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ICELANDIC TOURISM RESEARCH CENTRE

CITIZEN SCIENCE IN WHALE-WATCHING TOURS:

A PATH TO ENHANCED SUSTINABILITY AND COMPETITIVENESS?

ÁSA MARTA SVEINSDÓTTIR
GYDE RUDOLPH
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Publisher: Icelandic Tourism Research Centre, Borgum v/ Norðurslóð, IS-600 Akureyri

E-mail: rmf@rmf.is
Web: www.rmf.is

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Autor(s): Ása Marta Sveinsdóttir and Gyde Rudolph

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Cover Photo: Whale-watching participants taking photos on tour ©Pierre Raffy 2025

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INTRODUCTION

Whale-watching is a growing industry worldwide, reaching an estimated 13 million people (Burnham, 2021; Dionisio, et al., 2022), and has become one of the most popular tourist activities in Iceland (Icelandic tourist board, 2025). At the same time, whales are vulnerable species to the changing climate and other environmental pressures, making continued research to understand and protect them important. The whale-watching industry, in turn, depends on healthy whale populations (Malinauskaite et al., 2022) highlighting the close link between conservation and commercial interests.

As whale-watching grows in popularity, whale-watching vessels have become valuable platforms for scientific research, offering cost-effective and frequent opportunities to observe cetaceans (Cruz-Modino & Cosentino, 2022). Collaboration between researchers and whale-watching operators not only advance scientific understanding but also shape the educational aspects of whale-watching tours, encouraging environmental awareness among tourists. Through informative tours, whale-watching has been recognized as an activity with significant potential for ecotourism (Cruz-Modino & Cosentino, 2022; García-Cegarra & Pacheco, 2017; La Manna et al., 2020; Lopez & Pearson, 2017; Nicosia, 2016; Win et al., 2023), such as when operators aim to raise participants' awareness and willingness to support conservation efforts (Lopez & Pearson, 2017; Manna et al., 2020).

Building on this awareness and engagement, tourists can also become active contributors to research through citizen science initiatives. Citizen science involves the participation of non-scientists in scientific research. In tourism, this often takes the form of data collection by tourists during wildlife-focused travel experiences. This approach can produce valuable ecological and environmental data that inform management and conservation planning (Embling, Walters & Dolman, 2015; Dionisio, et al., 2022). Cetacean observation is one of the most frequent forms of citizen science in tourism and has been used to monitor cetacean populations for many years (Embling, Walters & Dolman, 2015). Integrating citizen science into whale-watching allows for the collection of valuable data on cetacean abundance and distribution, useful for developing effective protection and conservation measures (Embling, Walters & Dolman, 2015; Fernandez et al., 2021).

Despite this potential, there is limited knowledge in Iceland about how whale-watching companies and cetacean researchers collaborate, and to what extent citizen science plays a

role. Understanding these relationships is important, as such partnerships may enhance sustainable tourism practices, contribute to marine conservation, and advance scientific knowledge in Iceland.

This report presents the results of the study *Citizen science in whale-watching tours: a path to enhanced sustainability and competitiveness?* The title functions as the study's overarching research question. To investigate this question, the research focused on the collaborative relationships between Icelandic whale-watching companies and cetacean researchers, with a particular attention to whether and how citizen science methods are practiced within these partnerships. The study further explored whether these collaborations are mutually beneficial, supporting knowledge creation, nature conservation, sustainable tourism, and the companies' competitiveness. The research focuses specifically on operators engaged in responsible whale-watching, defined here as those that follow the Icelandic Whale-Watching Association's Code of Conduct, and/or actively participate in research.

The research was funded by the Science Fund of University of Akureyri. With the support of the Science Fund, Gyde Rudolph was brought on board as a research assistant, contributing to the research while simultaneously undertaking fieldwork for her master's thesis focusing on integrating regenerative tourism principles into whale-watching operations. Based in Húsavík, Gyde was able to combine these efforts, resulting in a productive collaboration that advanced both this research project and her own academic work. The study was carried out in collaboration with Dr. Charla Jean Basran from the University of Iceland's Research Centre in Húsavík and the non-profit organisation Ocean Missions. Dr. Basran assisted with the preparation of the study and provided ongoing support throughout its implementation, while the Research Centre generously provided a camera, some of the photographs in this report being taken with their equipment. The authors also gratefully acknowledge all the whale-watching companies that welcomed participation in their tours for the purpose of this research and all the interviewees that took part in this study.

1.1 Whale-Watching in Iceland

The abundance of cetaceans has played a crucial role in shaping the country's evolving relationship with whales. Whale-watching in Iceland began in the 1990s, with the first tours operating from Höfn in the southeast of the country (Nicosia, 2016). In recent years, the rise of whale-watching tourism has prompted communities to adjust their economic practices accordingly (Malinauskaite et al., 2021). Today it has grown to become one of the most popular tourist activities in Iceland with 18% of international travellers participating in a tour

during their visit in 2024 (Icelandic Tourist Board, 2025). This represents over 425.000 participants, as shown in Figure 1.

