



Science And Industry: Sharing Knowledge For Innovation

By: Hindertje Hoarau and **Carol Kline**

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Science and industry: Sharing knowledge for innovation

Hindertje Hoarau^{a,†}, Carol Kline^{b,1}

^a *University of Nordland, Norway*

^b *East Carolina University, USA*

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This paper contributes to a better understanding of the absorption of scientific knowledge in tourism innovation processes. Based on a synthesis of the literature and empirical study we present the model of *Innovation through Co-creation*. The cases of researchers working together with three whale-watching firms have allowed us to illustrate examples of co-creation, knowledge sharing and reflexivity during tourism firms' innovation processes. Intensive interaction of the tourism industry with researchers pays off in terms of innovation because flows of knowledge are intimately linked to social capital developed through intensive and frequent shared practice. Besides the theoretical implications of our model, we contribute to the field by providing practical implications for how tourism firms can organize their learning and innovation processes.

Introduction

This paper addresses the contribution of scientists to innovation processes in tourism and focuses on the sharing of tacit and explicit knowledge. Innovation can be defined as the process of making changes, large and small, radical and incremental that result in the introduction of something new

† Corresponding author. Tel.: +47 75517619, mobile: +47 45778778; fax: +47 75 51 74 57.

E-mail address: hjh@uin.no (H. Hoarau).

URLs: <http://www.uin.no>, <http://www.opplevelserinord.no> (H. Hoarau), <http://www.ecu.edu/rcsl/>, <http://sustainabletourism.org/> (C. Kline).

¹ Tel.: +1 919 306 1705.

for the organization and adds value to customers (O'Sullivan & Dooley, 2009). Knowledge is a prerequisite for tourism innovation (Hjalager, 2002) and the absorption, management and application of new knowledge to feed innovation processes is critical for the competitiveness of destinations and firms (Cooper, 2006; Weidenfeld, Williams, & Butler, 2010).

Innovation literature has recognized the importance of knowledge from different sources for innovation processes. For example, Chesbrough (2011) has argued for the 'open-innovation paradigm' where firms intentionally use internal and external sources of knowledge in their innovation processes. Instead of having all knowledge in house, firms can establish networks with relevant others to access and develop knowledge. For instance, customers have been mentioned as an important knowledge source for innovation (Foss, Laursen, & Pedersen, 2011) and the joint role of organizations and customers in value co-creation processes has been theorized by the increasingly popular service dominant logic (Cabiddu, Lui, & Piccoli, 2013). Open-innovation is a concept developed for the manufacturing and service sector and mostly applied in large, innovative firms. However, intentional knowledge search activities to capture external knowledge seem rare in tourism (Cooper, 2006). In addition, most tourism innovations are incremental and consist of a change in behavior (Hjalager, 2010; Sundbo, 1997).

In tourism, the value of the experience is not only created by the firm and its customers but is embedded in a larger social and physical context of *what is being experienced*. Value, therefore, can be co-created by all stakeholders involved during the practice of the experience, when knowledge is shared between them (Prahalad, 2004). This co-creation of value allows for knowledge transfer because customers, providers and other actors are engaged in joined practice. In this case, knowledge-sharing is not intentional, but a spontaneous consequence of co-creating the experience. Nevertheless, by strategically reflecting upon knowledge acquired in practice, tourism innovators can incorporate this knowledge into innovation processes (Sundbo & Fuglsang, 2002). Co-creation of the tourism experience is one example of a practice in which tourism firms interact with other stakeholders, however there are many other cooperation practices in which tourism firms are involved as well. So far, little has been written about how sharing of tacit and explicit knowledge between stakeholders in co-creational practices affects innovation processes in tourism. According to Cooper (2006) capturing the tacit knowledge that resides in the tourism industry is one of the major challenges and to date has not been formally addressed by researchers. Hjalager (2010) also recognizes that there still is an incomplete understanding of how innovation processes take place in tourism firms.

