

Sustainability in whale-watching: A literature review and future research directions based on regenerative tourism

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ARTICLE INFO

Keywords:

Whale-watching tourism
Sustainability
Regenerative tourism
Human-ecological management
Economic drivers
Human change
Macro-cultural discourse
Ecological impacts
Tourism demand

ABSTRACT

There is scientific consensus that human activity through whale-watching is causing an increasing amount of damage to the natural environment, which poses critical challenges to the goal of sustainability. Based on a quantitative *and* qualitative assessment of the scientific literature, this study calls for urgent rethinking in regards to whale-watching sustainability. A new, integrative framework for research actions built upon the concept of regenerative tourism is provided so as to lead to a more balanced evaluation of environmentally and socially responsible whale-watching tourism. The assessment of the literature review leads to three main research areas that have driven the research field in whale-watching tourism: the ecological responses of cetaceans due to human disturbance, the determinants of whale-watching tourism demand, and the impact of tourism on sustainability from macro-cultural and political perspectives. The new integrative framework, which additionally considers *innovation* and *external drivers* as prominent research areas, proposes future guidelines for studying the interplay between some of the more specific research topics: social change, economic drivers, gender perspective, co-creation, social responsibility, technology, climate change and long-term cumulative effects, among other issues of concern.

1. Introduction

Whale-watching tourism involves encountering whales, dolphins, and other species of cetacean in their natural habitat for human recreational purposes (Hoyt, 2002). The fact that the activity emerged as a non-extractive, conservation-oriented use of natural resources (Duffus & Dearden, 1990; Wakamatsu, Shin, Wilson, & Managi, 2018) led to its wide consideration as a sustainable activity commonly framed within the broader market of (eco)tourism. However, its overwhelming growth and the associated negative impacts on valued environmental systems urgently call for a balanced sustainability assessment (Higham, Bejder, Allen, Corkeron, & Lusseau, 2016). There have been recognisable efforts to put into place some guidelines that move the whale-watching industry towards a more respectful form of interaction between human beings and the natural world, such as the recommendations on how operators should manage the negative interactions between boats and the affected cetacean species (Amerson & Parsons, 2018; Higham, Bejder, & Lusseau, 2009; Hoyt, 2007; Lambert, Hunter, Pierce, & MacLeod, 2010). In so doing, some authors have also suggested that to address sustainability,

whale-watching must enhance scientific and educational development, contribute to long-term financial management and provide widespread social benefits across destinations (Hoyt, 2007; O'Connor, Campbell, Cortez, & Knowles, 2009).

However, the provision of effective management solutions is still a challenging hurdle. The sustainability of whale-watching is being compromised by its careless expansion at many tourist destinations and the resulting pressure on whale species and ecosystem services (Bejder et al., 2006; Curtin, 2010; Finkler & Higham, 2020; Orams, 2000; Parsons, 2012; Senigaglia et al., 2016; Wearing, Cunningham, Schweinsberg, & Jobberns, 2014). As pointed out by Gleason and Parsons (2019) in their regular digest of whale-watching research, there is a need to persuade stakeholders to behave in more respectful ways (Amerson & Parsons, 2018; Gleason & Parsons, 2019). From a broader perspective, the earlier calls for new forms of recreation based on integrative human-environment relationships and the worldwide 'pause' due to the Covid-19 pandemic also reveal the need for new imaginaries to move tourism away from the 'business as usual' mentality if the industry is to avoid collapse (Cave & Dredge, 2020; Higham et al., 2016).

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<https://doi.org/10.1016/j.tmp.2023.101120>

Received 13 March 2022; Received in revised form 19 April 2023; Accepted 23 April 2023

Available online 3 May 2023

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Therefore, the principal objectives of this article are to assess the state of research on the sustainability of whale-watching tourism and to set out a research agenda that calls for a transition within the more integrative concept of regenerative tourism. That is, based on the research gaps encountered during the literature review, we conclude that a ‘challenge-led’ approach based on the ideas of *regenerative tourism* may be paramount for addressing the externalities of whale-watching and (eco)tourism, and reconciling their development with “all well-beings as societal values, including environmental, social, cultural, and economic” (Becken & Kaur, 2021). The adoption of the regenerative paradigm could contribute to moving whale-watching towards a more proactive regeneration of the industry, tourist destinations, local communities, and coastal and marine environments rather than simply focusing on reducing its impacts (Day, Sydnor, Marshall, & Noakes, 2021; Duxbury, Bakas, Vinagre de Castro, & Silva, 2020; Reed, 2007).

Regenerative tourism is a novel concept that, in departing from the traditional ideas of sustainability, goes beyond the ‘sustainable development’ paradigm in order to transform the social-ecological systems where tourism takes place and adopts an innovative approach to elevating human and non-human well-being (Cave et al., 2022). It relies on social awareness building and the co-creation of meaningful tourism experiences, promotes local involvement and genuine community benefits, as well as a ‘restorative relationship’ with nature in all dimensions and at all scales (Cave et al., 2022; Hussain & Haley, 2022; Reed, 2007). From this perspective, the whale-watching sector would be able to contribute to the welfare of cetaceans and their recovery by collaborating with a science-based conservation policy. Furthermore, the principles of regenerative tourism would help consumers understand and accept that animal welfare needs to be at the centre of their whale-watching experiences. It would also guide authorities to promote an informed consensus on ‘good practices’ and keep on top of surveillance and regulation enforcement (Cave & Dredge, 2020; Day et al., 2021; Fumagalli et al., 2021; New et al., 2015; Pacheco, Sepúlveda, & Corkeon, 2021).

In order to put forward a research agenda framed in the regenerative paradigm, this article explores the knowledge on whale-watching tourism gleaned from scientific research carried out over the last 50 years. A blended review approach was conducted utilising quantitative and qualitative analyses. The results highlight those research efforts directed at overcoming the existing seminal gaps. By pinpointing the urgent need for a ‘rethink’ on whale-watching (Constantine & Bejder, 2008; Gleason & Parsons, 2019; Higham et al., 2016), this assessment is followed by a proposal for a new integrative framework for research actions that suggests *transboundary* and *transformative* routes to: i) fomenting changes in human behaviour, taking into consideration consumer heterogeneity, the actions of operators, the gender perspective, etc.; ii) reducing the (less-visible and cumulative, long-term) effects on cetaceans due to the direct impacts from human activity, but also from external drivers such as climate change; iii) innovative practices based on social responsibility, co-creation and technology. This new agenda will assist in encouraging whale-watching management towards implementing a full-blown environmentally and socially responsible policy (Fumagalli et al., 2021; Lissner & Mayer, 2020; New et al., 2015). This will be achieved first by providing orientation towards more integrative research efforts and, second, through the adoption of innovative practices for sustainable development pathways.

