What Do Experts Think About the Sustainability of Kiteboarding?

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ABSTRACT

The relationship between sports and sustainability has been recognised for 30 years, but the impacts of developing sports remain unknown. By combining a scoping review with the Delphi method, our study uncovers the positive and negative impacts of kiteboarding on the social and natural environment. In addition to expected impacts such as improving the fitness of an individual and generating conflicts among kiteboarders and beachgoers, our findings reveal surprising impacts, most of which positive because the experts primarily regard kiteboarding as an environmentally friendly sport. The only severe environmental impact identified by the experts was the lack of recycling of kiteboarding products. Despite the widespread perception of kiteboarding as a sport that contributes to climate change, the experts failed to reach a consensus on the severity of the carbon footprint of kiteboarders, who travel to distant locations. This study highlights the importance of assessing the environmental effects of individual sports.

Key words: kiteboarding, kitesurfing, sustainability, sport, impacts

INTRODUCTION

Sustainable development is increasingly becoming the most widely accepted concept of the global society, concerning all human activities, including sports. The relationship between sports and the natural environment, in particular, has been recognized for its importance for humanity since the 1994 Olympic Winter Games in Lillehammer, Norway, when concerns about the negative impacts of sports on the environment were addressed for the first time (Trendafilova et al., 2014). Since then, 'respect' for the environment has been officially adopted as a pillar of Olympianism

(Welters, 2019). As a result, the organizers of major sporting events now propose green venues and programs based on an environmentally conscious conception of sports, whilst a growing body of scholarship address sustainability in sports (Welters, 2019; Trendafilova et al., 2014).

In the context of the sustainability movement, major sporting events have tried to follow sustainability principles, as shown by the London or Tokyo Post-Games Sustainability Reports, highlighting the achievements of these Olympic Games in combating climate change and promoting a circular economy and a sustainable society (The London Organising Committee of the Olympic Games and Paralympic Games Ltd., 2012; The Tokyo Organising Committee of the Olympic and Paralympic Games, 2021). However, major international events are not the only sports activities that effect environment. For this reason, an increasing number of sports organisations within the framework of the UN "Sports for Climate Action" Agenda (UN, 2023) and the IOC Sustainability Strategy aim at taking a broader responsibility for sustainable development. For example, the *Sustainability Agenda 2030: A bold ambition for sailing's contribution to global sustainability* brings together perspectives on the sustainability of water sports and specific goals that must be fulfilled to create a sustainable future for sailing and water sports of the world (for more details see World Sailing, 2018). These goals are also pursued by the International Kiteboarding Association (IKA) (IKA, 2023). Therefore, the interest in sustainability issues has been permeating a wide range of sports, including individual sports and recreation activities, which also have a strong, negative impact on the environment (McCullough, Pfahl, and Nguyen, 2016).

Although sustainability in sports has been a research subject for almost 30 years, the concept remains abstract and fluid, lacking a consensus definition (Millington et al., 2022). This difficulty in defining a concept as complex as sustainability in sports was thoroughly documented by Tangen (2021). Nevertheless, the definition by Fyall and Jago (2009) seems to be useful, notwithstanding its generality or perhaps precisely because of it as they describe the two-way relationship between sports and sustainability. First, "it is important (…) to understand the impact that sport (…) has on the external environment so that these impacts can be more effectively managed". Second, "it is also important that the impact of changes in the external environment on the sustainability of sport (…) are understood in order to ensure the long-term viability of the sector". In other words, when exploring sustainability in sports, both of these aspects should be considered, namely impacts and development. The authors also emphasize the fact that sustainability in sports includes not only to an environmental dimension but also social and economic dimensions (Fyall and Jago, 2009).

On the one hand, the sports industry acts as a key contributor to economic and social development globally (Fujiwara, Kudrna, and Dolan, 2014). Economically, the sports industry provides significant benefits such as employment, revenue from commercial activities, and prosperity. Socially, sports promote community building, raise the awareness of sustainability and reduce crime, in addition to changing lifestyles of individuals and possibly increasing the levels of disposable income by helping to avoid healthcare costs (Taylor et al., 2015). On the other hand, considering its impacts on the environment, the sports movement must take the necessary steps towards social and environmental responsibility (see, e.g., Trendafilova et al., 2014; Trendafilova and McCullough, 2018). And by sports movement we mean not only the sports industry and organizers of major sporting events but also participants in recreational sports.

Sports, nevertheless, differ in their impacts and development. Major recreational sports such as golf (Wheeler, 2006) or skiing and related recreational activities (Rixen, and Rolando, 2013) have well-known environmental impacts. But new sports are also emerging, with unknown impacts and unclear development options. One such newly emerged sport is kiteboarding, whose environmental and societal impacts have never been comprehensively addressed thus far, prompting controversies and uncertainties about its future.