This paper addresses this gap in the literature by focusing on the role of scientists as external source of knowledge in co-creation processes in tourism. Traditional research outlets such as conferences and journals where explicit knowledge is communicated do not seem to reach tourism businesses. However, long-term interaction, sharing tacit knowledge and building social capital between scientists and tourism businesses facilitates the absorption of research-based knowledge in tourism innovation. The purpose of this paper is to contribute to a better understanding of the absorption of knowledge from scientists in innovation processes. Specifically, it focuses on the question *how do nature-based tourism firms absorb external knowledge from scientists in their innovation processes?* We will portray the significant business potential from integrating researchers throughout the innovation process. This study contributes to the literature in that it introduces a new model of *Innovation through Co-creation*, advances the concept of co-creation by including non-commercial relations for co-creating customer value and other tourism practices, and provides empirical evidence of examples of tourism innovations (and how they evolved).

Sources of knowledge within the nature-based tourism system

Within nature-based tourism (NBT), tourists are interested in getting in touch with nature, escaping the stresses of daily life, and seeing landscapes and wildlife. There are several sub-categories of NBT, such as eco-tourism, wildlife tourism, adventure tourism, captive tourism (e.g. zoological parks, aquariums), extractive tourism (hunting and fishing) and some types of health tourism (Hall, Hall, & Williams, 2008). Although NBT is a growing industry in general, wildlife tourism is the fastest growing component of NBT worldwide (Rodger et al., 2010). Many stakeholders, like the stakeholders of the host destination, including businesses and the government, tourists, and the setting itself are involved

in wildlife tourism. The network of stakeholders in a tourism destination can be understood as a tourism system in which different stakeholders have varying interest for participation (Jamal & Stronza, 2009). For example, within wildlife-watching tours, the “core” stakeholders would include the tourists, the tour company staff, the wildlife and the natural environment. These stakeholders are most immediately, intimately and regularly affected by a wildlife watching tour. Also involved within the system are both partners and competitors of a tour company; the interaction is critical and frequent, but perhaps secondary by comparison to the interactions that occur between stakeholders in the core. Even further away from the core of the tourism system are the groups that impact and are impacted by the tour company, albeit in lesser intensity and frequency than the partners and competitors. Each of these stakeholder groups (and individuals) bring with them a definitive role, set of goals, and their tacit and explicit knowledge.

Tourism researchers have identified several types of knowledge in tourism systems. Bertella (2011) speaks of scientific, managerial-political and local knowledge, Hjalager (2010) of embedded knowledge, competence and resource-based knowledge, and Hallin and Marnburg (2008) and Cooper (2006) consider tacit and explicit types of knowledge. “While explicit knowledge is open knowledge in the form of communication and can be codified in documents, books, databases and reports, tacit knowledge refers to all intellectual capital or physical capabilities and skills that the individual cannot fully articulate, represent or codify” (Hallin & Marnburg, 2008, p. 368). Explicit knowledge is easily explained, and tends to be the most accessible and communicated form of knowledge; blending tacit knowledge is more complicated but can lead to the most innovative business or social changes (Chathoth, Altinay, Harrington, Okumus, & Chan, 2013; Zahra, Gedajlovic, Neubaum, & Shulman, 2009).

There are several ways of thinking about the exchange of knowledge between stakeholders. One way is to see knowledge as residing in the heads of individuals and as such, appropriated, transmitted and stored by means of mental processes. A second way is the identification of knowledge as a production factor, in which knowledge is considered an objectified transferable commodity. The third way is to understand knowledge as residing in practice (Gherardi & Strati, 2012). Whatever understanding of the role of knowledge, tourism researchers agree that innovation is largely dependent on the creation of new knowledge (Hjalager, 2002), which is often developed through the sharing or “flow” of knowledge (Cooper, 2006). For an overview of networks and knowledge flow/diffusion theories, see Baggio and Cooper (2010).

The benefits of networks within the tourism industry include knowledge exchange as well as improved business activities, improved quality of services and experiences, business referral, enhanced visibility, cross-marketing, the inclusion in atypical events and programs (Novelli, Schmitz, & Spencer, 2006; Weidenfeld et al., 2010). For firms it becomes therefore of strategic importance to participate in these shared learning processes as knowledge relevant for innovation is typically distributed across a wide range of sources both inside and outside the organization. From this perspective, flows of knowledge are seen as inextricably linked to social relations developed through shared practice. Gherardi and Strati (2012) have argued that “participation in a practice” is both a way to acquire knowledge in action and a way to perpetuate such knowledge and to produce and reproduce society. Creativity can occur in practice when individuals do things, and it is through this action that the individual gets new ideas about doing them better, or differently. Therefore, the practice itself drives innovation by being a generator of new ideas, creativity and knowledge among stakeholders.