The present article is structured as follows. Section 2 describes the methodology used to identify the key research areas and the causes of the ‘lags’ encountered in the process of trying to reach the objective of whale-watching sustainability. Section 3 presents the main results obtained through the application of *scientometrics* and carries out a qualitative evaluation in order to raise questions about research achievements from the sustainability perspective. Section 4 proposes future lines of research by presenting an integrative framework built upon the regenerative paradigm. By combining the systematic interplay of key research areas with this novel concept, valuable actions and

responses would be provided rather than the mere declaration of good intentions and half-hearted suggestions on what should be done to move the industry towards true sustainability. Finally, Section 5 presents the conclusions of the study.

2. Methodology

2.1. Scope delimitation and methods

This paper poses the following research questions looking for yielding responses for sustainable whale-watching tourism pathways:

(RQ1) What are the main areas and interests of scholarly research in whale-watching?

(RQ2) To what extent has past and current research contributed to the sustainable management of whale-watching?

(RQ3) What would a feasible, future research framework aimed at regenerating sustainable whale-watching tourism look like?

A review was conducted utilising a blended methods approach of quantitative analysis and qualitative meta-evaluation so as to display a more insightful and balanced appraisal of the literature (see Fig. 1). Through scientometrics (quantitative assessment), a broad overview of the underlying knowledge domain and potentially significant - but currently overlooked - connections were identified (Bai, Bai, & Wang, 2021; Khanra, Dhir, Kaur, & Mäntymäki, 2021), responding to the primary research question. Then, a qualitative meta-evaluation was performed to address RQ2. The qualitative assessment contributed to a more interpretative analysis of the evidence (Weed, 2006), enabling us to describe and interpret the existing knowledge domain (Dinçer, 2018; Park & Gretzel, 2007). Finally, this blended review approach provided significant insights that helped us respond to the third research question

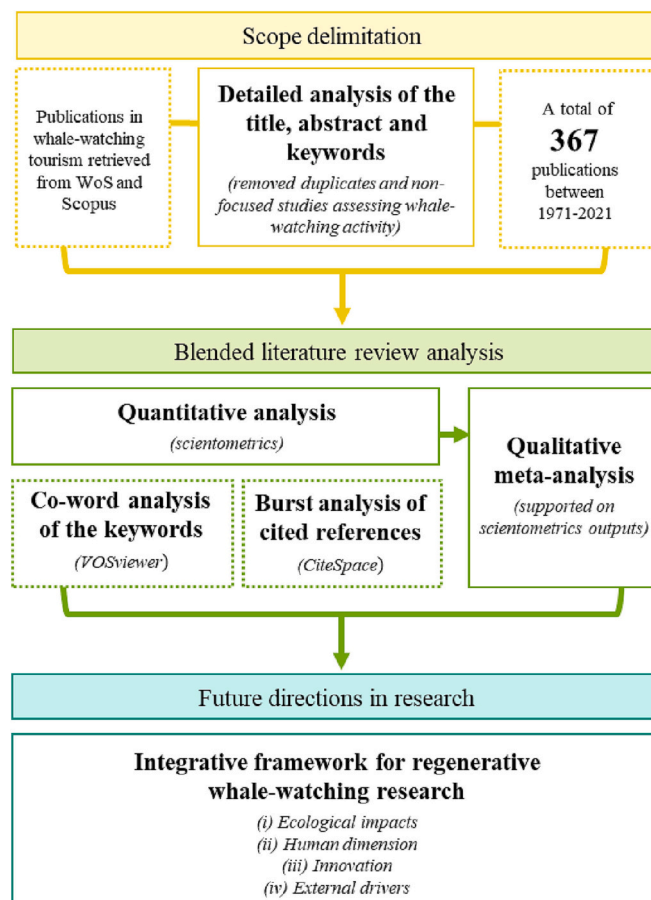


Fig. 1. Study roadmap.

of this paper (RQ3). It is hoped that the proposal of a new framework will facilitate the bridging of the existing research gaps, help overcome the challenges, and identify and exploit opportunities for reconciliation in whale-watching sustainability. This would have real and significant implications for research, for the industry - operators and consumers - and for the political sphere. These future lines of research are built upon the paradigm of *regenerative tourism* as a new way to understand sustainability, which is also a more integrative, resilient and proactive framework (Cave et al., 2022; Cave & Dredge, 2020).

2.2. Data processing

The publications consulted in this review were retrieved from the Web of Science (WoS) and Scopus repositories within the period from 1971 (the first recorded document) to 2021 (see Fig. 1). 'Whale-watching tourism', 'dolphin-watching tourism', and 'cetacean-watching tourism' - collectively known as *whale-watching tourism* - delimited the first scope of the search. A second exploration was also conducted, considering other complementary keywords that closely fit the research aims, such as 'sustainability', 'management', 'impacts', 'tourists', 'whale-watchers', 'operators', 'firms', and 'economic value'.

The title, abstract and keywords of the records were analysed in detail before they were included in the final database. After removing the duplicates and excluding some studies in which whale-watching tourism activity was not the principal focus of research - such as in the cases of scientific data collection and citizen science -, the definitive database ended up being composed of 367 publications. Notably, hand-curation processing of keywords was done to reduce 'noise' and obtain more accurate results. Thus, from the initial 1147 keywords, the final sample comprised 1042 - e.g., 'tour boat', 'boat/s', 'ship', 'vessel/s', were grouped under 'tour boat'.

2.3. Data analysis and mapping

The database was first analysed and mapped employing VOSviewer (Van Eck & Waltman, 2010) and CiteSpace (Chen, 2006). According to Moral-Muñoz, Herrera-Viedma, Santisteban-Espejo, and Cobo (2020),

the employment of one visualisation tool or another is down to the researcher's decision regarding the option that best fits his or her aims. Thus, while the former provides one of the best visualisations, CiteSpace facilitates the analysis of emerging trends in a knowledge domain (Moral-Muñoz et al., 2020).

Specifically, a co-word analysis and a burst analysis were selected for the quantitative approach (Fig. 1). The content analysis of keywords (co-word analysis) was conducted to explore the main research areas of the literature and their interlinkages (Sigala, 2021). Meanwhile, a burst analysis of the cited references was run to identify studies that have attracted scholars' attention within a certain period, regardless of how many times they were cited, and show predictors of research frontiers (Bai et al., 2021; Chen, 2006).

3. Results

3.1. Scientometric insights

This section is focused on identifying the main areas and interests of scholarly research in whale-watching, responding to RQ1. Figs. 2 and 3 depict VOSviewer's visualisation maps. The keyword map in Fig. 2 shows that whale-watching domain themes rely on i) cetaceans' ecological responses (corresponding to the cluster in the green), ii) consumer behaviour (blue cluster) and iii) the impact of tourism on sustainability (cluster in bluish green).

