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Innovation and future pathways in nature-based tourism – the outlook from an international expert panel

Peter Fredman^a, Jan Vidar Haukeland^b, Liisa Tyrväinen^c, Dominik Siegrist^d
and Kreg Lindberg^e

^aFaculty of Environmental Sciences and Natural Resource Management, Norwegian University of Life Sciences, Norway; ^bRegional Development and Tourism Group, Institute of Transport Economics, Gaustadaliéen, Oslo, Norway; ^cBioeconomy and the Environment Unit, Natural Resources Institute, Helsinki, Finland; ^dDepartment of Architecture, Civil Engineering, Landscape Architecture and Spatial Planning, Eastern Switzerland University of Applied Sciences, St. Gallen, Switzerland; ^eDepartment of Forest Ecosystems and Society, Oregon State University, Corvallis, OR, USA

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This article identifies innovations that are likely to take place in the nature-based tourism sector in the future. The authors do this with the help of an international expert panel representing a broad range of perspectives relevant to the nature-based tourism market, service provision, and the natural resources upon which this tourism sector depends. The diversity of expertise reflects the need for greater variety in data acquisition processes in innovation research, and the focus on nature-based tourism adds knowledge about a sector experiencing rapid development. The authors observe several key findings at the crossroads between the five main innovation categories identified: product packaging, new technology, business relations, outdoor activity, and learning. The nature-based tourism innovation system is more complex than tourism innovation in general, and of special interest is the learning category, which can support understanding of nature, value creation, and safety.

Keywords: innovation; nature; tourism; experts; future

Cet article identifie les innovations susceptibles de se produire à l'avenir dans le secteur du tourisme de nature. Pour ce faire, les auteurs s'appuient sur un groupe d'experts internationaux représentant un large éventail de perspectives relatives au marché du tourisme de nature, à la fourniture de services et aux ressources naturelles dont dépend ce secteur touristique. La diversité de l'expertise reflète la nécessité d'une plus grande variété dans les processus d'acquisition de données dans la recherche sur l'innovation. Les auteurs observent plusieurs résultats clés à la convergence des cinq principales catégories d'innovation identifiées : conditionnement des produits, nouvelles technologies, relations commerciales, activités de plein air et apprentissage. Le système d'innovation du tourisme axé sur la nature est plus complexe que l'innovation touristique en général, et la catégorie de

Corresponding author: Peter Fredman peter.fredman@nmbu.no Faculty of Environmental Sciences and Natural Resource Management, Norwegian University of Life Sciences, Ås, PO Box 5003, 1432, Norway

l'apprentissage, qui peut favoriser la compréhension de la nature, la création de valeur et la sécurité, présente un intérêt particulier.

Mots clés : innovation; nature; tourisme; experts; futur

Introduction

Innovation in different forms has characterized the tourism sector ever since the early explorers laid the foundation for more organized travel (Hjalager, 2010, 2015). Visiting places outside one's ordinary environment and hosting guests calls for a mind open to new influences and practices. In today's globalized world, characterized by rapid change and economic development, different forms of innovation have come to play increasingly important roles in tourism (Fayos-Solà & Cooper, 2019; Hall & Williams, 2020; Pikkemaat *et al.*, 2019). According to Ratten (2019), tourism innovation is inherently important owing to technological development that creates new markets and products and to the large number of small enterprises which makes this sector very competitive.

In the current study, the focus is on nature-based tourism, which is defined as activities occurring when people visit nature areas outside their ordinary place of residence (Fredman & Tyrväinen, 2010). Previous research has shown that the nature-based tourism industry, representing transactions in different sectors directed to meeting the demands of nature tourists, navigates under the influence of several social, technological, economic, environmental, and political factors (Elmahdy *et al.*, 2017). Since it is important to see innovation in tourism as systemic, integral to the whole tourism system (Hall & Williams, 2020), a rather complex web of knowledge emerges with respect to innovations in the nature-based tourism context, characterized by many small companies (often operated with lifestyle motives), attractions based on a mix of private and public natural amenities and infrastructure, and strong connections with local communities in rural locations (Fredman & Haukeland, 2021).