In this study, we combine two research methods, namely the Scoping review and the Delphi methods, to better understand the interplay between kiteboarding and the social and natural environment. Our goal is to identify themes discussed in literature and, according to experts' opinions, uncover the most serious impacts of kiteboarding on the social and natural environment. Uncovering these themes and impacts is an important milestone in understanding the sustainability of kiteboarding. As such, this study may foster the development of kiteboarding impact indicators and help to educate kiteboarders on behaviors that protect the social and nature environment. Moreover, this study also contributes with yet another piece of information to the mosaic of sustainability in sports, thereby advancing knowledge on environmental policy, management and education, in line with Cury, Kennelly, and Howes (2022).

THEORETICAL BACKGROUND

Kiteboarding, also known as kitesurfing, is a relatively new water sport that combines surfing with windsurfing, wakeboarding and paragliding. Kites were first used to drag people on the water surface in the 1970s. In 30 years, kiteboarding became safer and more accessible across the world and soon after considerably more popular. Now, kiteboarding is regarded as one of the fastest-growing water sports, but its popularity has also highlighted its negative environmental impacts.

Some studies have highlighted the negative effects of kiteboarding on coastal organisms such as nesting turtles (Matias, Carvalho, and Brasileiro, 2020) and, above all, on birds (Brosnan et al., 2018; Davenport and Davenport, 2006; Global Kitesport Association, 2017; Krüger, 2016; Le Corre, Gélinaud, and Brigand, 2009; Liley et al., 2011; Smith, 2004; Vistad, 2013, 2014). From a production or technological point of view, the large amount of short-lived equipment used in kiteboarding, mostly in the Global South, is concerning, especially because some of the materials may be toxic (Soltani et al., 2020). Kiteboarders produce a lot of waste (Terranea, 2019), including greenhouse gas (GHG) emissions, producing carbon dioxide in their frequent travels by plane and car (Wicker, 2018). Thus, kiteboarders are generally more carbon-intensive than the average general population (Wicker, 2018), and their effects are compacted by climate change.

In turn, Buckley (2017) underscored the effect of climate change on this sport. In line with the definition of sustainability in sports by Fyall and Jago (2009), changes in the natural environment can have an impact on kiteboarders. As a case in point, Ventin, Troncoso, and Villasante (2015) described how water pollution can affect or even preclude kiteboarding.

In terms of social sustainability, kiteboarding is credited with many positive impacts on fitness and health by reducing stress (Ceylan Akçakoyun, and Sukan, 2016; Le Corre et al., 2020) and contributing to a healthier lifestyle (Bekaroglu and Bozo, 2017). And by improving mental health,

kiteboarding may also have a positive effect on self-esteem (Buckley, 2018b), leading to better overall health and social behavior (Mann, 2004). Nevertheless, some studies have indicated specific health risks associated with this sport, such as sunburning (De Castro Maqueda et al., 2020) and injuries, including serious trauma (Kristen, Syré, and Humenberger, 2014; Hall et al., 2020).

The social impacts of kiteboarding on coastal communities is another important topic. Some authors highlight conflicts between kiteboarders and other water sports athletes and even among kiteboarders as coastal zones become increasingly overcrowded (Bozzo et al., 2015; Cabezas-Rabadán et al., 2019; Whitfield and Roche, 2007; Derriks, 2017, 2018; Needham et al., 2008; Szuster et al., 2020; van Bergen et al., 2020). In the Global North, kiteboarding is banned in several locations because this sport is considered too dangerous for other people (Seabreeze.com.au, 2008; Surfertoday, 2005), with conflicts between kiteboarders and local communities inevitably arising when locals lack access to the benefits of sports and tourism but are forced to bare their negative consequences (Macedo and Ramos, 2012). In the Global South, such conflicts emerge in undeveloped locations where kiteboarding tourism has been growing (Macedo and Ramos, 2012; Walczak and Levine, 2016).

Notwithstanding the above, kiteboarding has been recognized as a beneficial activity for local economies in many locations of the Global South (see, e.g., Nazli and Musal, 2018; Jasińska, 2019; Kulczyk et al., 2018; Woźniak et al., 2018; Korneevets et al., 2018; Fadda, 2019, 2020; Greenaway, 2017; Mateos, 2016; Bula, 2016; González Martí, 2018). And other economic benefits have been identified by researchers. Kiteboarding is an interesting business with large innovation potential (Carter, Milton, and Hanke, 2014; Lina Lundgren et al., 2011; Miclea, Hodirnau, and Csatlos, 2016; van der Vlugt, 2009; Zimoch et al., 2013). Furthermore, the innovation and development of new kites may be used not only in sports but also in renewable energy generation, including wind turbines (Argatov and Silvennoinen, 2010; Ryan Buckley et al., 2008; Canale, Fagiano, and Milanese, 2007; Cartier, Murphy, and White, 2010; Isabella, Rodden, and Blouin, 2007; Jimenez, Roth, and Frewin, 2011; O´Connor, Aye-Addo, and Perez, 2014; Oehler and Schmehl, 2019; Rao, 2019b, 2019a; Salma, Friedl, and Schmehl, 2020).