Tracking the evolution of the top-occurring keyword, shown in Fig. 3, enabled us to understand how the research field has progressed in response to whale-watching growth. For instance, in the early 1990s, the activity was still recognised as a form of 'ecotourism' since it contributed towards stopping commercial whale hunting - Canada being the main pioneer in this regard (Hoyt, 2001; O'Connor et al., 2009). In the 2000s, due to the exponential growth of the activity worldwide (O'Connor et al., 2009), concerns about the 'conservation status' of cetaceans led scholars to focus on assessing the 'behavioural responses' of whales and dolphins to the development of the activity with the aim of providing 'management guidelines'. As is shown in this second period (2001–2010), the broader concept of 'tourism' seems to overshadow

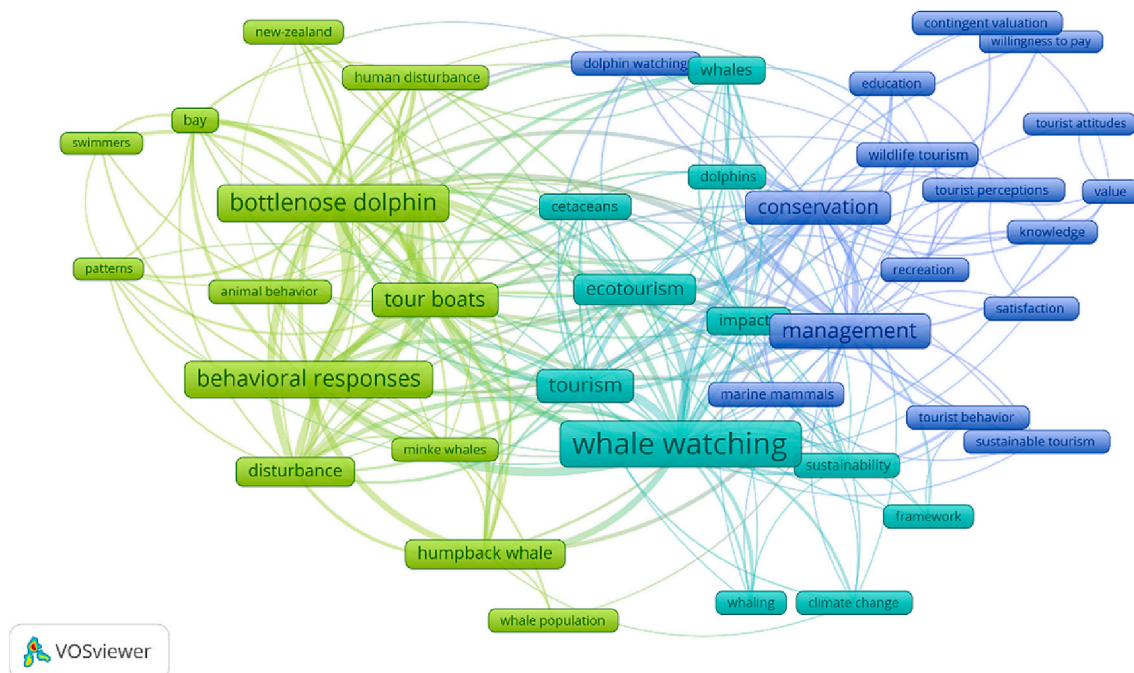


Fig. 2. Keyword map of whale-watching tourism research. Visualisation based on the strength with which two keywords occur in a publication.

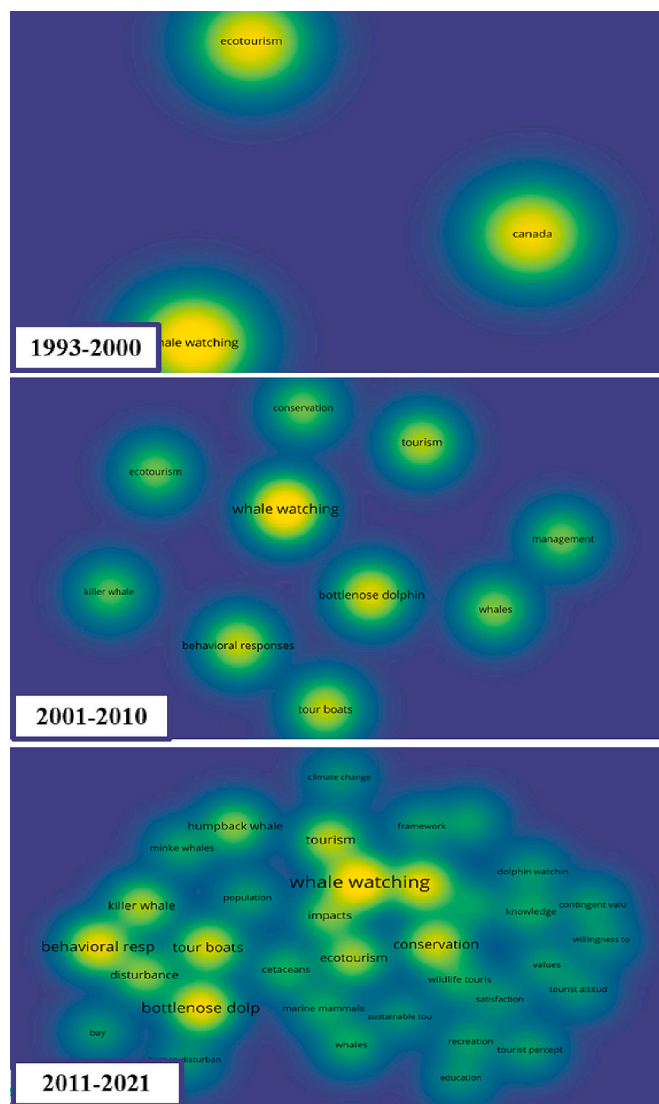


Fig. 3. Keyword evolution map.

Notes: Density view of the keywords by periods; colours range from blue (lowest item density) to yellow (highest density). 1993 corresponds with the first year where publications began to include keywords in their description.

1993–2000: threshold = 3 minimum keyword occurrences; 3 / 77 meet the threshold; 2001–2010: threshold = 5 min. occurrences; 10/175 meet; 2011–2021: threshold = 5; 39/1042.

Note that within 1993–2000, VOSviewer did not identify keywords meeting a threshold larger than three occurrences, probably due to the low number of keywords during this period ($n = 77$).

‘ecotourism’. By then, participation in the activity was becoming increasingly widespread, tempting some in the industry to adopt inappropriate practices now that they were no longer exclusively under the watchful eye of conscientious and responsible eco-tourists (Finkler & Higham, 2004; Malcolm & Duffus, 2008; Orams, 2000). Hence, between 2011 and 2021, scholars expanded their research to include consumer behaviour - ‘satisfaction’, ‘tourist perception’, ‘tourist attitudes’, etc. - as a critical aspect for reconciling the development of the activity with cetacean ‘conservation’. Similarly, ‘climate change’ became another research ‘hotspot’ in response to policy concerns over oceans’ vulnerability (Lambert et al., 2010).

Table 1 displays the top 12 references with the strongest citation burst, indicating that research interest has primarily focused on studies analysing the impacts on cetaceans, with three exceptions: Corkeron (2004), Hoyt (2001) and O’Connor et al. (2009). Corkeron’s study

(2004) confirms the attention given to macro-cultural discourse around the development of the activity, while the other two (Hoyt, 2001; O’Connor et al., 2009) report on the state-of-the-art developments contributing to the industry’s growth during their respective time periods.