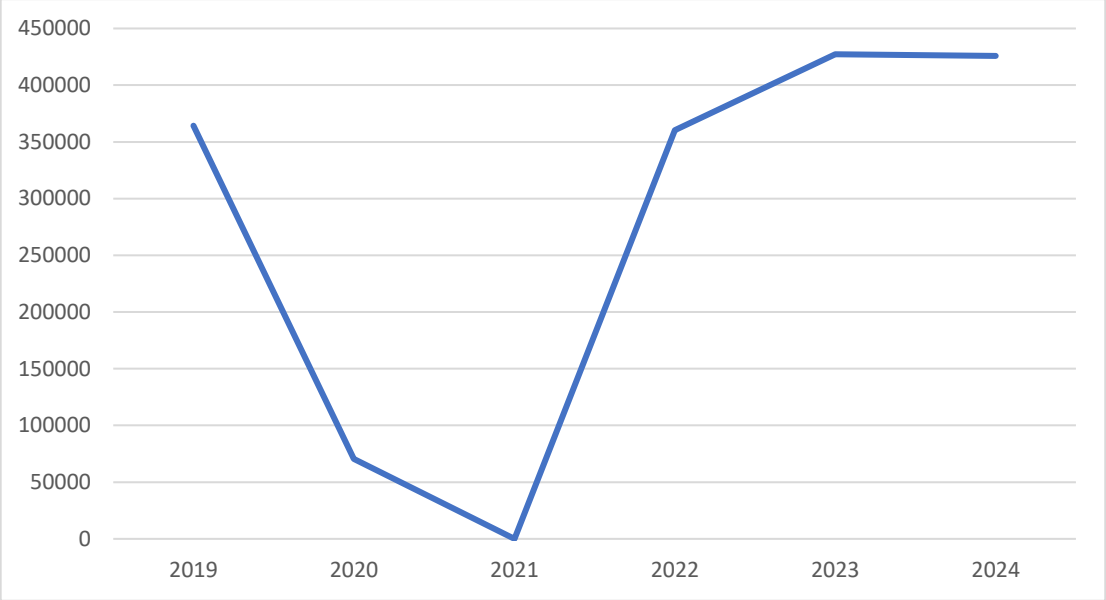

Figure 1: Number of whale-watching participants from 2019-2024 in Iceland. Data provided by the Icelandic Whale Watching Association (IceWhale)

Tours are offered across the country, especially in the north (e.g. Húsavík, Akureyri, Árskógssandur, Hauganes, Dalvík), the Westfjords (e.g. Hólmavík, Ísafjörður), the southwest (e.g. Faxaflói) and west (Ólafsvík). Tour options vary, ranging from larger oil-fueled tourist vessels and traditional oak boats to high-speed RIB adventures that allow for closer and faster experiences. These diverse tour formats cater to different tourist preferences, offering a range of experiences from calm educational settings to thrill-based encounters. Despite its popularity, the whale-watching industry in Iceland is not without its challenges. Voluntary guidelines for responsible whale-watching have been established, most notably the Code of Conduct developed by IceWhale, a non-profit organization which majority of operators in Iceland are part of. However, the degree of compliance among companies is inconsistent and the enforcement of these guidelines remains limited (Malinauskaite et al., 2021; Cook et al., 2020). The voluntary nature of the Code means it relies heavily on the goodwill and environmental ethics of individual operators. IceWhale aims to address these gaps by fostering cooperation among whale-watching companies, hosting workshops and promoting best practices. Despite these efforts there is still room for improvement in aligning the economic interests of whale-watching with conservation goals. While some companies integrate research partnerships and educational components into their tours, others focus primarily on the touristic and entertainment aspects, sometimes at the cost of sustainability (Cook et al., 2020).

Figure 2: Whale-watching in Skjálfandi bay, Húsavík ©Gyde Rudolph

1.2 Whale Research in Iceland

Due to Iceland's remarkable diversity of cetaceans, with at least 23 species observed in its waters (Icelandic Institute of Natural History, n.d.), numerous cetacean conservation projects have emerged in the country, many of which collaborate with whale-watching companies.

The country's nutrient-rich waters, influenced by the mixing of the cold Arctic currents and the warmer North Atlantic Drift, provide an ideal habitat for a variety of whales (Bellon et al., 2024). These favorable conditions make Iceland an important site both for long-term ecological studies and conservation-focused research on whale populations, migration patterns, and the effects of human activities on marine life. Several university-affiliated research centres across Iceland specialize in marine and cetacean research, offering opportunities for scientists and both national and international students to engage in fieldwork and academic studies. One of them is the University of Iceland's Research Centre in Húsavík which conducts studies on cetaceans in Skjálfandi Bay. Research focuses on species distribution, behavior, and the effects of whale-watching activities. In addition, the centre hosts a master's level field course every summer where students are introduced to a wide range of field techniques used in cetacean research delivered in collaboration with local whale-watching companies. Complementing these academic initiatives, the Whale Museum

in Húsavík organizes an annual whale conference during the summer months. The event brings together scientists, tourism operators, and ocean enthusiasts, featuring presentations from both Icelandic and international researchers, promoting education, awareness, and collaboration across scientific and tourism communities.

The University of Iceland's Research Centre in the Westman Islands focuses on the ecology and behavior of high trophic-level marine species, especially marine mammals. Research includes both land- and boat-based observations, with a strong emphasis on orcas through the long-running Icelandic Orca Project. Other studies explore species like pilot and blue whales, as well as deep-diving cetaceans in surrounding waters. The centre contributes to understanding biodiversity and species distribution in the region. In addition, student projects from Icelandic universities and academic institutions offering marine focused study programs also contribute valuable insights to cetacean research through initiatives like master's theses and PhD projects.

Iceland's primary governmental research body of marine life, the Marine and Freshwater Research Institute (MFRI) conducts assessments of whale populations, diet studies, and habitat analysis. Their work often informs policies on marine conservation and fisheries and management. They also maintain a collaborative photo identification database used to monitor individual whales over an extended period, thus supporting long term research.

Equally important, several independent research groups, charitable initiatives and non-profit organizations are actively engaged in cetacean research across Iceland, contributing to the understanding and protection of whale populations.

Finally, although headquartered in Norway, the North Atlantic Marine Mammal Commission (NAMMCO) collaborates with Icelandic institutions on research projects related to whale populations and sustainable marine resource management.


Figures 3-4: Humpback whales spotted in Skjálfandi bay, Húsavík ©Gyde Rudolph

METHODOLOGY

In this study, data was collected using qualitative research methods. The process began with a desk study, followed by a marketing analysis of whale-watching companies to gain a deeper understanding of the companies and how they position themselves and communicate research participation to potential customers. Building on these insights, semi-structured interviews were conducted with representatives from whale-watching companies and researchers involved in cetacean studies that collaborate with whale-watching companies. In addition, informal interviews were carried out with participants on whale-watching tours to investigate their motivation, participation and experience, complemented by observational analysis of tour activities, research participation and interactions between operators, researchers and participants. This multi-method design provided a rich understanding of the collaborative relationships of whale-watching practitioners and researchers and the participants in the tours.

2.1 Marketing Analysis

Website content, social media platforms, tour descriptions, and promotional materials of nine whale-watching companies were reviewed and analysed as part of the marketing analysis. The companies were chosen based on their engagement in responsible whale-watching and/or their support and participation in whale research.