The word innovation derives from the Latin "innovare," which means renewal, and it is an umbrella term that originally derived from the management and economics disciplines. Schumpeter's (1934) theories on how firms search for competitive advantage have influenced much of the economic literature to investigate the drivers of long-term economic growth (OECD/Eurostat, 2018). Contemporary innovation landscapes are characterized by well-established categories, such as product, process, organizational, and marketing innovation, which are explained and theorized in terms of their links with technological innovation (Edwards-Schachter, 2018; Lelo de Larrea *et al.*, 2021). More recent developments in knowledge production systems, as well as social and environmental challenges, have led to more diverse views about innovation to also include system-wide transformations (Grillitsch *et al.*, 2019) and innovation ecosystem constructs (Gomes *et al.*, 2018). Hence, a comprehensive view on innovation is crucial for the tourism industry to overcome some of the main challenges of the twenty-first century, including the sector's contribution to the United Nations Sustainable Development Goals (Fayos-Solà & Cooper, 2019; Spenceley & Rylance, 2019) and to stimulate more sustainable tourism practices (Gomezelj, 2016; Pikkemaat *et al.*, 2019) – topics which are essential to the future development of the nature-based tourism sector.

This article explores the types of innovations that are likely to take place in the nature-based tourism sector, which has received relatively little attention, and which involves a complex knowledge area more dependent on local natural assets relative to

other forms of tourism (Falardeau *et al.*, 2022). We do this with the help of an international expert panel representing five countries/regions in the northern hemisphere and a broad range of perspectives relevant to the nature-based tourism market, service provision, and the natural resources upon which this tourism sector depends.

With its many facets and forms, nature-based tourism is an important factor for economic, social, and ecological development in many rural places around the world (Fredman & Margaryan, 2020). Climate change and human impacts on biodiversity have put pressure on the sector to improve its corporate responsibility practices regarding nature and environment (Hall, 2010). However, nature-based tourism has the potential to offer guests a responsible stay in natural and cultural landscapes by making landscape values tangible, contributing to local employment, and adding regional economic values if social and environmental impacts are managed (Breiby *et al.*, 2021; Hall & Boyd, 2005; Siegrist *et al.*, 2015).

In the following section we discuss the concept of innovation with emphasis on nature-based tourism. We then describe how the data was collected and present our results, comparing them with previous evaluations. The article ends with a discussion and concluding remarks about innovation in nature-based tourism.

Innovation and nature-based tourism

Broadly speaking, innovation describes a sense of purpose to human evolution explained in terms of the creative capacity of invention as a source of technological, social, and cultural change. Despite a vast body of scientific literature about innovation, it is difficult to provide a comprehensive and inclusive definition. Edwards-Schachter (2018, p. 65) described it as a “multidimensional concept that includes varying meanings and definitions from the perspective of different disciplines” and provides an overview of as many as 10 salient types of innovation from the recent decades: technological, product, process, service, business model, disruptive, radical, design-driven, social, and responsible innovation. Change is essential to innovation from an epistemological perspective, but the outcome, process, and mind-set associated with it create fodder for different understandings (Kahn, 2018).

The Organisation for Economic Co-operation and Development (OECD) lays a foundation for how innovation is understood in practice. In the so-called “Oslo manual,” an international reference guide for collecting and using data about innovation, it is defined as “a new or improved product or process (or combination thereof) that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)” (OECD/Eurostat, 2018). Clearly, innovation is more than a new idea or an invention – it requires implementation, either by being put into active use or by being made available for use by other parties, firms, individuals, or organizations. In the most recent guidelines, OECD recognizes two major types of innovation (OECD/Eurostat, 2018): *product innovations* (innovations that change the firm’s products), and *business process innovations* (innovations that change the firm’s business processes). Product innovations can involve two generic types: goods (tangible objects and knowledge-capturing products over which ownership rights can be established and transferred) and services (intangible activities produced and consumed simultaneously). Business process innovations imply new or improved business processes, including six functional categories: production of goods or services, distribution and logistics, marketing and sales, information and

communication systems, administration and management, and product and business development.

However, the mainstream economic thinking around innovation represented by the Oslo manual has been questioned from several perspectives, not least with respect to future sustainable development (Chaminade, 2020). Not all innovations are sustainable, as improving a product or service can be innovative yet generate negative social, economic, or environmental impacts. This study did not explicitly focus on broader innovation, but we recognize that the transition to a more sustainable future requires innovation that goes beyond the technology or product focus and embraces social processes (Bandi Tanner *et al.*, 2023; Huggins & Thompson, 2022). Social innovations are seen as potential solutions to social problems such as climate change, unemployment, or demographic changes and are accordingly playing an increasingly prominent role in tourism (Wirth *et al.*, 2023a, 2023b). Social innovation in tourism can also be a path toward more integrated community participation in tourism planning to ensure positive local attitudes and improvement in communities' quality of life (Malek & Costa, 2015).