3.2. A qualitative review of the literature

This section responds to the second research question (RQ2). Qualitative evidence explores, in detail, the extent to which research has been able to respond to and support the following: i) the conflict between the development of the activity and cetacean welfare (supported by the keyword cluster regarding cetaceans’ ecological responses in Fig. 2); ii) the determinants of whale-watching tourism demand (the consumer behaviour cluster); iii) the macro-cultural and political effects on sustainability (the bluish-green cluster related to tourism’s impact on sustainability).

3.2.1. The conflict between the development of the activity and cetacean welfare

The need to overcome the conflict between the (non-sustainable) development of the industry and cetacean conservation has stimulated great research interest in: i) the human subjects causing the pressure (tour boats, swimmers, etc.); ii) the vectors of disturbance (vessel manoeuvring, time interacting, noise, feeding animals, etc.) and their exposure levels (e.g., distance, angle, time, decibels...); iii) cetacean behavioural responses (foraging, resting and socialisation time, swim speed, respiration rates and energetic costs, etc.); iv) the different cetacean species (e.g., killer whales, humpback whales, bottlenose dolphins...) and type of individuals affected (males, females or calf pods); v) the impacts at different whale-watching sites (see, e.g., Argüelles, Coscarella, Fazio, & Bertellotti, 2016; Avila, Correa, & Parsons, 2015; Chalcobsky, Crespo, & Coscarella, 2020; Currie, McCordic, Olson, Machernis, & Stack, 2021; Di Clemente et al., 2018; Kassamali-Fox, Christiansen, May-Collado, Ramos, & Kaplin, 2020; May-Collado, Quiñones-Lebrón, Barragán-Barrera, Palacios, & Gamboa-Poveda, 2014; Noren, Johnson, Rehder, & Larson, 2009; Schuler et al., 2019; Stamation, Croft, Shaughnessy, Waples, & Briggs, 2010; Weinrich & Corbelli, 2009).

Likewise, the development of more accurate research methodologies, more sensitive tools and lower-cost monitoring techniques have bridged some of the major research gaps, addressing the misinterpretation of cetacean species’ behaviour and the complexity of ecosystem dynamics (see Bejder, Higham, & Lusseau, 2022; Bejder & Samuels, 2003; Bejder, Samuels, Whitehead, & Gales, 2006; Bejder, Samuels, Whitehead, Gales, Mann, et al., 2006; Burnham, Duffus, & Malcolm, 2021; Chen & Lin, 2019; Erbe et al., 2019; García-Cegarra, Villagra, Gallardo, & Pacheco, 2019; Lusseau, 2003; Meissner et al., 2015; Radeta, Nunes, Vasconcelos, & Nisi, 2018). For instance, evidence shows that cetaceans decrease their energy reserves in response to the intrusive ‘swim-with’ activity (Constantine, 2001; Hoarau & Hjalager, 2020; Sprogis, Bejder, Hanf, & Christiansen, 2020; Stack et al., 2021) and take less predictable paths when vessels come too close (Williams et al., 2002). Meanwhile, exposure to (excessive) vessel noise significantly alters cetaceans’ communication, rest time, respiration rate, and swim speed (Arranz, de Soto, Madsen, & Sprogis, 2021; Au & Green, 2000; Erbe, 2002; Jansen et al., 2009; Sprogis, Videsen, & Madsen, 2020); other stressors on cetaceans’ health are found in CO and NO₂ vessel emissions (Lachmuth, Barrett-Lennard, Steyn, & Milsom, 2011).

From a sustainability perspective, all these studies have underscored the importance of following the existing whale-watching guidelines - or even developing more conservative ones - if the industry is to ensure the long-term survival of cetaceans. However, the transfer and implementation of research-based recommendations has not fully succeeded in practice. As Bejder et al. (2022) point out, the irresponsible behaviour of the tourism industry is threatening the conservation status of 21% of

Table 1
Publication citation network.

Reference	PY	Strength	Begin	End	1971–2021
Hoyt (2001), WW 2001, V0-P0	2001	11.13	2003	2011	
Bejder, Dawson, & Harraway (1999), https://doi.org/10.1111/j.1748-7692.1999.tb00840.x	1999	6.84	2003	2009	
Williams, Trites, and Bain (2002), https://doi.org/10.1017/S0952836902000298	2002	8.24	2004	2011	
Lusseau (2003), https://doi.org/10.1111/j.1523-1739.2003.00054.x	2003	5.73	2004	2013	
Constantine, Brunton, and Dennis (2004), https://doi.org/10.1016/j.biocon.2003.12.009	2004	8.88	2006	2013	
Bejder, Samuels, Whitehead, Gales, Mann, et al. (2006), https://doi.org/10.1111/j.1523-1739.2006.00540.x	2006	7.63	2006	2016	
Corkeron (2004), jstor.org/stable/3589096	2004	6.10	2006	2014	
Bejder & Samuels (2003), MAR MAMM FISH TOUR MANG, V0-P0	2003	5.78	2006	2013	
Williams, Lusseau, and Hammond (2006), https://doi.org/10.1016/j.biocon.2006.06.010	2006	6.50	2008	2016	
O'Connor et al. (2009), WW WORLD, V0-P0	2009	8.72	2012	2019	
Parsons (2012), https://doi.org/10.1155/2012/807294	2012	6.94	2015	2021	
Senigaglia et al. (2016), https://doi.org/10.3354/meps11497	2016	5.51	2017	2021	

Note: Co-citation analysis parameters: look back years = 10; top N per slice = 100; top N% = 50%; threshold burst = 2 years.

marine mammals, including cetaceans. For now, the first research question of this study remains unsolved. Factual research evidence is failing in its valuable role in encouraging the industry to behave in a balanced, resilient and respectful manner in order to ensure the desirable welfare status of cetaceans (Bejder et al., 2022; Fumagalli et al., 2021; Higham et al., 2016).

3.2.2. The determinants of whale-watching tourism demand

The intense emotions cetaceans evoke in people have led whale-watching to focus heavily on meeting tourists' expectations and desires (Cisneros-Montemayor, Sumaila, Kaschner, & Pauly, 2010; Orams, 2000; Orams & Forestell, 1995). In so doing, the search for satisfaction has been equated with the wish of tourists for close and prolonged encounters with cetaceans, pressuring operators to behave accordingly and increase the level of harassment of whales and dolphins (Duffus & Dearden, 1993; Meyer et al., 2021; Orams, 2000). However, Orams (2000) called for more research efforts to understand the effects of consumer behaviour on the development of the activity, thus revealing other factors influencing tourist satisfaction.