METHODS

In order to achieve our goal of identifying the most serious impacts of kiteboarding on the environment based on literature review and experts' opinions, we used two methods, namely the Scoping review and the Delphi method.

To analyze the broad theme of kiteboarding sustainability lacking a comprehensive analysis, a Scoping review was the first and right step to mapping the research field. Using this method, we summarized evidence to provide an overview of studied resources without critically appraising individual studies or synthesizing the in-depth evidence from different studies (Pham et al., 2014; Peterson, 2016). For this purpose, we followed the approaches developed by Levac, Colquhoun, and O'Brien (2010) and Colquhoun et al. (2014).

Initially, we searched for relevant research studies in three online databases, namely WoS, Scopus, and SPORTDiscuss. These databases are leading bibliographic resources, providing

comprehensive citation data from relevant academic disciplines related to our research question. Searching for articles in these databases enabled us to gather scientific data about relationships between kiteboarding and sustainability. Moreover, because scoping reviews also include gray literature (e.g., dissertations, research and projects reports, government reports, conference papers, and other relevant information), this step helps to increase the comprehensiveness of the review process and to reduce the publication bias associated with white literature (Paez, 2017). For this reason, we also used Google Scholar, which is not a human-curated database but rather an Internet search engine, comprising books, reports, theses, preprints and other such resources. The searching terms were *kiteboarding*, *kitesurfing*, *snowkiting*, and *landkiting*. The search was conducted in January 2020 and limited to articles published before 1.1.2020.

In the screening phase of the Scoping review, the papers written in English were screened and appraised according to two criteria. The first criteria concerned the research background – in articles listed in both WoS and Scopus and in gray literature; the articles were required to state the research question, describe the method, report results, and include references. In the gray literature, in particular, this criterion ensured the necessary quality of the resources. The second criterion focused on kiteboarding – the documents were required to mention one of the above keywords in their title or abstract or, more likely, to contain relevant information on the sustainability of kiteboarding.

In the eligibility phase of the Scoping review, the full text of each selected documents was assessed for relevance, defined as concrete information or findings about a link between kiteboarding and at least one of the sustainability pillars (economic, social, and environmental). In this phase, 79 papers were excluded, most of which because they merely mentioned kiteboarding as a popular activity or as an example of a modern extreme sport without any particular findings related to sustainability. The final pool of documents amounted to 158 resources.

This final pool was subsequently subjected to an in-depth content analysis. To reduce potential bias caused by article selection and further analysis, all aforementioned steps were separately completed by two researchers, and differences in findings were discussed until reaching a consensus. Upon strong disagreement between the researchers, a third (independent) researcher was involved in the process. Regular research meetings were held during this process to discuss all challenges and uncertainties.

In the content analysis, the documents from the final pool were examined for their relationship with one of the three sustainability pillars (environmental, social and economic), which were split into several sub-categories according to common topics found in the documents. First, one researcher created a codebook listing all relevant topics and their definitions. Subsequently, in the text analysis, the second researcher applied and adjusted the codebook. Lastly, the two researchers discussed the codes and categories to reach the final version of the codebook. Thus, the codes and categories in the codebook are the product of a consensus among coders, applying the principle of dialogical intersubjectivity (see, e.g., Smalling, 1992).

All documents were recoded again, in accordance with the new codebook and by both researchers. Once again, the data were compared to increase objectivity. After this phase, several topics were identified (see Table 1). These topics became the starting point for the subsequent Delphi method.

The Delphi can be regarded as a formal consensus method measuring and/ or developing consensus among stakeholders (Jones and Hunter, 1995). Using this method, a group of anonymous experts share expectations and opinions about real-world problems and forecasting (see, e.g., Landeta, 2006). Recently, the Delphi method has been used to determine various sustainability factors, including those associated with sports and tourism, especially when assessing sustainability factors (see, e.g., Mallen et al., 2010; Ocampo et al., 2018; Asmelash and Kumar, 2019; Fallah and Ocampo, 2021; Glibo, 2022).

The literature on the Delphi method is vast. Some authors prefer starting with an iterative process using a questionnaire or even open-ended questions (Green, Hunter, and Moore, 1990; Szpilko, 2014), while others criticize this iterative process for its inability to produce the level of information that a thorough literature review should generate (Green, Hunter, and Moore, 1990; Miller, 2001). The second approach, which consists of defining questions by literature review, more optimally provides us with the possibility to ask pertinent questions even in such a broad theme – the sustainability of kiteboarding. For this reason, we used the Scoping review results – impacts of kiteboarding on the social and nature environment (see Table 1) – to develop a questionnaire.

A key step in the Delphi method is the selection of experts. The objective is to create a panel with a wide range of experts with appropriate knowledge and from different backgrounds (academia, business, politics, and other areas) (Rowe and Wright, 2001). The optimum number of experts lies between 5 and 20. However, the real number depends on the diversity of the themes because they must be covered by experts with the appropriate knowledge. We argue that the Scoping review is a necessary step for identifying relevant experts without which the required expertise remains unknown or, at best, underestimated.

