experience. Although the data were limited, this study has reinforced the importance of the visual sensory experience in the tourism context by focusing on the visitor photo segmentation of the museums and searching for differences in the visual sensory experience according to the sociodemographic profile.

5.3. Practical implications

There are a few interesting implications that can be drawn from these findings. Our results overall suggest that museum managers should invest in a professional visual sensory experience of photos to be used for designing the interior environment and exterior landscape. Providing research with the social media photos of the visitors may be one way to significantly adapt the space to the visitor and create a better experience. In addition, thinking about the profiles of the visitors that are uploaded and putting some visual information about the museums could be an interesting way of knowing the museum public and adapting the visual content to the visitor profile.

Furthermore, our study suggests that the number of national visitors was much greater than the number of international visitors from the cod fish museum perspective. To sum up, national visitors put more photos on social media than the residents. Moreover, the residents took more photos of the exterior of the museum than the interior and took lots of selfies instead of the pieces of the museum. This suggests that it is important to think about changing elements to create a different visual stimulus for the residence's visitors.

In terms of codfish museum planning, a related to codfish could be created, with different supplies, particularly the museums, to offer a complete visual experience to the visitors and to generate new touristic flows. In addition, the visual sensory experience could be understood as a key to the development of the experience and sensory marketing of the destinations and museums.

The study furthermore supported the difference between women and men in the visual sensorial dimension, national and international visitors, and residents, which have marketing and management implications for museums and destinations. With the results, we can capture the visual sensorial experience that increased the understanding of the preferences and experiences of different publics.

Finally, the results obtained about the visual portfolio of the Portuguese codfish museums emphasize the idea that visitors identify the authentic and unique elements of the museums. This

visual stimulus can be used by museum managers to explore the elements to create a strong museum brand.

5.4. Limitations and future research

The present study has some limitations. Our study is limited to our focus on the visual sensory experience at the codfish museum and on the Flickr platform. However, future research is needed to understand the potential of exploring the visual sensory experience through photos published by visitors on social media considering different applications such as Facebook and Instagram. In addition, the low number of visitors and photos enabled us to conduct the context analysis manually. In future research, we suggest that studies use computational techniques for the analysis of the photos and their categories.

Our research is limited because of the methodology used, as we did not use other types of data to complement the research and because there are people who do not use social media. Therefore, the results may not be representative of the population. However, we used real-life photos of real visitors taken from the Flickr platform, which is a reliable and universal platform. Thus, it would be very interesting to use some neuromarketing techniques to understand what the visitor viewed in the photos to identify the main museum's important visual elements from the brain's perspective. Another interesting aspect was the opportunity to discuss the results with the managers of the museums, experts, and visitors through focus groups.

The number of national visitors was much greater than the number of international visitors to the codfish museums. In the future, it will be interesting to analyze if this is a normal occurrence in Portuguese museums or if it could be associated with the concept of place attachment. Moreover, with a large sample, it is interesting to analyze the differences or similarities of the visitor markets to adapt the attractions to different audiences.

References

Agapito, D. (2020). The senses in tourism design: A bibliometric review. Annals of Tourism Research, 83, 102934. https://doi.org/10.1016/j.annals.2020.102934

Agapito, D., Valle, P., & Mendes, J. (2014). The sensory dimension of tourist experiences: Capturing meaningful sensory-informed themes in Southwest Portugal. Tourism Management, 42, 224–237. https://doi.org/10.1016/j.tourman.2013.11.011

Åstrøm, J. K. (2018). Exploring theming dimensions in a tourism context. European Journal of Tourism Research, 20, 5–27. https://doi.org/10.54055/ejtr.v20i.337

Ballantyne, R., Packer, J., & Sutherland, L. A. (2011). Visitors' memories of wildlife tourism: Implications for the design of powerful interpretive experiences. Tourism Management, 32(4), 770–779. https://doi.org/10.1016/j.tourman.2010.06.012

Balomenou, N., Garrod, B., & Georgiadou, A. (2017). Making sense of tourists' photographs using canonical variate analysis. Tourism Management, 61, 173–179. https://doi.org/10.1016/j.tourman.2017.02.010

Dissabandara, D. R., & Dissanayake, R. (2019). Theoretical overview on sensory marketing. International Journal of Current Research, 11(7), 35803. https://doi.org/10.24941/ijcr.35803.07.2019

Diţoiu, M.-C., & Căruntu, A.-L. (2014). Sensory experiences regarding five-dimensional brand destination. Procedia - Social and Behavioral Sciences, 109, 301–306. https://doi.org/10.1016/j.sbspro.2013.12.461

Dorwart, C., Moore, R., & Leung, Y.-F. (2006). Visitor employed photography: Its potential and use in evaluating visitors' perceptions of resource impacts in trail and park settings. In Proceedings of the 2006 Northeastern Recreation Research Symposium.