The responses to these efforts have delivered extensive research analysing i) tourists' expectations and motivations, ii) their opinions about the service provided (boat comfort, crowding, close encounters, trip duration, interpretative elements, etc.), and iii) other desires that form the basis of satisfaction (see Ávila-Foucat, Vargas, Jordan, & Flores, 2013; Bentz, Lopes, Calado, & Dearden, 2016a; Cárdenas et al., 2021; Fraser, McWhinnie, Canessa, & Darimont, 2020; Malcolm, Dagostino, & Ortega, 2017; Valentine, Birtles, Curnock, Arnold, & Dunstan, 2004). For instance, it has been proved that boat safety and comfort, onboard information and operators' 'good practices' are significant contributors to tourist satisfaction (Cárdenas et al., 2021; García-Cegarra & Pacheco, 2017). This evidence demonstrates that operators can positively comply with existing regulations while still meeting tourists' demands (Filby, Stockin, & Scarpaci, 2015; Finkler & Higham, 2020; Tkaczynski & Rundle-Thiele, 2019). In the long run, education and interpretation are the most widely-studied elements that will mediate human pro-environmental attitudes and behavioural changes (Ballantyne, Packer, & Sutherland, 2011; Bentz et al., 2016a; Finkler, Higham, León, & Aitken, 2019; García-Cegarra & Pacheco, 2017; Hoberg, Kannis-Dymand, Mulgrew, Schaffer, & Clark, 2021; Maguire, Kannis-Dymand, Mulgrew, Schaffer, & Peake, 2020; Zeppel, 2008).

However, the question regarding the determinants of consumer demands and how the activity may lead to a behavioural change is still to be successfully answered (Tkaczynski, 2021). It has been found that, for instance, whale watchers are not all equally receptive to, nor always interested in, learning about environmental conservation (Malcolm et al., 2017; Zeppel, 2008). As another example, research has also pointed out that women are generally more concerned with animal welfare than men and thus their willingness to pay for whale protection

tends to be higher (Bertella, 2019; Malinauskaite, Cook, Davíðsdóttir, & Ögmundardóttir, 2021). The complex dynamics of tourist behaviour challenges the design of management solutions for environmentally sound whale-watching experiences.

3.2.3. The macro-cultural and political effects on sustainability

Initially, whale-watching development succeeded in promoting whales as icons for the international environmental movement and represented a viable alternative way of making a living for populations of whaling destinations (Lawrence & Phillips, 2004; Orams, 2002; Orams & Forestell, 1995). However, from this (socioeconomic) perspective, extensive debate regarding the sustainability of the activity has been prompted in the literature, sparking various currents of knowledge, as the following presents.

3.2.3.1. The macro-cultural discourse. Assuming that 'whales are worth more alive than dead', the capitalisation of whale-watching as an alternative in the face of political pressure to stop whaling was at some point feasible - except in Norway, Iceland and Japan, partly due to their high cultural resistance (Ris, 1993). Academics have highlighted the potential to increase economic profitability if whale-watching management strategies are adequately addressed (Cunningham, Huijbens, & Wearing, 2012). This has been justified, for instance, by the stronger preference of tourists for whale protection over banning whaling or limiting whale-watching (Wakamatsu et al., 2018).

However, other academics have questioned the simplistic argument about the 'goodness' of whale watching. They argued that the real motivation behind the 'save the whales' movement and tourist development was based on capitalist economic and political interests (Corkeron, 2004; Singleton, 2018). In this vein, Neves (2010) critically concluded that whale-watching and whaling were two different business models, suggesting more analytical and practical approaches to connecting the former with the goals of environmental conservation (Higham & Lusseau, 2008; Neves, 2010). Moreover, regarding the coexistence of both activities, Singleton (2018) evidenced a market niche of tourists demanding whale meat, which contrasts with the 'non-extractive' approach of whale-watching tourism.

3.2.3.2. The human-ecological and management discourse. Whale-watching has grown within a complex and highly fragmented regulatory context (Garrod & Fennell, 2004; Mallard, 2019). It has been widely reported by academics that the existing measures do not consistently prevent disturbances to cetaceans or that operators, to some extent, do not fully comply with the time restrictions - swim time, time in proximity to the animals -, nor employ appropriate manoeuvring techniques (Constantine et al., 2004; Meissner et al., 2015; Scarpaci, Dayanthi, & Corkeron, 2003; Whitt & Read, 2006; Williams et al., 2002). Likewise, the inadequate resources of authorities to monitor operators'

compliance with legislation - or their poor leadership - compromise the enforcement of viable management practices in responsible whale-watching (Parsons & Woods-Ballard, 2003).

Based on these considerations, the urge for a paradigm shift (Constantine & Bejder, 2008) has driven academics to recommend i) the development of unified, multidisciplinary strategies to manage the negative externalities of whale-watching (Higham et al., 2016; Stamation, 2008), ii) the involvement of operators and consumers to plug gaps in the limited monitoring capacity of authorities (Cárdenas et al., 2021; Soto-Cortés, Luna-Acosta, & Maya, 2021), and iii) the design of alternative monitoring strategies (e.g., declaring protected areas) to limit the growth of the industry (Ku, Chen, & Ying, 2014; Lusseau, 2003; Tseng, Huang, Kyle, & Yang, 2011; Williams et al., 2006).

However, research has yet to succeed in contributing to the sustainable management of whale-watching tourism from the macro-cultural and political perspective. According to Bejder et al. (2022), Fumagalli et al. (2021), Higham et al. (2016) and Pacheco et al. (2021), no sustainability achievements will be observed at most destinations if the actual whale-watching business model does not move away from the single-minded focus on 'economic-prosperity' and the site-specific, short-term thinking and governmental idiosyncrasies.

4. An integrative framework for research actions towards regenerative whale-watching

The present review calls for a proposal to move towards a comprehensive scientific engagement with whale-watching management practices according to the various knowledge gaps and unsolved research issues. Thus, this section responds to the third and final question of the present study (RQ3). An integrative framework building upon the ideas of regenerative tourism is presented, calling for a feasible future research agenda for sustainability pathways in whale-watching. This framework is suitable for understanding how the various elements and issues that make up the tourist experience can be integrated in order to improve the management of whale-watching destinations. Suggestions are made to reconcile the diverse interests of tourism, including economic prosperity and social well-being, with the protection of cetaceans and the enhancement of their welfare.

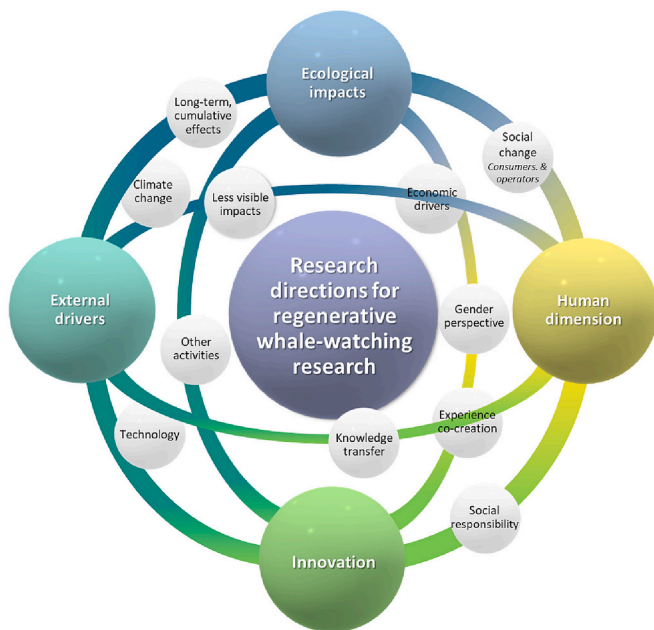


Fig. 4. Integrative research framework towards sustainable and regenerative whale-watching.
Source: Authors.