Based on our Scoping review, we identified the following fields of expertise needed to acquire sufficient knowledge through a balanced panel: coastal tourism, sustainability in sports, kiteboarding equipment manufacturing processes, kiteboarding industry management, local governance in sites affected by kiteboarding, environmental protection on sites affected by water sports tourism, including kiteboarding, sports media and professional kiteboarding. Since kiteboarding is a sport practiced in many locations, in many countries, we aimed at reaching out to geographically diverse experts from different areas of expertise, among other parameters. For each area of expertise, we identified relevant organisations, including universities, local government institutions, non-governmental organisations, enterprises, media covering kiteboarding and the environment, and kiteboarders associations. Of the 19 organisations contacted with a request for suggesting experts for a Delphi panel, 6 got back to us with their suggestions of experts. In total, 17 experts were individually invited to participate in the survey. Ultimately, 11 experts from the United States, Brazil, the Netherlands, Germany, Denmark, Sri Lanka, the Czech Republic and Australia took part in two rounds of our Delphi survey. These experts represented non-governmental organisations, the media – environmental documentary filmmakers, kiteboarder associations, universities and enterprises, and experts covered all necessary fields of expertise. Unfortunately, no local government representatives accepted the invitation even though universities, kiteboarding platforms and non-governmental organisations often collaborate with local government representatives, who have knowledge to share.

The themes generated through the Scoping review in table format (see Table 1) were shared online with these experts, who were asked to assess the severity of kiteboarding impacts on the social and natural environment using a 5-point scale – from extremely severe (5) to not at all severe (1), and to add supporting comments if needed. They were also asked to include missing impacts of kiteboarding when addressing the sustainability of kiteboarding. All experts remained anonymous to avoid influencing their opinion. The first round of answers was analysed towards reaching a 70% consensus, in accordance with Okoli and Pawlowski (2004).

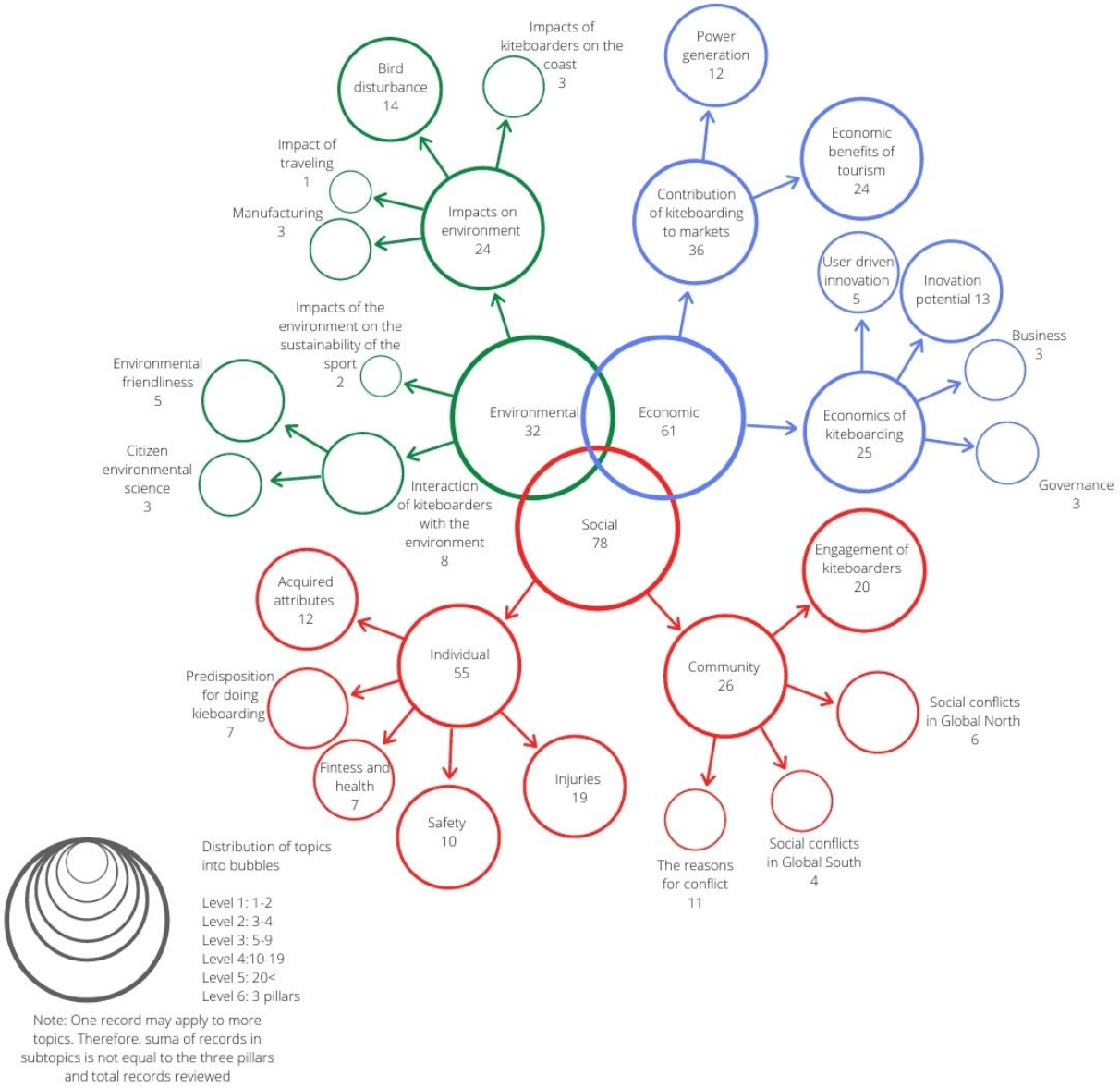
The first round, however, did not bring any consensus among experts, so the table with results was amended and sent online to the same experts again. The experts were asked to consider their previous responses and possibly change them according to other experts' ideas and comments. All 11 experts were willing to participate in the second round of the Delphi method although some had to be reminded to do so several times.