Fung, C. K. W., & Jim, C. Y. (2015). Unraveling Hong Kong Geopark experience with visitor-employed photography method. Applied Geography, 62, 301–313. https://doi.org/10.1016/j.apgeog.2015.05.014

Garrido, A. (2016). O bacalhau como património total. ARGOS: Revista do Museu Marítimo de Ílhavo, 4, 15–17.

Garrod, B. (2008). Exploring place perception: A photo-based analysis. Annals of Tourism Research, 35(2), 381–401. https://doi.org/10.1016/j.annals.2007.09.004

Hultén, B., Broweus, N., & van Dijk, M. (2009). Sensory marketing. Palgrave Macmillan. https://doi.org/10.1057/9780230237049

Karayazi, S. S., Dane, G., & de Vries, B. (2021). Utilizing urban geospatial data to understand heritage attractiveness in Amsterdam. ISPRS International Journal of Geo-Information, 10(4), 190. https://doi.org/10.3390/ijgi10040198

Lee, K. T., & Kim, J. H. (2016). World culture festivals: Their perceived effect on and value to domestic and international tourism. Journal of Psychology in Africa, 26(5), 443–448. https://doi.org/10.1080/14330237.2016.1219551

Lee, T. H., & Jan, F. H. (2019). The low-carbon tourism experience: A multidimensional scale development. Journal of Hospitality and Tourism Research, 43(6), 890–918. https://doi.org/10.1177/1096348019849675

Liu, B., Norman, W. C., & Pennington-Gray, L. (2013). A flash of culinary tourism: Understanding the influences of online food photography on people's travel planning process on Flickr. Tourism, Culture and Communication, 13(1), 5–18. https://doi.org/10.3727/109830413X13769180530567

Lv, X., Li, C. (Spring), & McCabe, S. (2020). Expanding theory of tourists' destination loyalty: The role of sensory impressions. Tourism Management, 77, 104026. https://doi.org/10.1016/j.tourman.2019.104026

Markwell, K. W. (1997). Dimensions of photography in a nature-based tour. Annals of Tourism Research, 24(1), 131–155. https://doi.org/10.1016/S0160-7383(96)00053-9

Mateiro, B., Kastenholz, E., & Breda, Z. (2018). The sensory dimension of the tourist experience in mountain destinations: The case of Serra da Estrela Natural Park. Revista Turismo & Desenvolvimento, 27/28(1), 2027–2038.

Mor, M., Fisher-Gewirtzman, D., Yosifof, R., & Dalyot, S. (2021). 3D visibility analysis for evaluating the attractiveness of tourism routes computed from social media photos. ISPRS International Journal of Geo-Information, 10(5), 275. https://doi.org/10.3390/ijgi10050275

Pan, S., Lee, J., & Tsai, H. (2014). Travel photos: Motivations, image dimensions, and affective qualities of places. Tourism Management, 40, 59–69. https://doi.org/10.1016/j.tourman.2013.05.007

Pradeep, A. (2010). The buying brain: Secrets for selling to the subconscious mind. John Wiley & Sons.

Sarkar, J. L., & Majumder, A. (2022). gTour: Multiple itinerary recommendation engine for group of tourists. Expert Systems with Applications, 191, 116190. https://doi.org/10.1016/j.eswa.2021.116190

Scarles, C. (2010). Where words fail, visuals ignite: Opportunities for visual autoethnography in tourism research. Annals of Tourism Research, 37(4), 905–926. https://doi.org/10.1016/j.annals.2010.02.001

Vu, H. Q., Luo, J. M., Ye, B. H., Li, G., & Law, R. (2018). Evaluating museum visitor experiences based on user-generated travel photos. Journal of Travel and Tourism Marketing, 35(4), 493–506. https://doi.org/10.1080/10548408.2017.1363684