Fig. 4 illustrates the proposed framework, which places the pillar focus on four major research areas - (1) ecological impacts, (2) the human dimension, (3) innovation, and (4) external drivers - and how they relate to one another in a 'three-dimensional' circularity motion of the elements involved, including social change, economic drivers, knowledge transfer, technology, climate change, and less visible impacts. To better understand how this holistic scheme works, the following aspects need to be considered:

(1) Holistic theoretical background

The design of our framework is grounded on a holistic set of approaches: i) McKinsey's 7S model, in which the different elements interact to achieve an effective collaboration (Waterman Jr, Peters, & Phillips, 1980); ii) Clarke's framework of converging approaches to sustainable tourism (1997), which considers ecotourism as a continuum; iii) the evolutionary and dynamic approach of *regenerative tourism* through the lens of Bellato, Frantzeskaki, and Nygaard (2022) and Sheldon (2022), which captures the ongoing evolution of human and non-human rights and seeks to balance the relationships - in the context of tourism regeneration - in a recurring adaptation to the learning cycles of tasks, resources and activities, and the development of capabilities, among other things (Bellato et al., 2022; Sheldon, 2022).

(2) A design based on orbiting connections

Secondly, the framework follows a three-dimensional orbiting design in which all the elements are harmoniously interconnected so as to reconcile the ecological and human dimensions of whale-watching tourism. These orbiting connections allow for the outputs of one or more elements (whether the four big spheres or the small grey spheres) to act as inputs to others, and any potential change or improvement (or adverse effect) in them may have an impact (positive or negative) on another element of the system.

(3) Innovation and external drivers as primary research areas

In addition, the framework also incorporates two pillars focusing on innovation and external drivers as major research areas (big spheres) with the aim of enhancing the development and application of operational and policy decisions. That is, the pillar *external drivers* enables us to understand those aspects that influence the activity but are not controlled by it - climate change, bycatch fishing, international shipping traffic, (micro)-plastics, other forms of terrestrial pollution and so forth - while *innovation* investigates progress led by creativity, original problem-solving, and new ways of thinking and applying knowledge (Moscardo, 2008).

(4) A blended qualitative and scientometrics selection of research topics

The proposed framework also values the emerging outcomes from the scientometrics analysis, particularly those keywords in Fig. 2 that are decentralised from the leading scholars' concerns and research (i.e., the visualisation map) and, therefore, require further research efforts (Teixeira & Pocinho, 2020). For instance, in the context of the human dimension, we encourage the prioritisation of *economic drivers* since 'value', 'willingness to pay' and 'contingent valuation' are positioned in the extremes of the keyword map. Likewise, other academic challenges highlighted in the qualitative review (such as the *gender perspective*) are included in the framework aimed at regenerating whale-watching tourism holistically. Worth noting is the integrative structure of this framework, which will allow the inclusion of as many research concerns and practical needs as may be further required.

Hereof, the following subsections discuss the research priorities revolving around the proposed pillars for regenerative whale-watching tourism. A description of each of the specific topics (grey spheres) is

presented and their potential relationships are also highlighted. The discussion is intended to provide more concrete and helpful recommendations alongside a holistic research perspective for (re)designing the whale-watching experience based on regenerative tourism.

4.1. Social change

4.1.1. Consumers

The efforts to understand the different tourist interests and preferences have confirmed that whale watchers are a heterogeneous market with varying consumption-related behaviours in the context of environmental responsibility and wildlife protection (Bentz, Lopes, Calado, & Dearden, 2016b; Malcolm & Duffus, 2008). However, the literature is still limited on how to move tourists towards more sustainable interests, behaviours, and practices, particularly when destination-specific idiosyncrasies affect their travel motivations and decisions (Senigaglia, New, & Hughes, 2020). As earlier studies found, specialisation in whale-watching tourism pertains to specific destinations and is influenced by their popularity (Bentz et al., 2016b; Pacheco et al., 2021). According to some scholars, social media content analysis may be utilised by researchers in re-shaping consumer behavioural patterns at whale-watching destinations (Bandara & Bandara, 2019; Pagel, Orams, & Lück, 2020).

Research has also not paid sufficient attention to emotional and aesthetic values as persuasive approaches to bringing about a structural transformation in tourism services provision. This is despite their tried and tested potential to induce attitudinal and behavioural social changes and encourage more ethical practices related to animal welfare protection (Ballantyne et al., 2011; Cloke & Perkins, 2005; Finkler et al., 2019; Fraser et al., 2020; Hoberg et al., 2021; Hughes, 2001; Maguire et al., 2020; Orams, 2000). As Finkler and Davis (2021) suggested, one feasible approach in this regard could be to include affective communication messages in educational and 'interpretation' programmes by, for example, projecting emotive film messages (Finkler & Davis, 2021).

Both forms of communication (social media analysis and invoking emotions) work well and may be considered as powerful, 'bottom-up' management tools. That is to say, well-informed and motivated consumers and tourists could help in the promotion of responsible practices by reporting those which are irresponsible, thereby contributing to the industry's market positioning as a regenerative (eco)tourism industry (Finkler & Higham, 2020).

4.1.2. Operators

As with the aforementioned communication messages, the analysis of the impact of operators' marketing strategies and how they project the activity's image has also been neglected so far in the literature, especially from the point of view of animal welfare. This is critical in the internet era where information is rapidly spreading through social media platforms (e-WOM) (Lenzi, Speiran, & Grasso, 2019). As Judge, Penry, Brown, and Witteveen (2020) suggested, misleading advertising about spectacular animal behaviours - e.g., dolphins jumping or doing impressive pirouettes, a whale's tail as it dives, etc. - can 'viralise' unrealistic and exaggerated images of the whale-watching experience, inciting tourists to demand the provision of the activity as advertised.

The inadequate and/or inappropriate practices of operators have been extensively reported worldwide: in the North-Western Mediterranean Sea (Tepsich, Borroni, Zorgno, Rosso, & Moulins, 2020), the North-East of the Atlantic Ocean (IWC, 2020b), the Pacific coast of North America (Amerson & Parsons, 2018), and the Caribbean coasts of Panama (Sitar et al., 2016), to cite a few examples. Despite a large number of guidelines and regulations to ensure 'good practices', this evidence is urgently calling for a total rethink of management formulas. According to some academics, operators' actions directly affect not only their profit, but also the wellbeing of cetaceans, consumers and residents (Becken & Kaur, 2021; Curtin, 2010).