Scholars have long debated how many rounds the Delphi method should encompass and even whether a consensus must be reached. Yet both debates remain controversial and hence unresolved (there is a concern about reaching a false consensus just to finish the survey resulting from fatigue) (see, e.g., Humphrey and de Wit, 2018). Beiderbeck et al. (2021) argue that disagreement among experts is a valid and highly insightful outcome, especially in prospective studies. Bearing in mind differences between Delphi studies, three types of termination criteria are mentioned, namely time- (i.e., number of rounds or specific period), participant-, and consensus-related criteria. For our Delphi study, we set two rounds because we used the Scoping review to gather existing information from other experts to prepare the questionnaire. This Scoping review can be understood as the first round of the study although the experts (the reviewed authors) differed from the experts who participated in the Delphi study. Moreover, a two-round study enabled us to ensure the consistency of experts' thoughts since they had to recall their thought process, albeit without demanding too much time from the participants with dissenting views, thus avoiding dropouts.

RESULTS

The final resource pool analysed in the Scoping review contained 158 documents about kiteboarding published between January 2004 and December 2020, including journal articles (100), reports (22) (mostly environmental reports or coastal management plans) and theses (18). These documents were sorted and clustered according to three sustainability pillars and sub-themes (see Figure 1). Detailed results of the review in tabular format are available from https://bit.ly/kitescopereview

Figure 1 Reviewed documents sorted and clustered according to three sustainability pillars and sub-themes



In total, 13 negative impacts (highlighted in grey in Table 1) and 6 positive impacts of kiteboarding on the natural and social environment were identified and discussed in the sustainability context in the literature. Most sustainability studies mainly assess the negative effects of human activities on the environment. However, this biased analysis provides only a one-sided view of activities. In particular, disregarding the positive economic and social benefits of sports, such as promoting both physical and mental health, fostering sustainable community development and boosting friendships, results in a distorted and incomplete perspective of the sustainability concept.

In the first round of the Delphi method, experts added four new impacts of kiteboarding on the natural and social environment, all of which were positive (see text written in italics in Table 1). One expert assessed kiteboarding as sport with a low environmental impact with the following justification: "*People kite- instead of wakeboarding behind a motorboat (much less sustainable in terms of environment and fossil fuels). The use of wind is a reason why I like kiteboarding.*" The same expert also added that kiteboarding had a positive impact associated with the positive relationship between

the sport and environmental protection: "*Kiteboarding as a way for people to appreciate and connect with the natural environment, which means they care more about it and want to preserve it*." Another expert expanded the list of positive environmental impacts of kiteboarding by adding the community-associated impact of this sport (sense of belonging) and comment on it, stating that "*Kiteboarding is an exclusive club that creates a strong sense of community and belonging. At least in my Country* (the specific name is omitted for anonymity), *if you see another kiteboarder on the beach, there's a 90% chance you're going to become friends.*" Lastly, the support of eco-business was also mentioned: "*Our Organisation* (the specific name is omitted for anonymity) *actively funds and organises local tree-planting and ocean clean-up initiatives to preserve the beauty of learning to kitesurf here. We also purchase as much of our stock from as low an impact suppliers as we can funding them to continue to make responsible business more viable*." The statement is in line with the previously added impact emphasizing the relationship between this sport and environmental protection.