There are few studies targeting innovation in nature-based tourism specifically, and those that exist are flavored by the special features of this sector, including products based on outdoor activities delivered in a rural context by small enterprises dependent upon natural resources and local communities (Fredman & Tyrväinen, 2010). Falardeau *et al.* (2022) argued that the challenges associated with innovation in the natural environment are like those of innovation in remote locations, and that such contexts foster slower innovation processes (Shearmur & Doloreux, 2016). This addresses the evolutionary aspects of innovation and the critical role of knowledge, especially in small nature-based tourism companies (Løseth, 2014). Fuchs *et al.* (2021) showed that the Norwegian nature-based tourism sector is dominated by lifestyle entrepreneurs characterized by motives and creative practices grounded on a combination of human and business-centered goals and a responsible use of local resources, altogether providing good fodder for innovation. Nature-based tourism firms tend to be small and lifestyle oriented (Elmahdy *et al.*, 2017), which might provide flexibility for adoption of innovation but also limits resources for innovation (Pilar & Pilar, 2013). Previous research also shows that entrepreneurial attitude influences innovativeness and performance in nature-based tourism enterprises; a stronger entrepreneurial attitude appears more likely to change the way owners organize their enterprise, with an outcome of higher income growth (Nybakk & Hansen, 2008). Rønningen (2010) confirmed an innovative capacity in microenterprises, but the possibility to scale up depends on the extent of external alliances. He suggests that new products and services tend to trickle down from suppliers instead of being self-invented. Kvam and Stræte (2010) argued that product innovation is incremental, and that cooperation between firms and a mediator is crucial in overcoming the step from innovation to diffusion.

Many nature-based tourism products are delivered under the label of adventure tourism (Mykletun, 2018), and Hansen *et al.* (2019) showed that an understanding of safety is a contributing factor that stimulates innovative activity, alongside the concern for customer thrill experiences. This points to the most intrinsic feature of nature-based tourism – the accessibility of natural resources critical for the product quality in nature-based tourism (Fossgard & Fredman, 2019; Kosenius *et al.*, 2020). Resources with open access create special conditions for growth in the nature-based tourism sector (Lundberg *et al.*, 2014), but not necessarily to the detriment of innovation processes. Holmgren and Lindkvist (2016) showed that fishing tourism

stimulated innovation and further development of coastal tourism in Northern Norway. Non-capitalized resource rent did not leak out through external companies, but rather functioned as an innovation mechanism on the periphery. Studies of innovation processes in forest-related recreation services in five European countries point to the importance of interactions between forestry and tourism, as well as networking between public and private actors (Kurttila *et al.*, 2020; Weiss *et al.*, 2007).

The research referred to above shows there is a contested relationship between the dependence on natural resources and innovation in nature-based tourism, and few studies on innovation refer to nature itself. One exception is Falardeau *et al.* (2022), who researched how three nature-based tourism organizations in Québec (Canada) aligned with nature and identified 49 attributes of innovation classified into four groups of business, offer and experience, social environment, and place. This study showed that the incorporation of the social environment and place reflects better accounting of nature and the specificities of nature-based tourism. By studying how much nature and natural resources are present in nature-based tourism innovation, Falardeau *et al.* explored a subject rarely focused on in the literature.

Data collection

Data collected for this study was part of a larger project analyzing key conditions for the development of nature-based tourism in the Nordic region (Fredman & Haukeland, 2021). Part of the project focused on future trends in nature-based tourism, including the quest for new innovations. For this purpose, a panel of experts in five different countries/regions (Norway, Sweden, Finland, the European Alps region, and the western United States) was invited to participate in an online survey. The choice of countries/regions reflected the aim of studying nature-based tourism destinations in the northern hemisphere featuring a mix of mountain, forest, and water resources used for tourism in several seasons. The selection and recruitment of experts were done through discussions within the research team (which reflected the countries involved) to cover the multi-faceted characteristics of the nature-based tourism sector, including the adjacent outdoor recreation and natural resource management sectors. Altogether, 73 experts were recruited with a background in 10 topic-areas: (i) national or regional government/ministries; (ii) regional tourism associations, destinations, or municipalities; (iii) tourism marketing organizations; (iv) nature-based tourism companies or associations; (v) outdoor industry (equipment, clothing); (vi) outdoor recreation or other nonprofit organizations; (vii) organizations managing facilities, natural resources, and/or areas used for nature-based tourism; (viii) academia or consultants; (ix) media with special interest in tourism and/or outdoor recreation; and (x) youth organizations with special interest in tourism and/or outdoor recreation. The experts were identified based on their significance in each country/region and invited by members of the research team.