Hence, knowledge needs a context in order to be created, a shared social and mental space for the interpretation of information, interaction and emerging relationships that serves as a foundation of knowledge creation (Sundbo, 1998). Jamal and Stronza (2009, p. 177) agree: “it is important to view collaboration as spatial and temporal, activities are occurring both within and outside the collaborative space of gathering.” Social networks are an ideal context for knowledge sharing and creation, which in turn can lead to the strengthening of social capital within a network of similar stakeholders (bonding social capital) or across networks of disparate stakeholders (bridging social capital) (Brouder, 2012; Bertella, 2010; Racherla & Hu, 2010). The increase in social capital, which includes constructs of trust and reciprocity (McGehee, Seungwoo, O’Bannon, & Perdue, 2010) will lead to further knowledge sharing as relationships strengthen, and ultimately contributes to an innovation system in sustainable tourism development (Mabeth, Carson, & Northcote, 2004). Kokkranikal and Morrison (2011) note that the benefits of networks within the tourism industry include learning and knowledge

exchange as well as improved business activities. Collaboration across networks can result in improved quality of services, business referral, enhanced visibility, cross-marketing, the inclusion in atypical events and programs (Novelli et al., 2006). Baggio and Cooper (2010) explored processes of knowledge sharing among networks in destinations as they strive to innovate. The authors criticize the literature in the knowledge transfer field as focusing too heavily on knowledge transfer/diffusion “within a single stakeholder” (p. 1758). They emphasize that there is a lack of research on knowledge transfer across group boundaries or “the value of knowledge sharing not just within the organization, but also through networks.” (Baggio & Cooper, 2010, p. 1758). While knowledge sharing occurs among many tourism stakeholders, it is collaboration in practice and across networks that is examined in this study, and particularly the networks of those stakeholders directly involved in the co-creation process, and the innovation outcomes that come from the resulting social capital.

Most practices in tourism are aimed at creating value for the tourist, which is defined by and co-created with the tourists rather than embedded in output. Prahalad (2004) also notes that the customer is co-constructing the service experience to suit his or her context. This process involves joint problem definition and solving, which requires continuous dialogue. The role of the company is to create an experience environment in which consumers can have an active dialogue and co-construct personalised experiences; the product might be the same, but the customers can construct different experiences. These types of high-quality interactions that enable an individual customer to co-create unique service experiences with the company are the key to unlocking new sources of competitive advantage (Prahalad, 2004). Chesbrough (2011) also argues that co-creation with customers can create more meaningful experiences for customers, who will then get more of what they really want. These moments of co-creation allow for knowledge transfer between stakeholders. Although co-creation of a tourism experience is done by a group of people who have an activity in common, they don't have common knowledge, a sense of community identity nor an element of overlapping values because the group does not repeat the practice more than once (the tourists leave after value is co-created). Therefore the practice of the tourism experience has to be distinguished from the concept of ‘community of practice’ (Hislop, 2009; Lave & Wenger, 1991). Besides the co-creation of the tourism experience, the tourism company engages in other co-creational practices with stakeholders, such as company meetings, formal engagement with the community, and representing the company at national conferences. In each case, knowledge sharing between stakeholders can occur, which can lay the groundwork for co-creation and innovative outcomes. When these practices repeatedly take place and social capital is build, common knowledge, a sense of community identity and overlapping values emerge and the group of cooperating stakeholders develops into a community of practice.

Scientists as source of knowledge

Within recent years, wildlife researchers have begun to be formally recognized as stakeholders in NBT (Coghlan, 2008; Rodger, Moore, & Newsome, 2010; West, 2008). The role of these scientists is multiple. For example, they can evaluate the impacts of tourism from a social or physical sciences perspective (Donnelly et al., 2011). They can serve an active role in a NBT experience by being an expedition leader (Coghlan, 2008) or special interpreter (Bertella, 2011). They might co-exist alongside ecotourism projects, conducting activities according to their own research agenda, or perhaps interacting with voluntourists or other types of tourists (Coghlan, 2008). Within NBT programming, scientific knowledge is used to develop interpretation programs and materials for wildlife tourists, managers use science to justify (and lend credibility to) decisions they make, and benefits gained from communicating scientific findings to this broader audience include increased support for conservation and biodiversity issues (Rodger & Moore, 2004). Additionally, scientists are considered the source of regulations that dictate tourist behavioral guidelines within the natural environment (Bertella, 2011).