To structure and analyse the marketing material, a coding framework was developed based on recurring patterns identified during the review. The framework included major analytical categories such as: Sustainability communication; research collaboration; citizen science involvement; use of scientific language; tone and messaging; calls to action (responsible tourism and conservation). These categories allowed the data to be systematically organised and enabled a structured comparison between companies. To facilitate this comparison, a table was created in which each company was placed in a column, and each analytical category became a row. Relevant excerpts, observations, or summaries from the marketing materials were inserted into the table, allowing for a clear visual comparison of each company.

A comparative analysis was then conducted to evaluate marketing strategies. By analysing the table, broader trends and contrasts in marketing strategies became visible. This process made it possible to determine, for example, which companies strongly foreground their scientific partnerships, which use sustainability primarily as a branding tool, and which rarely reference research or conservation at all. From the comparative table four overarching themes emerged: 1. Communication and Sustainability Policies 2. Integration of Research

Collaboration into Products 3. Social Media Presence and Calls to Action. Through this method, this study ensures a well-rounded understanding of how the selected whale-watching companies in Iceland position themselves at the intersection of tourism, sustainability, and scientific research.

2.2 Interviews

A total of 15 interviews were conducted with 16 participants: 8 cetacean researchers or research coordinators and 8 whale-watching representatives, including both management positions and guide positions. These roles were selected for their strategic, operational, and scientific perspectives on research-industry collaboration, and participants were identified through purposive sampling. The interviews followed an semi-structured interview guide, where the topics of discussion were decided in advance, but the content and emphasis of the conversations remained flexible. This approach allowed for an exploration of the subject from different perspectives to gain a better understanding of participants' experience (Jónsdóttir, 2021).

The interviewees were contacted via email, and all interviews were conducted online via Microsoft Teams between March and October 2025, with most lasting one hour. With participants' consent, the interviews were audio recorded, transcribed, coded and analysed thematically. As part of our qualitative methodology, we conducted semi-structured interviews with a range of stakeholders involved in whale-watching and/or cetacean research across Iceland. From whale-watching companies, we spoke with individuals occupying diverse managerial and operational roles, including marketing managers, research coordinators, head guides, and managing directors. This allowed us to explore how perspectives on cetacean research, citizen science and sustainability vary within organizations, from strategic planning to daily operations. In addition, we interviewed researchers from different research centres, university programmes, and NGOs who collaborate with whale-watching companies on data collection, education, and conservation initiatives.

To ensure that our findings are not limited to one geographic area or tourism model, we selected case studies from multiple locations across Iceland. The geographic and institutional diversity provided a broader, more representative understanding of the dynamics between whale-watching tourism, scientific research, and citizen science, enabling us to identify both regional challenges and common trends. Our aim was to generate comprehensive insights that reflect the complexity and variation within Iceland's whale-watching sector.

2.3 Informal Interviews

In addition to semi-structured interviews, 76 informal interviews were conducted with whale-watching participants throughout the fieldwork using an interview guide to ensure consistency while allowing for flexibility. These conversations took place in natural settings, such as on whale-watching vessels, at harbors, or during breaks between tours, allowing for relaxed and open discussions. The informal approach was particularly well-suited to the dynamic setting of whale-watching tours, where recording interviews was impractical due to the active nature of the experience. Passengers were actively engaged in searching for whales, and once sightings occurred, attention shifted entirely to observing and documenting the experience through photos and videos, which meant interviews were not feasible during these moments. Given these constraints, informal interviews were strategically conducted during quieter periods - before and after tours, during transit or in moments between guiding responsibilities. This flexible approach allowed for meaningful engagement without disrupting participants' experiences. Key insights were documented immediately afterward in field notes, ensuring accuracy, while maintaining the natural flow of interactions.

The informal interviews with whale-watching participants took place in North Iceland (Húsavík), West Iceland (Ólafsvík), and the capital region (Reykjavík) to capture perspectives from different operational contexts. However, the majority of these interviews took place in Húsavík as one of the researchers of this study was based there throughout the research. This included close collaboration with local whale-watching companies which provided direct, continuous access to a range of participants, offering rich opportunities for informal interviews.

2.4 Observation Analysis

Structured observations were conducted during 9 whale-watching tours in North Iceland (Húsavík), West Iceland (Ólafsvík), and the capital region (Reykjavík) to capture perspectives from different operational contexts. The observations focused on understanding the collaborative relationship between researchers and whale-watching operators, how sustainability and responsible whale-watching practices are communicated and practiced in real-time settings, and the extent to which whale-watching participants and staff were involved in research during tours. As one researcher was stationed in Húsavík for the fieldwork over a longer period of time, observations were also made in the harbor on particularly busy days (e.g. when cruise ships arrived to town).

The first fieldwork was done in late February, in the winter season, and the last one at the end of June in the summer season. Researchers followed a fieldwork guide developed specifically for this project, took notes and photographs. These observations allowed for the systematic collection of data of guide behavior, tourist engagement, and company practices. This guide was used during the tours, allowing for consistent data collection while remaining flexible enough to account for the variable nature of whale-watching operations. Observations were recorded in field notes during and immediately after each tour.

FINDINGS

3.1 Marketing Analysis

3.1.1. Communication of Sustainability Policies

Sustainability is a recurring theme in the marketing strategies of the companies, but the level of commitment and the way it is communicated varies significantly between companies. Some operators prominently emphasize their environmental efforts through eco-labels, and specific sustainability initiatives. These companies actively promote their participation in global certification programs (e.g. EarthCheck, the World Cetacean Alliance, Blue Flag) eco-label, highlight their use of hybrid or electric vessels, and outline concrete environmental policies, such as reducing plastic waste or offsetting carbon emissions.

Others demonstrate sustainability efforts in more indirect ways, such as through involvement in drafting industry-wide environmental guidelines or supporting local conservation initiatives. While they acknowledge environmental responsibility, sustainability is not always a core part of their marketing identity. A few companies take a more passive approach, making only a few references to environmental awareness without integrating sustainability as a key selling point. This variation suggests that while sustainability is recognized as important, its role in branding and customer engagement differs based on company priorities and marketing positioning.

3.1.2. Integration of Research Collaboration into Products

Research collaboration is also differently presented across companies. Some actively integrate scientific research into their tours, offering specialized experiences where guests participate in data collection or highlighting their partnerships with marine research institutions. These operators frame research as a fundamental aspect of their brand, often promoting their role in long-term studies of cetaceans.