The questionnaire was programmed and administered online in Norway with the Research Studio software, delivered by MI Pro (now called QuenchTec, www.quenchtec.com). All 73 experts who agreed to participate in the study were sent an e-mail with a link to the online survey between 7 and 22 March 2017. Up to four reminders were sent through the software, and an additional one to two personal e-mail reminders were sent to experts who had not responded to the software-generated reminders. The questionnaire had a short introduction explaining the purpose of the survey followed by seven main

questions, with one focused on innovation in nature-based tourism: “We use innovation to refer to a new idea, device, organization, or method. Please provide one example of an innovation in nature-based tourism you think has the potential to be successful in the next 10 years.”

Nature-based tourism was defined in the survey as “people visiting natural areas outside one’s ordinary place of residence,” and nature-based tourism businesses as “companies and organizations that receive payment for providing goods and services in support of nature-based tourism such as guiding, transportation, equipment sale or rental, lodging, etc.” Answers to the question were provided in an open format without any word restrictions. We received written answers from 67 experts, including 19 from Norway, 20 from Sweden, 10 from Finland, and nine each from the European Alps and the western United States. Answers varied in length from a few words to several sentences (the longest answer had 73 words).

The content of each answer was analyzed by the research team (one from each study country/region) to identify key subjects with respect to innovation in nature-based tourism. An inductive reasoning approach was followed, with no a priori classification other than a contextualization within the nature-based tourism definition. This is a process based on grounded theory (Matteucci & Gnoth, 2017) going from the specific to the general, which in qualitative research means starting with data, looking for patterns and themes, and finally generalizing based on the data. An initial arrangement of the data was made by the lead author, which was then circulated and revised by all the team members until a common understanding of the data was reached to organize the answers into meaningful categories. The objective was to obtain a set of general categories of innovation in nature-based tourism derived from this body of observations.

The data analyses resulted in five main categories of innovation, whereof four were divided into subcategories. The categories are seldom exclusive, and many interesting observations are to be found in the intersection between categories, as further explored below. We compare our categories with the OECD/Eurostat (2018) classification of innovations and the classification of innovation in nature-based tourism by Falardeau *et al.* (2022) to validate our results.

Results

Table 1 presents study results (first and second columns), as well as the comparisons with OECD/Eurostat (third column) and Falardeau *et al.* (fourth column). Letters in brackets in the subsequent text refer to quotes by experts from Norway (N), Sweden (S), Finland (F), the European Alps (EA), and the western United States (US), respectively. We kept the wording used by the respondents in their answers, without making any corrections for misspellings, etc. Answers provided in non-English languages (four cases only) were translated into English by the authors.

Product packaging

This category includes several subcategories that together make up the largest group of innovations reported by the experts. This includes different product mixes, design and distribution of products, a quest for comfortable nature experiences, and connections with local communities. The most prominent category concerns the *product mix* such as “adventures consisting of several activities” (N), “combinations such as skiing-sailing,

Table 1. Categories of innovation in nature-based tourism. The third and fourth columns contain comparisons with OECD/Eurostat's (2018) and Falardeau *et al.* (2022) innovation categories.

Main category	Subcategories	OECD/Eurostat (2018)*	Falardeau <i>et al.</i> (2022)
Product packaging	Product mix	PI (service)	Offer and experience; Social environment; Place
	Design and distribution	BI (distribution and logistics/order processing); BI (marketing and sales/pricing strategies)	Business
	Comfortable nature	PI (goods, service)	Business; Offer and experience
	Local connections	PI (service)	Place
New technology	Augmented and virtual reality	PI (service); BI (production of goods and services)	Business; Offer and experience
	Locational information	PI (service); BI (production of goods and services)	Business; Offer and experience
	Self-guided tours	PI (service)	Offer and experience
	Digital detox	PI (service)	Offer and experience
Business relations	Collaborations	BI (administration and management/managing external relationships)	Business; Place
	Networking	BI (marketing and sales/advertising)	Business; Place
Outdoor activity	Trails	PI (goods, service)	Offer and experience
	Biking	PI (service)	Business; Offer and experience
	Inclusion (low threshold)	PI (service)	Social environment
Learning		PI (service)	Social environment; Offer and experience

*PI – Product innovation; BI – Business process innovation.

walking-kayaking and so on” (S), or “culture-based nature tourism. Combinations of city and country visits” (S). A couple of experts highlighted the quest for personal development in combination with nature experiences: “certified experience packages with several dimensions such as culture, history, training in different combinations and mix” (S) or “products combining nature, recreation and personal development have a high potential” (EA). Other types of mixes focus on the relationship with the natural resources upon which the nature-based tourism experience depends: “using the health benefits of forests in tourism products” (F), “development of responsible experience tourism in nature such as animal safari where the product is developed based on the premises of nature” (N).