Communication of their agenda, goals and results is critical for scientists to justify and validate their research. “Science is no longer removed from politics and society. The full implications of this change in power relationships for scientists are unknown. However, it appears that if scientists are to get funding for research then they need to engage with society and sell their services, and they need to build relationships with those who can influence” (Rodger et al., 2010, p. 690). Rodger et al. (2010)

argue that scientists need their science to be accepted as fact and considered important. Scientists disseminate and attempt to validate their research in many forums, and in the case of NBT, this might include sharing knowledge with tourists, tour operators, natural resource managers, hosts and destination marketers, and community members.

Using stakeholder-knowledge for innovation: strategic reflexivity

Tourism researchers agree that innovation is largely dependent on the creation of new knowledge (Hjalager, 2002), which is often developed through the *sharing* of knowledge (Cooper, 2006). It is the strategic management of this knowledge that is at the core of innovation (Cooper, 2006); one way to manage knowledge is to reflect upon it. The concept of reflexivity stems from temporary sociology (Malerba, 2006) and denotes that people follow their own trajectory in a world full of possibilities and dangers. They reflect upon their situation to consider their best personal and professional options. In the organization and management learning literature, reflection has been explained as careful thought in which people “recapture” their experience, mull it over and evaluate it (Keevers & Treleaven, 2011). Sundbo and Fuglsang introduced a strategic reflective representation of innovation, where change is a result of personal reflexivity in interaction processes (Fuglsang & Sundbo, 2005; Sundbo, 1997).

In a classical view, strategy is made via a logical, linear process of formulation, planning and implementation (Casey & Goldman, 2010), and can be considered a rather positivistic view on knowledge, positioning the manager as the sole responsible figure for strategy. Casey and Goldman (2010) argue the emergent or learning view holds strategic thinking as a fluid and ongoing learning process, occurring concurrently with taking action (Casey & Goldman, 2010). Hence, this view of strategy is inherently practice based (Gherardi & Strati, 2012) where knowledge is acquired through action. Tourism firms must participate in strategic reflexivity to manage knowledge and encourage innovation but also to be economically sustainable. Ordanini and Parasuraman (2011) argue that effective new service development depends on the continuous renewal, creation, integration, and transformation of information and knowledge. Finkelstein, Harvey, and Lawton (2008, p. 11) assert that the key to long-term viability is through reflexivity:

Visioning is the handmaiden of strategy. As a practical organizational development tool, its power stems from bringing leadership teams to think reflexively. It raises fundamental questions about organization, culture, markets and relationships that can only be answered by engaging in past-present-future thinking. This enlivens strategic conversations and stimulates the search for alternative ways of seeing. The upshot is a deeper understanding of problems and prospects. Fresh solutions and more ambitious goals emerge naturally from the process.

Strategic reflexivity is similar to the concept of adaptive management within a business or community application, where stakeholders learn from doing, and employ their learning as a strategy to change with the environment (Dunphy, Griffiths, & Benn, 2007; Ordanini & Parasuraman, 2011). The flexibility and constant learning of an adaptive management approach shapes a business to function as an integrated system adjusting to a multitude of economic, socio-cultural and environmental influences (Dunphy et al., 2007). Strategic reflexivity and adaptive management approaches to NBT are only beginning to be explored.