Table 1 Impacts identified in the Scoping review and supplemented by experts' opinions

	Environmental	Social	Economic
Kiteboarding impacts on the water and coast	Degradation of marine ecosystems	kite boarders' injuries and safety	
	Degradation of coastal ecosystems	Improving fitness and health, including mental health	
	Bird disturbance	Learning new skills	
	Activity with a low environmental impact	Conflicts with other kiteboarders and/or beachgoers, including safety	
	Positive experience from practicing a sport related to the natural environment – advocacy for environmental protection	Conflicts with local authorities or environmental protection institutions	
		Sense of belonging in the community	
Kiteboarding impacts related tourism	Impact of traveling (carbon footprint)	Social interaction with the local community	Direct economic benefits to kite-related tourism businesses– regional (schools, shops, and bars)
	Overload of waste and lack of sources (drinking water)	Conflicts between the kiteboarding tourism industry and artisanal activities (e.g., fishing)	Indirect economic benefits for local businesses (hotels, restaurants)
			Secondary economic benefit from supporting eco-businesses
Manufacturing	Sourcing materials	Violation of the human rights of workers in factories	Added value to the economy
	Manufacturing and transportation carbon footprint		
	Insufficient recycling of kiteboarding products		

In the first round of the Delphi method, 70% consensus among the experts was not reached for any of the impacts listed above (Table 1). In the second round, once the experts reviewed the other experts' thoughts and comments, consensus was reached for 14 impacts (see Table 2).

As shown in Table 2, the experts scored the positive social and economic impacts of kiteboarding in the field of sustainability with the second-highest severity level (very severe), indicating that kiteboarding improved athletes' fitness and health, enabled them to develop new skills and fostered social interactions with a local community. They also emphasized that positive experiences in nature lead to environmental advocacy and that kiteboarding also brings economic benefits to local businesses. As the only severe negative impact, they identified the insufficient recycling of kiteboarding products.

Another cluster of impacts was scored by experts as moderately severe. Two positive impacts were related to social and economy factors; one was the impact on sense of belonging to the kiteboarders' community, and the other one was the economy benefit of this sport for countries where kiteboarding equipment is manufactured. In turn, two negative impacts of kiteboarding were also assessed as moderately severe by the experts, namely conflicts with other beachgoers and kite boarders, with nearly all experts commenting about possible solutions to this problem, which is likely why they assessed such conflicts as a moderate severe impact) and the violation of workers' human rights. However, two experts argued merely intuitively rather than based on evidence, as shown in their comments: "*Hard to tell what is happening behind closed doors*."

The last cluster referred to impacts scored with low severity or importance. The experts admitted that kiteboarding may cause the marine ecosystems degradation and mostly commented on cases of kiteboarding in locations with vulnerable ecosystems, albeit not in their country, or of occasional vandalism. Similarly, they did not rule out conflicts with artisanal activities (e.g., fishing), but they highlighted an easy way to solve potential conflicts in advance. The experts also admitted that kiteboarders' injuries are a potential impact on the health system of tourist areas with limited healthcare resources. Nevertheless, they stated that injuries occur infrequently because most kiteboarders follow rules of safety. Lastly, the experts acknowledged the secondary economic benefit from supporting eco-businesses as an impact with low importance, without justifying this rating in any comment.

Table 2 Distribution of impacts by severity/ importance

		Positive	Negative
5	**Extremely severe/ important**		
4	**Very severe/ important**	• Environmental advocacy stemming from positive experiences in nature • Improved fitness and health • New skills • Social interactions with the local community • Indirect economic benefits for local businesses (hotels and restaurants)	• Insufficient recycling of kiteboarding products
3	**Moderately severe/ important**	• Sense of belonging • Added value to the economy	• Conflicts with other kiteboarders and/or beachgoers • Violation of workers' human rights in factories

2	**Low severity/ importance**	• Secondary economic benefit from supporting eco-businesses	• Degradation of marine ecosystems • Athletes' injuries and safety • Conflicts of the kiteboarding tourism industry with crafts (e.g. fishing)
1	**Not at all severe/ important**		

The other eight impacts failed to reach 70% consensus among the experts. However, some of them nearly came close to crossing the 70% threshold, including the carbon footprint of manufacturing and transporting kiteboarding equipment, sourcing material, and conflicts with local authorities and environmental protection institutions. All three impacts were assessed as very severe. A similar level of agreement was reached on the carbon footprint related to traveling and on direct economic benefits of kiteboarding-related tourism business, which were assessed as moderately severe (highlighted in grey in Table 3).

Table 3. Experts' impact assessment on a 5-point scale

Impact	Assessment				
	Not at all severe	**Low severity**	**Moderately severe**	**Very severe**	**Extremely severe**
Degradation of coastal ecosystems	45.5%	18.2%	36.4%	0%	0%
Bird disturbance	0%	18.2%	27.3%	45.5%	9.1%
Carbon footprint of traveling	0%	0 %	63.6%	27.3%	9.1%
Overload of waste and lack of sources (drinking water)	0%	18.2%	54.6%	27.3%	0%
Sourcing of materials	0%	18.2%	18.2%	63.6%	0%
Carbon footprint of product transportation	0%	9.1%	27.3%	63.6%	0%
Conflicts with local authorities or environmental protection institutions	0%	18.2%	9.1%	63.6%	9.1%
Direct economic benefits to kiteboarding-related tourism businesses– regional (schools, shops, and bars)	0%	0%	63.6%	9.1%	27.3%

DISCUSSION

The concurring experts' opinions on the positive and negative impacts of kiteboarding reflect well the relationship between sports and sustainable development. On the one hand, sports promote sustainable development (UNGA, 2015), but on the other hand, in many spheres, both sports and sports-related tourism can create pressures, even, causing tensions between various sports activities overlapping in the same area, between different social groups, such as interest groups in

business (Ramallal et al., 2010), and between kiteboarding and environmental protection (Bellan, G. & Bellan-Santini, D., 2001).