Another major subcategory of product packaging is about the *design and distribution* of consistent nature-based tourism products and a better system for matching between product and customer. In this case, technological solutions are viewed as a key aspect among several experts: “most innovations will be in the way to market, pack and distribute thanks to new technology” (S). One of the Norwegian experts expressed this

with the following explanation: Experience tours have to be product developed and ready to sell with a price reflecting quality and based on relevant provisions. This is when they can be included in booking apps. This means there must be a calculation model for each product. In addition, destinations/areas must have necessary local support to set the correct price for the region. (N).

Comfortable nature refers to innovations that combine activities or stays in natural environments with higher levels of comfort, such as transportation services, camping, food, or outdoor cooking. For example, “taking people to fairly remote exclusive experiences by small helicopters or big drones” (S), or “local produce (vegetables, beer) delivered directly to you at the cabin you visit” (N). Several of the experts also mentioned alternative forms of accommodation, here illustrated with the words from two of the Swedish experts: “small windmills or effective solar panels making it possible to have comfort in basecamps in wildlife and remote places. Tent camps with style and ease” (S), and “different types of accommodation in natural environments such as igloos, tree-cabins, rafts with culinary experiences based on local culture and raw material” (S).

Hence, associated with the comfortable nature subcategory, we also identify products with a *local connection* as a subcategory of product packaging. This is expressed by one of the Norwegian experts as “a wider variety of ‘close to home adventures’ offer to tourists visiting different cities, so they can take part in the local gems of Sunday trips” (N). One of the Swedish experts highlights the local shorter trips: “organized day trips in hiking” (S). This subtheme also benefits from the opportunities with new technology, here illustrated with two examples from Sweden and the European Alps: “products that combine the local inhabitants with the commercial sector, increased use of digital tools in the product experience” (S) and “connecting locals with guests through digital services: every local could be a host!” (EA).

New technology

The second most prominent innovation category identified concerns different applications of new technology. This includes, for example, “using drones in nature photographing” (F), “RV technology, travel apps, general outdoor gear” (US), “using apps or wearable technologies to measure their nature-based exercises to discover patterns leading to insights that will optimize their health” (F), and “greater use of social media and mobile devices to encourage outdoor participation and to market existing opportunities” (US).

One of the subcategories in this context concerns *augmented and virtual reality*. An expert from Finland explains: Augmented or virtual reality applications will gain popularity. If people do not get real experiences in the nature that they are looking for (e.g., northern lights, seeing rare animals or plants) they are willing to experience these things virtually in the real environment. (F)

Similar ideas are proposed by experts from Sweden and the European Alps: “experiencing nature in an enhanced way by using a digital layer, such as AR (augmented reality)” (S) or “nature experience offers that use geo-referencing systems and augmented reality” (A). Yet another context to apply augmented reality of nature is within games, here expressed with the words from one of the Finnish experts: “Pokemon Go for adults, mobile games and using mobile devices as aid will grow in popularity, augmented reality” (F).

Another useful application from new technology is the possibility to geo-reference different activities and provide *information on certain locations*. This is about mapping of where people go and what they do with electronic devices. This category is described by one of the Swedish experts as “clever digital information about where, what and how to visit nature, including all aspects of a visit, also commercial actors” (S). Applications for mobile phones appears to be one area of innovation in this respect: “an example of an innovation device or service could be an app with information customized for the tourist depending on location, activity, weather etc.” (N), or “wilderness and GPS based mobile phone applications and games” (F).

We also identify *self-guided tours* as a separate category (with noticeable connections to the Learning category below), where technology enters the scene as a means of “digital help or digital development” (S). Interestingly, a final subcategory in the new technology realm is about getting away from it all – a *digital detox*, here exemplified with the words from one of the Norwegian experts: “trips where you connect to nature, and become ‘offline,’ and leave your electronic gadgets at home” (N).