Thus, operators should become more responsible by balancing their

actions and communication messages with the potential adverse effects on the welfare of stakeholders and the natural environment, thereby complying with a sound regenerative approach to the management of the industry (Cave et al., 2022; Cave & Dredge, 2020).

4.2. Economic drivers

Academics still need to provide a closer understanding of tourists' preferences and their willingness to pay for a broader range of aspects of the experience in order to support a cost-effective, high-quality and ecologically sustainable whale-watching industry in the long run (Cheung et al., 2019; Cook, Malinauskaite, Davíðsdóttir, Ögmundardóttir, & Roman, 2020; Mayer et al., 2018; Suárez-Rojas, González Hernández, & León, 2021). From the traditional contingent valuation methods and discrete choice experiments, studies still need to move towards more accurate models to include and understand, among other things, the role of consumers' emotional and aesthetic values in the context of their 'purchasing decision' regarding more committed whale-watching tours (Cook et al., 2020; Lee, Mjelde, Kim, Lee, & Choi, 2019; Malinauskaite et al., 2021).

Likewise, research should also be directed towards how to provide reliable insights into the industry so as to tailor experiences with economically sound plans according to the heterogeneous group of customers' expectations. Hence, there is a need to estimate the value of potential 'substitution relationships' in order to encourage operators to reallocate investments to more sustainable actions that compensate for the 'less environmentally-friendly' preferences of some consumers. The findings along this line of research would potentially add value to the product and increase its market competitiveness, thereby working towards a more regenerative tourism economy.

4.3. Gender perspective

Women are involved differently than men in tourism consumption (Rasoolimanesh, Khoo-Lattimore, Md Noor, Jaafar, & Konar, 2021; Swain, 1995). They generally make more ethical and 'environmentally-aware' consumer choices, while men tend to be more interested in the thrill of engaging in challenging experiences in nature (Chauvat, Granquist, & Aquino, 2023; Rizzolo, Delie, Carlson, & Dietsch, 2023; Rosa, Larson, Collado, Cloutier, & Profice, 2020; Suárez-Rojas, León, & Lam-González, 2023). However, in the whale-watching field, there is, as of yet, no strong consensus about the role of gender (see Ávila-Foucat, Gendron, Revollo-Fernandez, Popoca, & Ramírez, 2017; Cook et al., 2020; Lissner & Mayer, 2020; Suárez-Rojas et al., 2021; Tortolini, Deglati, & Coscarella, 2021). As tourism is a crucial arena in the fight for gender equality (Alarcón & Cole, 2019; Figueroa-Domecq & Segovia-Perez, 2020), there is a need for more in-depth studies that elucidate the link between whale-watching tourism consumption and gender.

Differences between women's and men's perspectives also have implications for natural resource management and wildlife issues, as earlier demonstrated in the (eco)tourism management context (Chauvat et al., 2023; Miller & Jones, 2006; Sanborn & Schmidt, 1995). Indeed, women have a more refined 'ethic of care' (eco-feminism) and are more likely to engage in animal welfare and rights initiatives (Bertella, 2018; Fennell, 2011; Mkono, Rastegar, & Ruhanen, 2021). Likewise, Cave et al. (2022) underlined the predominance of women in supporting a regenerative shift and a move away from the male-oriented values of the capitalist domain towards values based on justice, inclusivity, and ethics of care. However, to our knowledge, there is no evidence yet of *ecofeminist pedagogy* and *gender empowerment* within academia and management decision-making in tourism general, or in the whale-watching activity in particular (Je, Khoo, & Yang, 2022), even though it may imply a sound critical turn towards achieving the sustainability paradigm shift (Alarcón & Cole, 2019; Figueroa-Domecq & Segovia-Perez, 2020).

4.4. Experience co-creation, social responsibility and knowledge transfer

The challenges of sustainability cannot be achieved if there is no cooperation between stakeholders - government, industry, community, and academia - or if no attention is paid to collective interests and constructing relationships of trust (Perkins, Khoo, & Arcodia, 2022). Although this may constitute a great challenge in the context of whale-watching tourism due to its complex regulatory and macro-cultural scenario, some cases have demonstrated a factual chance when creative and innovation-based participation plays a role in it (Hoarau & Hjalager, 2020). For example, tourists will be more satisfied and willing to support regulations when they feel privileged to be in a whale-watching area declared under a multi-stakeholder, co-creation process (IWC, 2020a; Xie, Tkaczynski, & Prebensen, 2020). Likewise, it has been demonstrated that knowledge transfer and co-creation between researchers and whale-watching firms allow operators to organise their learning and innovation processes while seeking differentiation within the competitive market (Hoarau & Eide, 2019; Hoarau & Kline, 2014). However, further efforts need to be directed towards providing sounder theoretical and practical insights into the opportunities these active and collaborative approaches may provide within the various whale-watching scenarios at destinations worldwide.

On the other hand, even though there is a market niche demanding tourist experiences that are engaged with ethical issues, such as those involved with corporate social responsibility initiatives (Lissner & Mayer, 2020; Suárez-Rojas et al., 2021), the existing ones signalling tourist firms' sustainability efforts seldom encourage science-based conservation strategies or contribute to the socio-economic development and regeneration of the destination (Bertella, 2019; Fraser et al., 2020; Garrod & Fennell, 2004; Moscardo, 2008). Hence, whale-watching requires advances in scientific research towards innovation in social responsibility strategies and the potential to reconcile responsible custodianship of natural resources and employee wellbeing with consumer satisfaction, economic returns and market differentiation. Further, in-depth, empirical analysis is also needed in order to ascertain the impact of this holistic approach in practice.

4.5. Technology

Innovation in applied technology has assisted scientific research development, particularly in measuring the (direct) ecological impacts on whales and explaining environmental issues (Alves et al., 2019; Hays et al., 2019). However, these tools potentially have broader implications for efficiently promoting *sustainable* and *regenerative* tourism management (Nunes, Radeta, & Nisi, 2020; Perles-Ribes & Ivars-Baidal, 2018). Technologically speaking, efficient boat engines may constitute a good example that could help in working towards a regenerative framework. Apart from reducing fuel consumption by over 60%, which also implies the reduction of pollution emissions and an increase in financial returns (Chuang, Chen, Kung, & Shih, 2020; Hoarau & Eide, 2019), they would add value to the tourism experience and contribute towards market differentiation. Moreover, it has been recently demonstrated that the employment of global positioning system (GPS) and other mapping tools can help to monitor regulation compliance on the cetacean-watching routes (speed, encounter duration and boat distance from the shore) in addition to locating animal spots or registering previous routes (de Freitas, dos Santos, da Silva, de Oliveira Lunardi, & Lunardi, 2021). Similarly, the new App developed by Nunes et al. (2020) is expected to track cetaceans based on sound signalling while contributing to satisfying tourists' expectations of the experience without disturbing the wildlife.