Innovation outcomes

Because innovations of services and experiences are not directly visible, the tourism industry has the reputation of not being very innovative (Hjalager, 2002). However, tourism innovation exists, and provides opportunities to differentiate the tourism product and disperse socioeconomic gains at grass-roots level (Carlisle, Kunc, Jones, & Tiffin, 2013). According to Hjalager (2002), tourism innovations can vary in scope; they can be regular, niche, revolutionary and architectural and Carlisle et al. (2013, p. 61) distinguish between “continuous improvements [that] are often characterized as incremental innovations and technological revolutions as radical innovations.” Hjalager (2010) cites five categories in which innovation can take place: 1) product innovation when products (services and experiences)

are reshaped or reinvented, 2) processes innovation, which are “backstage initiatives which aim at escalating efficiency, productivity and flow” (p. 2), 3) managerial innovations which are internal shifts within an organization, 4) marketing innovations, and 5) institutional innovations, which are new “structure or legal framework[s] that efficiently redirects or enhances the business” (p. 3) within an entire field. Related to NBT, she also has argued that the commoditization and marketing of natural resources is a necessary intermediate function that transforms the natural resource into a product (Hjalager, 1997). The services and value propositions that are part of nature based tourism-experiences are essential and at the core of the innovation process.

Methods

The objective of this study is to understand the role marine biologists play in innovation processes of Nordic whale watching firms. The research is guided by a hermeneutic phenomenological ontology and epistemology (Pernecky & Jamal, 2010). Hence, we are interested in the meaning that cooperation with researchers has for different actors in whale watching firms. The meaning of social practices and phenomena, like co-creation, cooperation and innovation, is constituted by the meanings social actors give to them. Because we are interested in the conditions under which innovations take place, we have chosen a qualitative approach. Qualitative techniques can be defined as an array of interpretative approaches which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world (Easterby-Smith, Thorpe, & Lowe, 2002).

The current research is positioned between deductive and inductive studies, being neither a test of an already developed theory, nor a development of a new theory. Rather, it is a contribution to theory building through dialectic interaction between field studies and existing theory (Easterby-Smith, et al., 2002). This fits a hermeneutic phenomenological approach as, according to Pernecky and Jamal (2010), the researcher seeks to interpret and understand the lived experience; searches for meaning, analyses, critiques, and negotiates between theory and data. To study the meaning and outcomes of cooperation between tourism firms and marine researchers, we conducted case studies, an ideal method strategy when a holistic, in-depth investigation is needed (Feagin, Orum, & Sjoberg, 1991).

Two Icelandic and one Norwegian NBT-companies, designated Alpha Iceland, Beta Iceland and Delta Norway, have been selected as cases for this study. Eisenhardt and Graebner (2007) argue that multiple cases enable a broader exploration of the research questions and theoretical elaboration. Multiple cases are likely to build stronger theoretical contributions but theoretical sampling, selecting cases because they are suitable for illuminating and extending relationships and logic among constructs (Eisenhardt & Graebner, 2007), can be more complicated. The cases selected here have strategic importance in relation to the general problem (Denzin & Lincoln, 2011). They were selected using the strategic choice method on the basis of the following similarities: wildlife tourism (whale-watching) as core activity, characterized as small or medium enterprises, more than 5% annual growth over the past 10 years, located in Nordic tourism destinations, and long term cooperation with scientific researchers.

Data were collected through reviewing the companies' public reports and websites, face-to-face interviews with managers, guides, captains and researchers and, when possible, participant observation of core-activities. This triangulation of different types of data and methods contributes to the credibility and validity of the study (Eisenhardt & Graebner, 2007). The research was carried out in two phases. In 2010, the primary researcher visited each company to conduct one interview with the manager or owner. Subsequently, she spent one week with each company in 2011 to conduct interviews and observations. A total of 17 interviews were conducted with managers, guides and researchers, and were structured by a set of topics and were semi-guided so the informant could freely speak about topics addressed. The interviews focused on sustainability, innovation, cooperation and the use of knowledge, including questions about the marine research conducted on board and its usefulness in relation to the tourism venture. The research process resulted in interview transcripts, field observations, and researcher notes regarding company documents and website material. The data were coded into discrete parts that were examined and compared to other parts to reveal differences

and similarities, a process of data analysis that is interpretive and dialogic. Instead of taking a subjective or objective stance towards the data, the authors focus on the relationship between self and other. Spending time with the companies and being part of their whale watching practices helped to establish an understanding of the life world of the different respondents.