Other companies support scientific initiatives by offering their vessels as research platforms or partnering with conservation groups, but without making research a core feature of their tours. In these cases, collaboration exists but is not heavily emphasized in its branding. Some companies mention affiliations with scientific organizations but provide little visible evidence of active engagement in ongoing research. This suggests while research partnerships are valued, not all operators see them as a primary driver of customer interest or a defining element of their identity.

3.1.3. Brand Alignment with the Scientific Community

The extent to which companies align their brand with scientific credibility also varies. Some companies build their image around conservation and marine science, using educational language and emphasizing responsible whale-watching practices. They frequently highlight their partnerships with researchers, conservationists, and policymakers, positioning themselves as advocates for marine protection.

Others focus more on the experiential side of whale-watching, marketing their tours as opportunities for close encounters with marine life rather than as educational or scientific experiences. This divergence reflects differing perceptions of what appeals most to customers - whether it is scientific credibility or responsible tourism or the excitement of wildlife encounters.

3.1.4. Social Media Presence and Calls to Action

Social media plays a key role in how companies reinforce sustainability and research messages. Some operators frequently share educational content, research updates, and conservation- related initiatives, using platforms like Instagram and TikTok to blend entertainment with environmental awareness. Others use social media primarily for promotional purposes, focusing on showcasing tour experiences.

Calls to action also differ among companies. Some actively encourage responsible tourism practices, advocate for anti-whaling initiatives, or promote conservation programs. Others focus more on marketing the experience itself, with less emphasis on broader environmental or ethical messaging. While all companies acknowledge responsible tourism to some extent, those with the strongest sustainability branding and research integration position these elements as defining features of their identity, while others treat them as supplementary aspects rather than central aspects.

3.2 Interviews

3.2.1. People Behind the Practice: Backgrounds and Motivations

Most individuals employed in whale-watching operations are highly educated, many guides are marine biologists, while others have advanced within the industry over time, starting in ticket sales or cleaning and working their way up to management positions.

I've been with [Company] now for over 12 years. Started basically on the floor and have been with the company ever since. - Whale-watching manager

Many expressed a strong sense of pride in their work, speaking enthusiastically about the companies they work for, with many emphasizing that they would not want to work anywhere else. Some of the researchers interviewed had previously taken summer jobs with whale-watching companies, deliberately choosing to work with those they perceived as the most ethical and aligned with their values.

When I picked [Company] it was because I knew there was only one boat and they were just starting out and they were trying to be good from what I could read online. I don't think I would go to any of the other places cause it's just, I don't want to contribute to that.- Researcher

Many of the people interviewed are foreigners, cetaceans enthusiasts, who had moved to Iceland to work in whale-watching or marine research, reflecting a common pattern in the field.

That's like the classic way, that whale people come to Iceland, fall in love with it and decide that they want to study whales. – Researcher

The people working as guides now are highly educated, marine biologists and all kinds of biologists, from all over, with lots of experience. They're coming to Iceland because of their passion for whales and marine life. - Whale-watching manager (Translated by author)

The interviewee continued explaining how recruiting educated and enthusiastic people as guides enhances the guests experiences and adds value to the tours.

But this passion is contagious, it spreads to the customers and raises the standard of the guiding significantly. Having educated people in these roles, who can answer questions, really makes a difference.

Several interviewees highlighted the independence and enthusiasm of the guides, noting that they have significant flexibility in how they present information to participants. Guides were described as passionate about whales and therefore naturally inclined to stay informed about the latest research. Through companies' organized internal meetings guides come together to discuss new research and share recent readings, allowing them to refine and update their onboard presentations. Rather than enforcing a uniform script, companies encourage guides

to find their own voice, drawing on their unique backgrounds and interests fostering authenticity in the tours and a culture of trust and respect within the team. However, there is no formal collaboration with research groups, research centres or universities in place regarding the educational content shared with guests. Topics may include marine conservation, sustainable fishing, beach cleaning, and recycling, all with the goal of inspiring guests to take action.

We try to inspire them [whale-watching participants] to do something and change the way they might be doing things in their daily life. - Whale-watching guide

Another guide expressed a similar view, highlighting the importance of leaving a meaningful impression on guests.

When they leave the boat they will maybe be a bit more aware - We need to, for example, protect the oceans - or maybe, next time in the supermarket they will think if they really need a plastic bag. - Whale-watching guide

Guides seem to play a central role as intermediaries in communicating marine science to the public, sharing latest scientific findings and encouraging responsible behaviour. However, without any formal collaboration with the research community in shaping the content presented, suggesting a missed opportunity to strengthen the educational and conservation impact of whale-watching.

3.2.2. Mutual Benefits of Collaboration: Improving Tours and Research through Collaboration

The collaboration between whale-watching companies and researchers is characterized by an informal yet mutually beneficial relationship. Researchers are often allowed to join tours free of charge when space allows, using the opportunity to carry out their research activities such as data collection. Some companies even support educational initiatives by providing free trips for marine biology courses and providing logistical support, such as lending boats or offering them at minimal cost to research groups. One interviewee explained how the collaboration strengthens their own operations and visitor experience.

This often draws attention and sparks interest among passengers, when researchers are on board, as they are usually introduced by the crew. Passengers find it exciting and enjoyable to

see how much is being done here in relation to whales. - Whale-watching manager (Translated by author)

From the researchers' perspective, collaboration with whale-watching companies is very important, especially when research budgets are limited. Researchers often rely heavily on funding, and access to regular boat tours is for some the only way to carry out fieldwork.

For students and for researchers, especially without very large grant funding, it's a way to get out on the water and do a lot of observations at no cost. And you know, to rent a boat and to do as many trips as they do, would be, we would need a pretty hefty budget. I'm always hesitant to quote numbers off the top of my head because it's been a while since I've worked on our budget, but I want to say we were estimating they were saving us at least three million króna a summer and that's probably an underestimate because yeah, probably renting a boat and a captain would be significantly more if we were to do that. - Research coordinator

In some cases, researchers collaborate directly with guides, who have a background in science, many of whom become co-authors on academic papers, this they do without including the companies. Some whale-watching companies actively collaborate with researchers and university research centre's while other companies have taken this a step further by developing their own internal research team, conducting in house studies. These efforts often result in personalized storytelling during tours, deepening visitor engagement.