Despite evidence of the benefits of regenerative tourism in whale-watching, the extent to which these green technological solutions would be cost-efficient for operators is still under-studied. Similarly, there is a need to ascertain the impacts of sustainable innovations on consumers' preferences for higher-quality experiences based on

regenerative technologies. Besides, this would increase both tourists' 'experience value' and the industry's adherence to social responsibility.

4.6. Climate change, long-term and cumulative effects, and less visible impacts

The transversal impacts of climate change on whale populations and marine ecosystems calls for the urgent pursuit of regenerative tourism and merits urgent attention. Climate change places future human-wildlife relationships in question and creates deep uncertainties within the macro-cultural and political discourses with respect to the industry's sustainability and the need to become regenerative (Cui, 2021). The displacement of cetaceans from the traditional breeding and feeding sites due to climate change is unfavourable for whale-watching destinations - e.g., in terms of their attractiveness and their ability to adapt to damages (Albouy et al., 2020; Cornejo-Ortega, Chávez-Dagostino, & Ivanova-Boncheva, 2014; Meynecke, Richards, & Sahin, 2017; Richards, Meynecke, & Sahin, 2021; Salvadeo et al., 2013; Sousa et al., 2022). Thus, academia is challenged to successfully help the whale-watching industry towards mitigating the effects of climate change on wildlife by i) providing valuable evidence to implement practical adaptive responses, ii) helping them to understand tourists' choices around whale-watching in the context of changing conditions, as well as answering other questions such as their willingness to pay for the cost of carbon offset measures, and iii) identifying the pattern of causal linkages within which the industry operates in order to assess the multiple impacts constraining its development.

Nevertheless, cetaceans' longevity and their migratory patterns (among other things) make it difficult to monitor cumulative and less visible effects - such as sound modulation and stress. This challenge can be addressed i) by taking advantage of the open-source availability of extended data series from years of studies which may be supported on online platforms, ii) by implementing recent advances in technology to reduce efforts on tracking and decode whales' stress signals during encounters, iii) by utilising the innovations in analysis methods and models, and iv) through the adoption of data sampling standardisation methods worldwide (see Arranz et al., 2021; Bandara & Bandara, 2019; Barra et al., 2020; Burnham et al., 2021; Erbe et al., 2019; IWC, 2020a; Pérez-Ortega, Daw, Paradee, Gimbre, & May-Collado, 2021). Knowledge and data sharing between different research disciplines and sites would also be critical to achieving these challenges within the regenerative framework.

5. Conclusions

Whale-watching is a complex and highly dynamic tourist activity that still faces many unanswered challenges in regards to successfully achieving a balance between human wellbeing and the natural world. Therefore, it requires new theoretical and empirical approaches so as to tackle the existing shortcomings head on and make comprehensive progress towards a *regenerative* and *sustainable* activity in the near future.

Whale-watching is, by its very nature, a consumptive (recreational) activity. This has led academics to centre their attention on the following three research areas: i) the assessment of the ecological responses of cetaceans to human disturbance, ii) the behavioural determinants of the tourism demand shaping whale-watching consumption, and iii) the issues around the macro-cultural, political and management discourses that question the 'goodness' of whale-watching tourism. However, a curated qualitative analysis of the literature shows that evidence has not succeeded in assisting the industry towards designing and implementing straightforward, adaptive solutions for balancing whale-watching development and sustainability.

Therefore, we propose a research agenda for whale-watching tourism following from the major research concerns identified in the literature review - ecological impacts, human dimension, innovation and external drivers - and how these are interconnected. The proposed

framework is grounded on the ideas of *regenerative tourism* by carefully looking at creating positive and restorative outcomes for all forms of wellbeing - social, economic and ecological (Becken & Kaur, 2021; Day et al., 2021; Duxbury et al., 2020; Reed, 2007). The research agenda is also in line with the suggestions in the field of whale-watching tourism regarding the urgent need to adopt transformative methods of tourism management in order to avoid an eventual industry collapse (Bejder et al., 2022; Cave & Dredge, 2020; Clarke, 1997; Fumagalli et al., 2021; Higham et al., 2016; Pacheco et al., 2021).

Thus, the active pursuit of an integrative and regenerative framework revolves around four pillars concerned with i) the activation of the processes of innovation, ii) wellbeing in the human dimension, iii) vigilant attention to ecological impacts, and iv) the impulse of external drivers. A set of key research areas emerge when working out the potential interactions between these pillars, based on the accumulated research stemming from the 'scientometrics' and qualitative analyses: i) social change, paying particular attention to reconciling tourists' interests and operators' behaviours with more responsible practices; ii) innovation in whale-watching elements and practices based on new technology, co-creation process and corporate responsibility; iii) the preservation of cetaceans and enhancement of their wellbeing from a broader perspective, such as when taking climate change into consideration; iv) the collective involvement of the different stakeholders in the decision making process, with particular consideration for the vision of women and their caring attitudes and ethics concerning animal rights.

This framework is original in providing academics with the opportunity to follow up a road map for future research in whale-watching tourism with practical, managerial implications. Furthermore, it can be applied to other tourism contexts such as *wildlife ecotourism* and *active tourism* (Caparrós-Martínez, Martínez-Vázquez, & de Pablo Valenciano, 2022; Dertien, Larson, & Reed, 2021). The research schedule grounded on the 'regenerative' perspective may be also useful for understanding tourists' behaviour and their relationships with natural environments, generating opportunities for the implementation of full-blown responsible practices aimed at reconciling the aims and interests of all stakeholders involved (Esfandiari, Pearce, Dowling, & Goh, 2022; Fredman & Margaryan, 2021; Tejedo et al., 2022).

Finally, despite the efforts of this article to contribute with an integrative assessment of the latest whale-watching sustainability research and moving towards a regenerative framework, some limitations are presented. First, the focus on the academic community as the leading player or actor may be misguided and may not be sufficient in terms of the joint efforts that are needed from both the industry and the academics. Further research should consider the potential roles of other actors to raise a feasible and consensual regenerative change: industry, academics, government, and civil society. According to the ideas of regenerative tourism, the role of stakeholders needs to be rethought in order to contribute to a more resilient and healthier socio-ecological environment (Laurent & Martin-Rios, 2023). Lastly, although the framework proposal of this article points out the potential of *innovation* as a key driver for regenerative whale-watching tourism, there is a need for a more in-depth analysis of the proactive and enhancing interactions of social and technological innovations.

Funding details

This work has been supported by the postgraduate research scholarship APCR2020010004 from the Canarian Agency for Research, Innovation and the Information Society - ACIISI (Government of the Canary Islands), co-financed by the European Social Fund. It has been also carried out with funding by the following projects: MARCET II Project (MAC/4.6c/392), approved in the second Call of the 2014-2020 Interreg MAC Program with ERDF-EU Funds; ProID2021010048, approved in the Call of the Canary Islands ERDF 2014-2020 Operational Program from ACIISI (Government of the Canary Islands) with ERDF-EU Funds; TED2021-131848B-100, from the Ministry of Science and

Innovation (Government of Spain) with EU Next Generation Funds.

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Declaration of Competing Interest

No potential conflict of interest was reported by the authors.

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