Business relations

This category represents new paths to economic activities based upon relations with other stakeholders and networking. *Collaborations* refer to public land as well as local communities in general. One of the Swedish experts calls for better collaboration between private tourism companies and protected area management: “change of national parks and how businesses are dependent of operations on other landowners” (S). An American expert suggests that local communities should tie into the outdoor recreation economy by employing local youth to build infrastructure and teach STEM skills (e.g., problem-solving, critical thinking, and logic skills). Another example from Norway stresses the distributional aspects of income and expenditure from nature-based tourism: “an innovation in how to organize the co-operation and distribution of income and expenditure between landowners will be valued” (N). In a similar vein, one of the North American experts stresses the need to communicate the economic impact of outdoor recreation to local politicians, business owners, and leaders to “demonstrate viability as compared to logging and other natural resource extraction where there’s conflict” (US). Yet another collaborative initiative mentioned is “alberghi diffusi,” an innovative concept of hospitality launched in Italy in the early 1980s that implies a “dispersed hotel” converted out of various buildings in small communities: “Alberghi diffusi is a very valuable approach to deal with an infrastructural problem we have to face on in different regions in the Alps” (EA).

Closely related to collaboration is *Networking*, which was mentioned by experts from the European Alps with a focus on regional and local connections: Differentiation of the offers, clear management of a vast variety of offerings, better adapted to the individual regional possibilities as before. In general, there will be more cooperative marketing of destinations as before, not that each individual village will offer something but there will be much more networking of the communities together to offer as a region a set of possibilities for the tourist. This in all aspects, touristic infrastructure, shared mobility, advertising. (EA).

In contrast to the quest for more focus on collaborative and networking activities, one of the experts talks about making nature-based tourism entrepreneurs “become more like

rock stars” (S) and calls for a change in self-confidence and better trust in oneself in business relations.

Outdoor activity

This category implies development and facilitation of various activities in the outdoors, with emphasis on trails and on biking as a prominent outdoor recreation activity. *Trails* are critical to many nature-based tourism activities and here mentioned in three different contexts: coastal trails, skate skiing trails, and long-distance hiking trails. Innovations in coastal trails include “possibilities to row/paddle or walk/bike along coastal paths and stay overnight at former lighthouse stations and other historical buildings” (N). One of the Swedish experts emphasized that “innovation in skating trails should target wilderness areas” (S).

Biking is just one among many outdoor activities provided by nature-based tourism businesses, but since it appears specifically in the answers it is likely to have great innovation potential, symbolizing innovation at the core of nature-based tourism participation (activity in the outdoors). This includes “building destinations for mountain biking” (N), “country biking” (S), as well as “new forms of mobility like new cross or mountain e-bikes or other forms of e-mobility without combustion engines” (EA). A special subcategory in this context is fat bikes, mentioned by three of the experts. One of them sees particular potential in the winter season: “fatbiking in winter – gives easy access to nature for a big group of people that haven’t learned skiing or other ways of winter transportation” (N).

We also identify *inclusion* as a subcategory under the Outdoor activity category, with an emphasis to lower the threshold for certain groups in society to visit nature. This includes “introducing newly arrived immigrants to nature and outdoor activities (including the right of public access)” (S) as well as “encourage (especially) young people to go outdoors and enjoy the nature” (F). Specific measures mentioned are development of infrastructure in nature areas for accessibility and better information about recreation opportunities and guided tours.

Learning

This category includes interpretive hikes in designated areas (for example, climate parks), self-guided tours, information centers, and storytelling with transformative elements contributing to learning as well as enhancing the tourist experience: “I think storytelling, combined with a transformation-element (like learning something new) in general, will be a key factor to success” (N). One of the experts from the European Alps brought up the need for better information about paths; “an information centre which gives long-distance hikers and cyclists information about paths, risks, including booking the places” (EA). Yet another suggestion in this category is mapping technology to notify the public of issues within the forest or other public lands: “instantly capable of updates would bring many land management organizations into the world of smart phones that could then use push notifications etc., to better educate the public” (US). One of the Norwegian experts also suggests along these lines “an example of an innovation device or service could be an app with information customized for the tourist depending on location, activity, weather, etc.” (N). These ideas connect with the *self-guided tours*,

described under the new technology category above, where learning and the visitor experience are both promoted through mobile devices.