We have like a whole family structure that we can show people like ´This is the leading female and these are her children, these are the grandchildren' so people get really excited knowing which animals they have seen and many of them have names. [...] I do feel like it definitely connects people a lot more to nature and to the animals that they see. – Whale-watching guide

Indeed, the collaboration is not driven by scientific interest only but also strategic considerations. Promoting research partnerships, through brochures, websites, and onboard messaging, helps companies appeal to environmentally conscious tourists.

What is also good is to be able to say that it's good for the sustainability of the company and to attract these environmentally minded people that are our preferred target group – Whale-watching manager

3.2.3. Challenges in Collaboration: Tensions and Limitations in Collaborative Practices

Although collaboration between researchers and whale-watching companies has brought significant benefits, several challenges were identified in the interviews. One issue frequently mentioned was the scientific limitations of data collected during commercial whale-watching tours.

The research becomes biased because we only go a certain distance out and only during daylight hours. – Whale-watching manager (Translated by author)

Additionally, some researchers shared that carrying out fieldwork during tours can be difficult due to frequent interruptions from tourists.

Talking with the students I worked with last year, one of them had a hard time. He was often called to interact with the whale-watching groups and serve as an educational source. [...] It's great because certainly educational outreach is part of the mission. But at the same time when you are doing research and constantly having to also educate tourists about what you are doing, there are chances that can sometimes defeat or interfere with the research. – Research coordinator

From the perspective of the companies, communication and coordination with researchers can also be a point of friction.

The collaboration has mostly gone well, but of course there have been hiccups. Everyone is looking at things from their own operational standpoint, we're a commercial business and depend on this for our livelihood. There have been issues with poor communication. We have passengers at sea, and sometimes researchers are shooting and collecting samples in front of them. They have sometimes lacked understanding. But again, I see this from our point of view. We might have one humpback whale saving the whole tour, and if it's disturbed and decides to leave, especially during peak season, it can ruin everything. Crews have noticed that behavior sometimes changes after sampling, and while that's not supposed to happen, it has raised concerns. – Whale-watching manager (Translated by author)

Some operators also mentioned cultural clashes between researchers and experienced crew members.

Over the years, we've had researchers who act like know-it-alls. They try to tell captains, who've been at sea for 50 years that they're doing things wrong. 'You can't do this, haven't you read this paper?' And they're here for maybe two weeks. Sure, people are allowed to bring up ideas and observations, but we've had cases where after researchers leave, we get all kinds of criticism about our practices. But we're a professional business, we want the whales to keep coming back. – Whale-watching manager (Translated by author)

Issues of academic elitism and lack of transparency were also raised by several interviewees. One company manager expressed frustration:

The problem is access to researchers' information. They're very keen to keep research to themselves, and that can be a problem. You might be participating in a five-year research project and everyone's asking ‚What's this person actually doing?' Sometimes I feel there's academic snobbery. I fully understand the value of research, but just because you're in a research team and your friend is a deckhand doing almost the same tasks, there has to be some balance. Researchers need to understand the environment they're in. It sometimes feels like what we're doing is looked down upon, we're just exploiting nature for profit. Academia becomes this sacred thing and we're the fools. – Whale-watching manager (Translated by author)

The same interviewee continued explaining that this tension can go both ways:

And on the other hand, some see academics as pencil-pushers who've never even pissed in the sea. So it's kind of a two-sided obstacle to having a research team with us. - (Translated by author)

One whale-watching company owner offered a more frank critique of hosting student researchers on board his boat.

Yeah, they get in the way a bit. They're pushy about getting the best photos, and the paying customers matter less to them. I had to have a word with them, they can't just push their way to the front to get the best picture. – Whale-watching owner (Translated by author)

Even though the majority of interviewees agreed that the collaboration is beneficial, for most part, there was widespread consensus that whale-watching companies see themselves primarily as service providers in these partnerships, rather than active research partners. This was, however, not generally framed as a concern by the operators. One interviewee reflected:

Yes, I would say we are a service provider. We're not involved in shaping the research. I've sometimes asked questions about why certain things are happening, but we haven't been involved in deciding which projects are done. - Whale-watching manager (Translated by author)

Researchers reflected on this and most expressed openness to involving the companies more actively in their research, not only as platforms for data collection but also shaping the research itself. However, this did not seem to be an approach many had actively considered but when asked they responded positively. As one researcher explained:

We wouldn't react negatively if they had some ideas they wanted to explore further. If they take the initiative, that would just be fun. – Researcher (Translated by author)

Some researchers, however, acknowledged this limitation in how collaboration is currently structured and suggested that involving companies more actively in research, especially in shaping research questions, could help foster stronger stewardship and pride in the role they play in conservation. One researcher explained:

We should avoid going in and being like ´We're doing this, please give us your data´ as opposed to going in and saying ´What do you think we should be studying?´ and not telling them to follow this line by line, but hearing what they have to say and taking that into account when coming up with our research questions. Or checking with them if your research question is something they want answered. I think that would give whale-watching companies more of a sense of pride and ownership over the research that's being done, because then they'll feel much more involved. – Researcher

Finally, there are ethical tensions inherent in balancing collaboration with accountability. One interviewee discussed the dilemma researchers may face when they observe poor practices at sea, as reporting these practices might jeopardize ongoing cooperation.

Whale-watching is often seen as a positive alternative to hunting whales, which I don't disagree with. At least the whale comes out of that interaction alive generally. But at the same time, it's not without impacts to the whale populations. [...] Perhaps not every captain was as conscious of the guidelines regarding how close you can come to a whale. And then it puts us in an uncomfortable situation, because if we want to maintain that collaboration and they haven't necessarily given us the leeway to say ´Hey, tell us if a captain's

not obeying the rules´ then do we threaten the collaboration to report someone who's not following standards? – Research coordinator

3.2.4. Citizen Science as a Bridge Between Research and Public Engagement

It's incredibly important for scientists to be able to get extra help. There's so much in the world that scientists want to study, but it just isn't possible due to a lack of manpower, really. By using citizen science, a lot of data can be collected. But it's also about raising awareness among the public about the kinds of research projects going on in the world and getting people excited about science.