In terms of social sustainability, the experts considered that the sport has a very positive impact on physical and mental health, in line with Ceylan et al. (2016), Le Corre et al. (2020) and Buckley (2018b). This perspective was expressed in several experts' arguments. One expert stated: "*Not much has made me more fit and excited to get active than kitesurfing and I see that for a lot of our clients*." Another expert noted: "*Physical and mental health are greatly improved by these* activities." Mental health is also associated with an enhanced "sense of belonging", which was rated as a moderately severe impact by the experts.

The experts, conversely, disregarded kiteboarding injuries a serious issue even though some authors, e.g., Hall et al. (2020), have indicated that high-energy sports. including kiteboarding, naturally result in serious traumatic injuries to the shoulders, knees and head (L. Lundgren, Brorsson, & Osvalder, 2011; Paiano et al., 2020). In this study, the experts corroborated the findings of Diewald et al. (2019), Midway, Wagner, and Burgess (2019) and Wiesner (2017), who have emphasized the need to be aware of risks and observe safety rules. This point of view was expressed in several statements, such as "… *most injuries are from those that venture out of accepted rules and regulations for the sport."* or "*Kiteboarders choose to partake and are aware of the risks. Don't see an undue burden put on healthcare systems*."

The experts rated social interactions with the local community as a highly positive impact, confirming the UN agenda: "*We recognize the growing contribution of sport to the realization of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities as well as to health, education and social inclusion objectives"* (UNGA, 2015). The experts' opinions complemented this statement when highlighting that "[social interactions] *provide new perspectives and may influence humanitarian behaviour. Inspire and share the stoke*" or *„There are nice examples of where kiteboarding benefits and integrates with local communities, or act as therapy/better activity for some".*

The consistency of their opinions is patent in their disregard for conflicts between kiteboarding tourism and artisanal activities, which could result in potential conflicts with local communities, assessed as impacts with low severity. By contrast, the experts regarded conflicts with other kiteboarders or beachgoers as moderately severe. According to Pereira et al. (2014) and Walczak and Levine (2016), experts tend to focus on good beach management plans and compliance with rules across all coastal users. As a case in point, one of the experts who participated in this study commented that: "*When right of way rules are broadly taught and adhered to there is minimal conflict. Self-taught kiteboarders seem to be the worst offenders for creating conflicts as they feel incorrectly wronged as they don't know the right of way rules*."

The agreement among experts was relatively good in the field of the economic sustainability of kiteboarding. The kiteboarding market has been growing, and more people are interested in this sport. As such, kiteboarding has become a suitable business opportunity (Hellblom and and Sparre, 2007). The experts, accordingly, regarded kiteboarding as a sport with a moderately high/severe value to the economy through equipment manufacturing; however, they rated the economic benefits for local business (hotels and restaurants) resulting from kiteboarding tourism

development as very important, as shown by their comments: "(…) *especially valid for windy locations which enjoyed little to no tourism before their potential for kitesurfing was discovered. For example, Tarifa, Kalpitiya, Zanzibar, Kenya*." or "(Kiteboarding) *can be a massive source of income and provide resources to underdeveloped areas*". Yet, according to the experts, the importance of secondary economic benefits resulting from supporting/ sponsoring eco business is low.

In the field of environmental sustainability, one expert added a new theme/ impact – "kiteboarding is a sport with a low impact on the environment". His argument is in line with the view of Huddart and Stott (2019), who assessed kiteboarding as a non-motorised sport less harmful than motorised water sports. Such a generally defined theme is difficult to assess on a severity or importance scale. However, the experts believed that kiteboarding is an environmentally friendly sport based on their understanding of its environmental impacts. Thus, the only severe impact identified by the experts was the lack of recycling of kiteboarding products. By contrast, degradation of marine ecosystems was perceived as a problem with low severity, as argued by Huddart and Stott (2019). For example, one expert stated: "*I have not witnessed this. As it is a "human powered" activity", I believe this impact to be minimal*."

Surprisingly, no consensus was reached among experts about the carbon footprint of kiteboarders, who often travel to remote locations, although IKA, for example, calls for restricting air travel emissions and using public transport and green vehicles, in accordance with the World Sailing Agenda (IKA, 2023). Most experts assessed this carbon footprint as moderately severe environmental impact with arguments such as "*Should be mindful of our travel methods and frequency but people are going to travel, sport or not*." or "*a relatively small kite community.*" Similarly, there was no consensus on the severity of carbon footprint caused by the transportation of kiteboarding products although nearly all experts focused on buying local kiteboarding products.