Discussion

Based on data from 67 experts in five countries, this study identifies five main categories of future innovation in the nature-based tourism sector. The diversity of expertise in this study addresses the need for a greater variety of data acquisition processes in innovation research (Pikkemaat *et al.*, 2019), and the focus on nature-based tourism adds knowledge about a sector undergoing rapid development (Fredman & Margaryan, 2020) with few previous studies targeting nature-based characteristics specifically (Falardeau *et al.*, 2022). The systematic literature review of innovation ecosystems in rural tourism by Madanaguli *et al.* (2020) shows that the innovation process involves not just a new product or service development but also more complex processes, such as joint marketing and organizational innovations. This highlights the complexity of the topic and motivates multiple research approaches. In our case, we identify several product and business process innovations, including some that are well known from previous tourism research (Hall & Williams, 2020; Hjalager, 2010, 2015). Previous studies of trends in nature-based tourism have, for example, identified soft adventure, digitalization, and professionalization as having large commercial potential (Haukeland *et al.*, 2023), all visible also in our investigation.

Most of the innovations identified in this study are product innovations rather than process-oriented business innovations according to the OECD framework (Table 1). A product reflects both tangible goods and intangible services sold to tourists, and in our case the two are often mixed. Many of the innovations found (for example, local connections, comfortable nature, self-guided tours, biking, and learning) typically involve the engagement of users through their time, availability, attention, transmission of information, or effort, which means that the attributes or experience of the service depend on the input of users (OECD/Eurostat, 2018), also known from the tourism literature as co-creation of experiences (Campos *et al.*, 2018). However, infrastructure and facilities to make nature more accessible, comfortable, and safe also involve tangible objects (for example, hotels, trails, and restaurants) providing intangible services such as overnight stays, biking opportunities, and/or local food experiences. This illustrates some of the complexity of tourism innovation in general, and nature-based tourism in particular where natural assets are critical for service delivery.

Business process innovations identified in this study include design and distribution, new technology, and business relations. Characteristics of an improved business function are related to those for an improved product, in particular services that can be delivered to customers, such as greater efficacy, resource efficiency, reliability and resilience, affordability, convenience, and usability (OECD/Eurostat, 2018). Design and distribution of consistent nature-based tourism products, for better matchmaking between product and customer, include improved distribution and logistics (e.g., order processing), as well as better marketing and pricing strategies. New technology focuses on developing and adapting products or business processes, such as through augmented and virtual reality, geo-referenced recreation activities, and providing information on specific locations. However, the business intelligence category, representing new ways of economic thinking, is primarily about improved administration and management in the OECD framework, including different types of external relations. The networking

category is primarily about marketing and how destinations can co-operate around such activities.

Comparing our findings with Falardeau *et al.* (2022), who studied the relationship between innovation and the “natural” territory at the heart of nature-based tourism, we notice that many of the innovations fall within the traditional “business” and “offer and experience” groups. Specificities of nature-based tourism, captured through the “social environment” and “place” groups by Falardeau *et al.*, are found in the local connections, collaboration, networking, inclusion, and learning categories of our study. This includes, for example, products that combine nature, recreation, and personal development, community networking, young people going outdoors, and interpretive hikes. It is well known that interpretative services in tourism have the potential to support tourist learning experiences which in turn may promote pro-environmental behavior (Lee *et al.*, 2021), and the role of tourism for social inclusion is a topic in both political and scientific discourses. Hence, just like Falardeau *et al.*, our study identifies new avenues to take more account of the nature-based tourism specificities to support a reorientation of tourism innovation toward a more sustainable development.

In this respect, possible cross-fertilizations between the innovation categories identified in this study are of special interest. The results point to the importance of innovative product packaging through combining different activities where new technology can guide, support, or augment the experiences. Digital technology can, for example, create opportunities to enhance outdoor learning experiences (Hills & Thomas, 2020), and it certainly can be a powerful tool when it comes to business intelligence, product packaging, and networking (Chekalina *et al.*, 2021; Fuchs *et al.*, 2021). Product packaging in terms of local connections is closely related to the collaboration dimension of business relations. This highlights one of the intrinsic features of nature-based tourism, that of its dependence on natural resources closely connected with local communities (Fossgard & Fredman, 2019). The trend toward shorter trips with a local flavor also accelerated during the COVID-19 pandemic when long-distance travel was restricted in many countries.