Often, people think there's this huge gap between an ordinary person and a scientist with a PhD and all that. Some think, 'No, that's something I could never do, I don't want to spend 10 or 12 years in school to become a scientist.' But what's so exciting about citizen science is that anyone can become a scientist. So, it's twofold how important it is to have citizen science. - Researcher (Translated by author)

This statement highlights the value of citizen science as a source of additional manpower for research and its role in connecting the public to science. Majority of interviewed researchers acknowledged the potential of citizen science as a valuable method for data collection and public engagement. However, they emphasized that for it to be effective, all participants need to be properly introduced to the tasks and supported through the process.

We need to properly train the participants if it is supposed to work. Monitoring is important, which is a challenge. There has to be a strong guideline or somebody overseeing the data collection. - Researcher

Another researcher echoed this, stressing both the potential and the risks:

If you design the program properly, it can be extremely helpful to research. You have eyes out there in the field that you know are much more than just a couple students or a couple researchers. But at the same time if you don't have the proper structures and set up in place, you could get a lot of data that is not accurate so it's a great tool if used correctly. - Researcher

Citizen science efforts mentioned during the interviews that were seen particularly effective involved longer expeditions or small, well-trained groups. These initiatives took place outside traditional whale-watching tours. One researcher who relies heavily on citizen science explained:

It would be difficult to make that finding without that contribution from citizen scientists. It's not just a nice to say kind of thing, it actually has led to publications that we wouldn't have

been able to do if we didn't have that. So yeah, I would say it's very, very important for our kind of work. - Researcher

They continued:

We really wouldn't be able to do it without those people because we just need people, you know, need a lot of people.

Although citizen science has received growing attention in marine research, only one whale-watching company in Iceland offers a tour specifically focused on citizen science. That particular tour, however, has evolved away from direct data collection and now emphasizes general scientific education and observing researchers while they collect data. Other tours, while sometimes built around scientific themes, rarely involve tourists in actual research tasks. Nonetheless, most interviewees agreed that engaging people with research, even if they are not directly contributing data, can significantly deepen tourist awareness and emotional connection to marine life.

While formal citizen science tours are rare, nearly all whale-watching companies reported encouraging their guests to contribute in informal ways, primarily by sharing their photos of whales to platforms such as Happywhale or the Marine and Freshwater Research Institute (Hafrannsóknastofnun) Photo ID database. One operator explained:

We haven't exactly been encouraging people to participate in science directly, but we do encourage passengers to share their photographs with researchers. It's both good and bad that everyone has a phone and constantly has it up, maybe they're not really enjoying the moment, but that's another discussion. Still, passengers end up with a lot of material, and we encourage them to share it, for example with Happywhale and Hafró. Those images can be used in all kinds of ways. - Whale-watching manager (Translated by author)

Researchers also confirmed the value of this type of informal collaboration. One described how these contributions support long-term monitoring efforts:

We collaborate a lot with people that are on board whale-watching boats or even cruise ships and they send us their sightings or their pictures. So we encourage people to send those pictures of whales because it helps our monitoring program a lot. – Researcher

One interviewee mentioned a newly funded research project that will involve onboard whale-watching participants collecting data on specific whale species. Several other interviewees, both whale-watching representatives and researchers, expressed willingness and future plans

to further apply citizen science methods to whale-watching tours, indicating an overall interest toward using this approach to a greater extent.

Additionally, a Facebook group managed by a cetacean research group open to the public was mentioned frequently during the interviews as an effective platform for collecting sightings and photographs of whales. It serves as a space where anyone, tourists and locals, can share observations from Iceland, and is a useful source of ongoing data for researchers.

3.2.5. Sustainability Challenges and Marine Conservation in Whale-watching

When asked about the sustainability challenges associated with whale-watching operations and conducting whale research onboard vessels, interviewees frequently mentioned fuel consumption and heavy boat traffic during the high season. These were identified as major environmental concerns. Some companies have invested in hybrid engines or scheduled tours during off-peak hours to minimize traffic, but such efforts are not yet widespread.

All companies interviewed follow the code of conduct, and most agreed it has significantly improved practices over time. However, many stressed that the guidelines remain voluntary.

It seems to work quite well as long as it's convenient for the companies to do so. But then in times where there are very few whales around and there's a lot of pressure on the companies to show something it quite easily goes out the window. – Whale-watching guide

Interviewees emphasized the pressure created by marketing promises. Overpromising exceptional encounters often leads companies to break guidelines to meet tourist expectations, highlighting the tension between commercial success and responsible wildlife tourism.

It's such a competitive industry, they're all promising incredible encounters with whales. But in reality, that's not what most encounters are like. So you're going to break the rules to try and have those encounters. I think the big challenge is the integration between advertising and the code of conduct. - Researcher

Majority of interviewees valued IceWhale's role in promoting sustainable practices, though some questioned its neutrality given that its board consists largely of company owners. Some argued IceWhale should play a stronger role in monitoring adherence to the code, while others felt responsibility ultimately lies with companies.

Companies rely a bit too much on IceWhale to educate people. But it should be the companies that prioritize this. Customers are looking for sustainable options and when you explain your actions most people understand and support it. – Whale-watching guide

The role of captains was repeatedly highlighted as central in ensuring guidelines are followed. While all companies have access to the same standards, decision-making at sea varies.

It's not about the company because everyone gets the same information. It's more about the captain himself. Some of them are just like, 'Oh, we're just gonna get the people very close to the whale and they're going to be super happy,' which of course is not the point. – Whale-watching guide

Guides were generally seen as more committed to responsible approaches than captains, and several noted that new captains often lack training, as the code of conduct is not taught in navigation schools.

A recurring critique was the lack of formal regulation and the absence of a broader marine conservation perspective in tourism policy. While some expressed skepticism toward regulation, others argued strongly for clearer legal frameworks.

There are no regulations from the Environmental Agency on this I think this should be in law. Nature conservation perspectives are largely missing, and the focus is only on land-based tourism. But isn't the ocean a natural treasure too? – Whale-watching manager (Translated by author)

Several interviewees also stressed that whale-watching companies are key stakeholders in conservation and that collaboration with researchers could strengthen both their credibility and their practices.