Findings

Individual stakeholders cooperating with the whale-watching firms are at the core of the strategic reflexive innovation process. Within wildlife tourism, tour-companies are engaged in many different practices in which stakeholders come together and cooperate. The main practice is the wildlife-watching tour, however in addition to the tour, we distinguished between practices internal to the tourism company like staff meetings, workshops and parties, and practices external to the tourism company, such as interactions with non-governmental organizations, research networks and the community. We focus on research-knowledge present in these practices and how this knowledge is shared with practitioners. After discussing the different practices, we will delve deeper into how tourism stakeholders strategically reflected upon the knowledge shared during these practices and to which innovation outcomes this has led. The three cases are presented in [Table 1](#).

Tours

The whale-watching tours typically start with purchasing a ticket and waiting for the boat to launch. In the case of Alpha, the tourists are offered a small whale-exhibition, café and souvenir shop in the boat that is dedicated as waiting room. Beta's tourists have the possibility to visit the municipality's whale museum, although this is not part of the whale-watching tour and a separate ticket would be purchased. Delta's expedition starts with a guided tour in the company's own whale museum. The guiding is offered in several languages to educate people about whales before they go out at sea. There is extensive attention to the role of scientific research in Delta's museum. The company wants to increase the level of knowledge of tourists:

Table 1
Company profiles of Alpha, Beta and Delta.

	Alpha Iceland	Beta Iceland	Delta Norway
Location	Reykjavik/Iceland's capital area	Northern Iceland	Northern Norway
Product	Whale-watching tours Small whale exhibition	Whale-watching tours Sailing tours Multiple days cruises	Whale museum Whale-watching tours
Research focus	Minke whales, white-beaked dolphins, humpback whales & sea-birds	Minke whales, white beaked dolphins, humpback whales & sea-birds	Sperm whales
Role of researchers	Generate knowledge about cetaceans Help during the tours Add value to the tours Gather munitions for the anti-whaling lobby	Generate knowledge about cetaceans Add value to the tours Marketing for the company	Generate knowledge about cetaceans Add value to the tours Marketing for the company
Facilities offered to researchers	Free access to whale-watching tours Housing	Free access to whale-watching tours	Free access to whale-watching tours Housing
Networks	Ice Whale; Wild North; Green Globe certification; International fund for animal welfare (IFAW); Faxaflói Cetacean research	Ice Whale; Wild North; IFAW; Husavik research center & whale museum	Marine Research and Education Fund of Andenes; International research networks; cooperative projects with Spain and Azores

Knowledge of whales is for most people close to zero and they want to know and if you want to give them knowledge, you have to translate it to popular language, you cannot talk like a scientist, but that is not a problem and if they know you are doing research, of course they know that your knowledge is very good (Manager Delta).

A whale watching tour typically takes three to five hours during which guides, captains and researchers are working together to create a valuable experience for the tourists. These stakeholders each have their own roles to play and specific knowledge to contribute. The captains know the sea, how to find the whales, and often have years of experience as fishermen. The guides know how to 'read' tourists and can judge what kind of stories and jokes to use to entertain them. They are also trained in health and safety issues. The researchers have scientific training about the wildlife and are able to link local phenomena to a larger scientific knowledge pool. The researchers also perform tasks and roles on board that are not directly related to their scientific work. For example, they are expected to lend the crew a helping hand with some specific tasks that are part of the routine of the tours.

Since they come for free we often ask them to help with the chocolate and cinnamon rolls (Guide Beta).

The scientific role of the researchers on board is to identify different species of whales, take photographs and catalogue them. The majority of researchers cooperating with whale-watching firms are part of research programs funded by universities and research institutes. They are participating in whale-watching tours strictly as a means to collect data for their research. In this role they also share their scientific knowledge about whales and other wildlife with the guides and tourists. Typically, researchers work with the same guiding company year after year. When co-creating a whale-watching experience, guides and researchers are able to share both explicit and tacit knowledge by listening, observing and learning from each other's practices. One of Alpha's guides noted:

We share knowledge with the researchers; they have monthly newsletters to tell the guides what whales they have seen, they do presentations and when the tourists want to ask questions during the tour, they answer them; we had a lot of people come especially because we have researchers on board.