Among the experts, there was little consensus on other environmental impacts of kiteboarding, reflecting different experiences. Furthermore, environmental impacts also vary with the location, as explained by de Sousa et al. (2011), Ariza, Pons, and Breton (2016), Krüger (2016), Derriks (2017, 2018) and Matias, Carvalho, and Brasileiro (2019). The experts were aware of possible impacts but unable to simply assess them, as expressed in the following statements: "*Depends on locations, some environments are more fragile than others*" and "(....) *there it's a sensitive area for native birds. However, we formed demarcated areas for travel and also through kitesurfing, funding for research projects especially with conservation were started. So I would say it depends on the ethos of how manages and does thing*." The experts' individual experiences are reflected also in their assessment of conflicts with local authorities or environmental protection organizations, but once again, those experiences depend on the location where they kiteboard.

CONCLUSION

Combining two methods (Scoping review and Delphi method) allows us to understand how kiteboarding sustainability is currently regarded by researchers and by experts in this sport. This study shows that kiteboarding has significant positive impacts, especially in terms of social sustainability by strengthening the physical and mental health of an individual and by promoting

respect between and empowering individuals and communities. Both researchers and experts recognise the economic benefits of kiteboarding as indirect benefits for touristic areas, especially for hotels, restaurants and other hospitality services. In the post-pandemic period, sports, including kiteboarding, considerably foster economic and personal well-being.

The negative impacts of kiteboarding must also be considered, though. Experts and researchers alike indicate the contribution of kiteboarding to climate change in the form of GHG emissions. However, experts consider that the environmental impact of these emissions (moderate) is less important than the impact resulting from the lack of recycling of kiteboarding equipment (severe). And while some studies address the various impacts of kiteboarding on marine and costal ecosystems, experts dismiss this problem because they regard kiteboarding as sport with a low environmental impact. Nevertheless, they admit that kiteboarding may have negative impacts on ecosystems in some localities, which can lead to conflicts with local authorities or environmental protection institutions. In this regard, both researchers and experts agree on the importance of adequate coastal and beach management aimed at not only promoting environmental protection but also avoiding conflicts between different beachgoers and coastal users.

Kiteboarding experts also stress the need to educate kiteboarders on injury-prevention strategies and safety rules to keep other beachgoers safe and to protect ecosystems and the natural environment through coast responsibly. They believe that most kiteboarders follow these rules based on their own positive experience, that kiteboarding leads to environmental advocacy and that beach management should prevent conflicts, which can impair kiteboarding experiences.

The results of our study may contribute to the development of a set of indicators to help kiteboarders assess behaviour related to their sport. This assessment tool may also serve as an educational tool for raising awareness to even partly negative impacts of kiteboarding on sustainability. Such an approach will help to enforce the aforementioned safety rules protecting the social and natural environment. As a result, many organisations, including World Sailing, are publishing educational guides highlighting the environmental and social impacts of specific sports, including individual sports. As such kiteboarding may stand alongside other sports that contribute to maintaining both a healthy lifestyle and environmental sustainability.

LIMITATIONS OF THE STUDY

Although we combined two qualitative research methods to identify themes related to the sustainability of kiteboarding and assess its most serious impacts based on experts' opinions, all qualitative research methods have limitations. The first method, scoping review, also includes grey literature and thus studies with questionable quality (Daudt, van Mossel, and Scott, 2013). For this reason, we introduced the research background criterion to ensure the quality of such sources. In fact, both grey literature and articles found in WoS and Scopus were required to clearly state the research question, in addition to including other sections such as methods, results, and references. Moreover, the grey literature analysed in this study consisted of dissertations, research, governmental and committee reports, and conference papers, among others, whose evidence most often meets quality standards *a priori*. Furthermore, the language bias of this study may be criticized because we only selected articles

written in English for the Scoping review. Nevertheless, this eligibility criterion is in line with an increasing trend to publish in English to share information globally. Ultimately, we believe that we did address most known themes and impacts of kiteboarding on sustainability because the experts from different countries only added two other impacts.

The second method, Delphi, entails some bottlenecks, but we adopted specific approaches to overcome these obstacles, as discussed in depth in the Methods section. A limitation of the Delphi method that was not discussed above and should be considered here is the bias in sample selection. In this study, we identified and contacted relevant organisations, including universities, local government institutions, non-governmental organisations, enterprises, media outlets, and kiteboarding platforms, among others, requesting their suggestions of experts for the Delphi panel in each field of expertise related to kiteboarding sustainability, excluding those from local government institutions. Nevertheless, people from the other organisations regularly collaborate with local authorities, so even public administrators might have been represented to some extent, albeit indirectly, and therefore their knowledge was not completely overlooked.

Another limitation that should be considered is that all experts volunteered to participate in this study. Volunteering is always hard to avoid in sociological research such as this study. However, the sustainability of kiteboarding requires respondents who meet specific subject matter criteria and who are willing to address such a complex topic. Readers should be aware that the respondents of our study do not represent all experts on the sustainability of kiteboarding. But despite the limitations discussed above, our comprehensive and in-depth study has the potential to enhance the current knowledge on the sustainability of kiteboarding.

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