Whale-watching companies are some of the biggest advocates for marine conservation, because if there aren't whales to see, their tours aren't going to be very popular. By working with the companies, if we're trying to educate the public, we also have the opportunity to educate the companies and improve their practices. Hopefully we can help them be credible advocates. – Research coordinator

3.3 Informal Interviews

3.3.1. Motivations for choosing tours

Most participants had never seen whales before and saw the experience as a once-in-a-lifetime chance to connect with the ocean and Icelandic nature. Common motivations included Iceland's reputation for whale sightings, recommendations from friends/family, online reviews, and the location's status as the "whale capital" for interviewees interviewed in Húsavík. Several tourists had booked their tour through cruise ships, travel agencies, or platforms like GetYourGuide.

For many the decision was not based on the company's sustainability or research involvement initially - those aspects became more relevant after the tour experience or through information provided during booking or guiding. Though some said they were drawn to eco-labels or mentions of carbon neutrality, particularly when these were highlighted after booking.

Many tourists reflected positively on company reputations or the non-intrusive character of their experience. Comments like "you have to see them like this in the wild" highlighted appreciation for seeing whales in their natural environment. Others were drawn by aesthetics - such as "the vastness of the ocean", peaceful atmospheres, or whales elegantly diving close to boats - and saw the tour as part of a broader nature-focused Icelandic experience.

While most participants expressed satisfaction with the experience, even when whales were not sighted, some, especially cruise tourists, noted disappointment or raised concerns about transparency - particularly when expectations for sail-powered or carbon-neutral tours were not met but promised.

3.3.2. Tourist Participation in and Perception of Research

The interviews revealed that tourists generally appreciated the presence of researchers on board and were especially engaged when explicitly invited to ask questions or observe data collection. Several tourists were surprised and inspired to learn that whale fluke patterns are used for identification, and some even recognized different individuals themselves after having learned about the method on the tour. There was also interest in understanding how researchers collect data, with fluke prints, bubble-net feeding, and boat impacts. Participants mentioned being especially engaged when guides introduced tangible tools like baleen plates or shared updates about ongoing research.

Although few tourists actively participated in structured citizen science (e.g., submitting photos or engaging in microscope sessions), many expressed increased curiosity and appreciation for the scientific and educational components of the tours. Some participants described the tour as "more meaningful" because they contributed to research.

3.3.3. Impacts on Awareness and Behavior

Despite mixed expectations - some disappointed about not seeing whales, others moved by the experience itself - many guests described their time at sea as peaceful, reflective, and even transformative. Tourists frequently referenced feeling "tiny" in the vastness of the ocean, indicating broader themes of humility and environmental connection.

Several participants described behavioral shifts, especially regarding plastic use. One Indian couple shared that they began refilling water bottles for the first time while traveling in Iceland - a small but telling sign of change. Another traveller reflected on river pollution in the UK, linking their whale-watching experience to broader ecological issues. Others reconsidered their seafood choices or expressed stronger support for anti-whaling campaigns after learning about Iceland's dual relationship with whales as both wildlife and commercial resource.

There was widespread recognition of whales are wild animals and that sightings are not guaranteed. Interestingly, this awareness did not dampen the perceived value of the trip. For many, the experience of being on the ocean, hearing about marine conservation, and witnessing the care shown by guides and crew added to their satisfaction - even in the absence of whale sightings.

In some conversations, it also became clear that the tourists were beginning to question the impact of the boats on the whales and ask the researchers on the tour for their opinion. Others noted that whale-watching was of course generally better than whaling, but they perceived the experience on the boat and the whales as "hunting" or "chasing".

3.3.4. Sustainability and Competitiveness

While sustainability rarely played a primary role in booking decisions, it often shaped post-tour reflections. Tourists responded positively to company's environmental initiatives, even if they hadn't been aware of them beforehand. The carbon-neutral label, silent boats (when available), and emphasis on responsible whale-watching were cited as distinguishing features - especially in comparison to more commercial or intrusive wildlife tourism in other countries.

Transparency remains an area of improvement. Several participants that joined tours during the winter months were unaware that they were booking during the off-season and expressed disappointment at the low likelihood of sightings. Some tourists expected sail-powered tours and felt disappointed when diesel engines were used instead. Clearer communication could enhance trust and manage expectations.

That said, many tourists expressed strong support for companies that engage in research and ethical whale-watching. They described such companies as more "trustworthy" and "authentic". A few even suggested they'd be willing to pay extra for science-based or conservation-oriented tours, especially if their own participation was actively encouraged and clearly explained. This suggests that citizen science - if communicated effectively - has the potential to enhance competitiveness by aligning tourism with ethical, educational, and environmental values.

3.4 Observation analysis

3.4.1. Tour Environments

The whale-watching tours observed took place under varying weather conditions, ranging from heavy wind, rain, and snow to calm sunny days. Some companies operated seasonally, with fewer tours offered at the beginning and end of the season, while others ran tours year-round, adapting to changing weather and sea conditions. During winter, tours were generally less frequent due to harsher conditions and fewer whale sightings.

Figures 5-6: Tours with snow and high waves ©Gyde Rudolph

All vessels used were powered by oil engines, though their designs differed significantly. Some boats were open-deck vessels with limited indoor seating, while others offered more sheltered areas, some resembled small cruise ships with onboard amenities such as a bar, and some were traditional schooners. Most had originally served as fishing boats that had been converted to passenger vessels. The number of participants per tour varied from 10 to 50, with most being international tourists.

Figures 7-8: Participants on two different types of whale-watching boats ©Ása Marta Sveinsdóttir

3.4.2. Research Integration

Integration of research varied: on certain tours, researchers conducted photo-identification, behavioral observation, acoustic monitoring, and data collection of microplastic samples. Figures 9-10 show different kinds of research conducted on whale-watching tours. Some companies offered to share tour photos via email or encouraged tourists to upload their own to citizen science platforms like HappyWhale. Notably, research integration was more visible on tours that included collaboration with university researchers or NGOs.

Figures 9-10: Researchers conducting acoustic monitoring and photo-identification ©Gyde Rudolph

Tourist involvement in research was generally limited to observation and listening. However, tours that encouraged interaction - such as photo-ID comparisons, direct questions or playing whale songs over the speakers - fostered higher engagement. One tour joined, demonstrated a strong integration of scientific research and conservation messaging, with researchers from an NGO framing their work around citizen science and marine ecosystem protection. Tourists were generally curious and engaged, asking questions and documenting the experience. However, while the presence of a microplastic trawl and microscope encouraged interaction, actual hands-on participation was minimal, with most tourists briefly observing rather than actively contributing. In this example, citizen science primarily served as a tool to raise awareness of marine conservation and foster public engagement, rather than as a means of active data collection by participants.