This quote refers to sharing of explicit knowledge between guides and researchers. In addition, tacit knowledge about how to find the whales, how to identify them, and how to interpret hydrophones is shared between researchers and guides. Being able to call on researchers during the tours increases the quality of the guiding and offers room for improvisation. Guides can ask the researchers about facts they do not remember, but also researchers can offer tourists 'in the moment' information that enriches the tour. An example is whale-identification:

There are two researchers that take pictures of whales, and we can always count on them. For example, they know if this humpback whale we meet has been seen in the bay before (Guide Beta).

The senior researcher working with Alpha explained that the photo identification of whales helps tourists to feel closer to the animals. The whales are listed in catalogues and when a whale is recognized by its tailfin, the researchers communicate the whale's name to the guides. This is also done at Delta; researchers see it as their role to provide the guides with real-time knowledge to improve the value of the whale-watching experience:

The first thing you do when you get new knowledge is to update it to the tourists. It is important that the people get to know that we are doing something, so what we do is that we are constantly improving and changing the guides talk every time something is happening. (...) Like yesterday we found a whale that I have seen before in another area and I told the guides to say that to the tourists (Researcher Delta).

This example of explicit knowledge sharing serves to educate people during the tour, but also demonstrates that the researchers have an important function on board. In case of Delta, the tourists are told that their money is partly spent on research, therefore the researchers need to have a visible contribution to the tour. They are part of the value-creation of the whale-watching experience. This can also be found back in the marketing activities of the companies. Alpha and Delta communicate their research activities on their website and in other marketing material. Beta emphasizes the link between the company and researchers by designing special jackets with the logo of the company that the researchers have to wear on board.

While all three companies support research, there are challenges as well when it comes to 'using' knowledge from scientists. For example, it is up to the guides to relay the information researchers give them to the tourists; however the researchers feel that they do not always do this adequately. There seems to be a gap between the level of detail that the researchers would like the tourists to know, and what guides actually explain. Therefore, a conflict can arise when guides decide, based on their knowledge about people in general and a group specifically, what to share and what to omit. One of Alpha's guides said the following about this:

By observing the people you learn what interests them and what is not interesting. Of course some people are interested in everything about whales and some just in the basic things. So it is quite good to be working at the bar on board and watch people ... I say a big part of the guiding is the feeling for nature, people, whales and birds (Guide Alpha).

Researchers might not have this fine-tuning to people or may be inclined to provide the maximum amount of information. Guides act as knowledge brokers between researchers and tourists. However, the differences between the roles of knowledge of guides and researchers can limit their social capital formation.

Internal practices

Staff-meetings are a recurrent internal practice. Whether researchers participate depends on the type of cooperation they have with the company. For example, Beta sees researchers as external while Alpha and Delta consider them as part of the team. At Alpha, researchers get the chance to present their newest findings during weekly staff meetings and take part in the discussion. In addition, Alpha's staff organizes workshops to brainstorm improvements to the company; the knowledge, skills and experience of people combined there contributes to the generation of many new ideas.

We had a staff day in spring where we talked about environmental issues and how we could improve the guiding or improve the boats. We also discussed the weakness of the company and what to do with the competition; so it was like lot of information we got out of it (Manager Alpha).

Hence, information from guides and researchers is used to improve tours, marketing and organization.

We report to the manager because he is responsible for the social media. For example, when we have a sighting with killer whales, we are giving him information or a picture (Researcher Delta).

Researchers at Delta also recognize the challenges of knowledge sharing between management, staff and tourists. One proposed practice to facilitate this is a newsletter posted on Delta's website.

The important thing to do is to translate the things we know to the tourists and also to the company; the thing is that all of us, our projects, are in the starting phase and we cannot give many results to the company yet. In two to three years we have something more to say. At the moment we only give instant results to the people (Researcher Delta).

Sometimes, however, tensions can arise between the different stakeholders in the organization, like the researchers and guides.

Some of the researchers don't get along with our people very well. We need to meet them regularly; both the crew and the researchers to discuss what is okay and what is not.... On one of the boats there are not so many seats inside, and sometimes the researchers take a whole table and then the crew gets mad because there is no room for the passengers anymore... (Manager Alpha).

After work, the guides and researchers of Alpha and Delta continue interacting. Most of them live together in the housing that both companies provide.

The exchange of knowledge usually happens around the table, because in our house the main topic is whales and the second is puke... If somebody finds an interesting scientific paper, we share it (Researcher Delta).