Critical to nature-based tourism are opportunities to perform various outdoor recreation activities (Margaryan & Fredman, 2017), in this case captured through the emphasis on biking and trails. Looking at mountain biking specifically, it has developed into a global sport and recreation activity of significant economic importance (Buning & Lamont, 2021). Many tourism destinations with a desirable geographic terrain have accordingly invested in trail systems and offer skill courses, guided tours, accommodation, etc. to package biking as an attractive product for different market segments (Stemmer *et al.*, 2021). Similar developments can be seen for other trail-based recreation activities such as hiking, cross-country skiing, and snowmobiling (Godtman Kling *et al.*, 2017). We also note that the quest for facilities and more comfortable outdoor experiences could go hand in hand with a more inclusive tourism sector where nature areas become more accessible for people with specific needs and disabilities.

While most innovations identified in this study deal with improving products, consumer experiences, or business performance, our results indicate that innovation in the nature-based tourism context goes beyond the traditional economic rationale reflected by OECD and the Oslo manual. An important theme in the international literature is understanding the role of nature-based tourism within the context of global transformations (Gren & Huijbens, 2015; Mostadanezhad *et al.*, 2016). A path toward strong sustainability calls for a shift in focus from local to global transformations, and from specific systems to holistic transformations (Chaminade, 2020). Studies also show that

small- and medium-sized tourism companies are more interested in pursuing sustainable activities, including protecting nature, and tourism lifestyle entrepreneurs are more likely to behave in a sustainable way that contributes to supporting local communities (Dias *et al.*, 2023; Shrivastava & Kennelly, 2013). Though our data do not explicitly focus on broader aspects of innovation, such as its relationship to sustainable development or host communities in nature-based tourism destinations, the innovations identified will serve such ambitions.

For example, fat biking was identified as a way to access winter environments by those who would not traditionally do so, and e-biking is a way to access (without combustion engines) areas by those who might not do so on traditional bikes. Likewise, we recognize the potential for tensions in this broader context. For example, new products may attract more visitors, which is beneficial for owners and employees of tourism and other businesses at destinations, but increased visitation may increase pressure on natural areas and host communities, which can be a major obstacle for a responsible tourism of the future. This is particularly challenging in countries with a right of public access to nature, such as Norway, Sweden, and Finland, and it may lead to calls for new and innovative policy tools (Øian *et al.*, 2018). Likewise, e-bikes may facilitate access and increase visitation to natural areas, potentially leading to social conflict with traditional trail users, an issue in natural areas in many countries. In this context, learning for environmentally and socially improved behavior is a key approach to minimize negative impacts and avoid regulations and other hard policy measures.

Concluding remarks

So, where does this study take us – forward in all directions or toward the specifics of innovation in nature-based tourism? Perhaps a bit of both. Innovation is a complex socio-cultural process involving diverse actors and sources of knowledge. It is not only about improving and sustaining the competitive advantage of firms and organizations but also about addressing the major social challenges of the twenty-first century (Edwards-Schachter, 2018). In a similar vein to Falardeau *et al.* (2022), we identify several key innovations to nature-based tourism at the crossroads between the different innovation categories. Steps forward depend on the engagement of users, connections with local stakeholders, and sustainable use of natural resources. The latter is of special interest to the nature-based tourism sector. Haukeland *et al.* (2023) showed that the quest for sustainability has become a key issue for the sector's value chain expressed in terms of responsible travel, authentic experiences, and locally produced products. This is where the educative innovation category of our study could come into play, contributing to better understanding ecological systems, value creation, and safety – all critical factors for a sustainable service delivery in nature-based tourism relevant to most places and activities.

There are many possible development prospects for the nature-based tourism industry beyond the scope of this study (for example, special food offers, private-public partnerships, walk/bike and authentic accommodation, online promotion, and offers for disabled people), but possible negative effects need to be monitored closely so that the industry does not get lost in the different directions forward. Tourism is a social phenomenon, and social innovation is therefore inherent to many aspects of tourism development, also in the nature-based context. The social relevance of this study includes a better understanding of nature-based tourism as a form of tourism that is gaining in importance

worldwide, indications for a more professional innovation management of nature-based tourism to improve the quality of the offerings, and incorporating the requirements of sustainable development into the management of nature-based tourism. This is critical in our time with accelerating pressure on natural resources and increasing concerns about greenhouse gas emissions. Scientifically, this study increases our understanding of a growing segment of tourism that research still pays insufficient attention to, given the fundamental relations with the ecological system. We do this with help from an international panel of experts with different roles in the nature-based tourism system, linking nature-based tourism research with the tourism innovation and sustainability agenda.

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