Figures 11-12: Microplastic trawl deployed by researchers and samples filtered, participants observe ©Gyde Rudolph

3.4.3. Conservation Messaging and Ethical Practices

Most guides were highly knowledgeable, and majority of the tours offered rich educational content. Conservation messages were generally framed through the ecological importance of whales and the role of tourism in protecting them. Some guides actively interpreted whale behaviors and shared ecological insights. Others adopted a quieter approach, particularly during engaging whale behavior moments, and mentioned that they would just let the tourists enjoy the moment and "the show" and continue the guiding later. The structure and content of each tour were significantly shaped by whale activity. On most tours guides adapted by offering information about birds and geology when whales were absent and shifting between observation zones based on sightings. Guides frequently referenced responsible whale-watching practices, including the Code of Conduct, primarily when whales were encountered. They explained the importance of approach distance, time spent near an individual, and vessel coordination to avoid crowding. Environmental practices onboard varied: while reusable cups were common, waste management systems (e.g. recycling bins) were rarely observed. Engines were sometimes turned off when whales were nearby, but this was not consistent across all tours. While references to Iceland's whaling debates were sometimes included, the depth of conservation messaging varied by guide. The ecological roles of whales, such as their contributions to nutrient cycling, were often emphasized. Figures 13-14 show examples of educational material which was used during some of the tours.

Figures 13-14: Visual educational material on tours ©Gyde Rudolph ©Ása Marta Sveinsdóttir

3.4.4. Communication Between Staff and Researchers

On several tours, strong collaboration was observed between guides, captains, and onboard researchers. Guides coordinated with captains to manage time spent with the whales, often adjusting course based on behavioral observations or researcher input. Researchers were sometimes invited to share findings with tourists directly, particularly when identifying individual whales. Captains frequently approached researchers to discuss whale behavior, expressing curiosity and enthusiasm. Their questions often reflected a strong local knowledge base and a genuine interest in the scientific work being conducted.

3.4.5. Seasonality and Its Impact on Research Access

The environment of the harbors changed significantly with the season. During peak summer months, some of the harbors were bustling with overlapping tours, cruise ships, and tourist traffic. Figures 15-16 show the boat traffic and cruise ship tourism in Húsavík. In contrast, the off-season was quieter with fewer operations. On busy cruise ship days, data collection by researchers was sometimes restricted due to space limitations, as their participation was sometimes contingent on seat availability. This limited consistent data gathering and excluded researchers from certain specialized tours.

Figure 15-16: Boat traffic in Húsavík ©Gyde Rudolph

CONCLUSIONS

This study explored the collaborative relationships between whale-watching companies and cetacean researchers, with particular attention to the role of citizen science. By examining how these collaborations contribute to knowledge creation, sustainability, and conservation, the findings reveal generally productive partnerships while also highlighting missed opportunities for more integrated and mutually beneficial forms of collaboration.

The findings show that these collaborations bring substantial benefits to both sides. From the researchers' perspective, the collaboration offers significant advantages, particularly access to tours and to people for data collection that would otherwise be financially or logistically difficult to achieve. For the companies, research on and the well-being of marine life are central to their work, as their livelihoods depend on the continued health of the ocean, and it attracts customers and enhances their experience on the tour. There are, however, nuances to these collaborations as described by several interviewees. Tensions arise from lack of communication, differences in working styles, perceived academic elitism, and a lack of transparency regarding research outcomes. These findings highlight that effective collaboration requires ongoing dialogue and mutual respect.

Although most companies expressed a strong sense of environmental responsibility, the way this commitment is practiced and communicated varies widely. Some actively promote their collaboration with researchers as part of their sustainability profile, while others, though equally engaged, do not emphasize it publicly or see it as central to their identity or messaging. As several interviewees pointed out, this may represent a missed opportunity, as many tourists are drawn to experiences that allow them to contribute to science and conservation. Integrating research participation into tour narratives could therefore enhance both visitor engagement and competitive advantage.

A key focus of this study was the role of citizen science in bridging research and tourism. In practice, citizen science in whale-watching tours involved less direct data collection by participants than initially anticipated, instead taking forms such as sharing photographs with open photo-ID databases for researchers to analyse. Nonetheless, participants demonstrated strong enthusiasm for learning about whales and marine life, conservation, and participating in ongoing research. Many described these experiences as emotionally moving, prompting reflection on human–nature relationships and inspiring greater environmental awareness. These dynamics illustrate how citizen science supports sustainable forms of tourism and has the potential to enhance companies' competitive positioning by deepening visitor

engagement and communicating a clear commitment to conservation. Guides play a key role in this process, acting as intermediaries who translate scientific knowledge into accessible narratives and encourage responsible behaviour. These findings underscore the educational and transformative potential of whale-watching as a platform for science communication and environmental stewardship. Moreover, as researchers interviewed recognized the value of citizen science as a research method, there is clear potential to further develop citizen science–focused tours. Although some plans exist to expand such activities, this could be done to a much greater extent. These initiatives could strengthen collaboration even further and enhance public engagement with marine science, as well as the connection between tourism, research, and conservation. However, it is important that participants are properly introduced to the tasks and supported throughout the process to ensure that the data collected is useful, as emphasized in the interviews.

Building on these findings, the study also points toward future models of collaboration. Currently, operators see themselves primarily as service providers in relation to researchers. Yet both sides expressed interest in more balanced and interactive forms of partnership. Moving toward co-created research practices where questions, methods, and outputs are shaped jointly could help establish a stronger sense of shared ownership of knowledge creation. Such partnerships could bring together researchers, operators, and participants in citizen science initiatives, to co-create knowledge, thereby supporting and developing more sustainable whale-watching practices.

Finally, given the recurring critique of weak legal frameworks and the absence of a broader marine conservation perspective in tourism policy, there is potential for researchers and operators to collaborate in advocating for clearer regulations and stronger protection of marine ecosystems. Joint efforts in this area could strengthen conservation outcomes and ensure that whale-watching contributes meaningfully to the sustainable use of marine environments.

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