We have a lot of contact; we live and work together, 24 hours a day... We talk all the time about our experiences, and especially during dinner. If a guide comes back from a tour with a question he could not answer, we start thinking and discussing together. When we have the answer, we can use it next time during the tour (Guide Delta).

In case of Beta, guides and researchers do not live together, but they spend time together outside working hours:

There is usually a lot of interaction between guides and researchers and of course also when we have parties (...). We have parties throughout the summer, and a big party at the end of the season before everybody leaves. We get to know everyone very well and even when we sit together and have a beer, have a good time (Guide Beta).

Also Alpha recognizes the importance of social bonding between employees and organizes parties every season to keep spirits up.

We had some problems through the years, usually at the end of July; people getting tired and working a lot, two or three months from the spring...we try to have a party; it is very difficult to get the staff together (for a meeting) because they have different shifts (Manager Alpha).

New people that come to the business are important because they bring fresh knowledge methods that the others can learn from:

Even though they don't have experience in Norway, all of the researchers coming to work here have a lot of experience working in other projects. For example, the two girls from Switzerland have been working in Canada with minke-whales and we have another girl working in the lighthouse who has been working in several places in Spain. So even though they are for the first year here they are more experienced in other things (Researcher Delta).

Sometimes it is good to change, to have some new energy. (...) We have one new employer who is always very happy. If I ask her something it is never problem to do it. She is always smiling which makes other people smile too, so that is nice to have employers like her (Project manager Alpha).

It is important to the company that knowledge and experience stay in the organization and is a source for newcomers. Continuity in seasonal employees is valued:

We have five guides that had worked for us before, that is very important for us we get the people back every year, I don't need to train them and they have a lot of experience from previous years (Researcher Delta).

Throughout the tours and internal practices, the managers, crew, guides, and scientists have many instances of interaction and communication. The varied contexts of these interactions (e.g. formal,

informal, in front of tourists, in closed company meetings, fleeting, extended, regularly-scheduled, intermittent) influence the pace and shape of the bonding social capital formed between the various stakeholders.

External practices

Most external practices involve national or international meetings where the companies associate with like-minded others. Both Alpha and Beta attend meetings of the Wild North Network, a coalition of Nordic nations coordinating wildlife research and developing guidelines for sustainable wildlife-watching. The network is organized around geographical clusters and being in a cluster with the competition raises problems for Beta. However, discussions spawned through the Wild North also bring new ideas for innovation, which distinguishes the company from the competition:

By talking to the researchers in the Wild North Network I learned they were recording sounds of the whales. Since they are doing it on board of our boats I got permission to publish the sounds of different whales and dolphins on our website (Marketing manager Beta).

Alpha invests time and resources in the Wild North to enhance wildlife protection and build a coalition for their fight against whaling. This will contribute to a better whale-watching experience for their tourists because the whales will be more abundant and less shy when whaling is forbidden and guidelines for whale-watching are in place.

In addition to sharing knowledge via networks like the Wild North, the companies are connected to larger scientific networks. Cetacean researchers attend international conferences to present their work and learn from colleagues. The communication between members of scientific communities can contribute to scientific developments, as well as new contacts and knowledge for the companies.

We took pictures of whales and we shared them with researchers in Azores and we found that three (whales) in Norway had been identified in Azores Islands and that was the first time somebody was confirming the migration routes. This is of course an important finding and it is because of collaboration (Researcher Delta).

Local communities are also considered external stakeholders. The companies' 'license-to-operate' is dependent on the acceptance of the local communities, and good relations with these communities are important to demonstrate that their interests are wider than just commercial. Alpha invites school-kids to come whale-watching and learn about the biology and ecology of the bay. Communication and collaboration with the local community is also important for Delta. In addition to enhancing the knowledge stocks within the company, it seems that cooperation with researchers contributes to the companies' social responsibility as well:

It is important that we can work with the local newspaper, give news from and for the local people, so they can understand what we are doing, that it is not only business but something else as well (Researcher Delta).

Strategic reflexivity

Interactions with researchers bring new ideas into the companies that are reflected upon by the management. However, employees and researchers strategically reflect upon new knowledge as well and have ideas on how to improve the product for tourists:

Sometimes we have guide meetings with the manager and we discuss things, like introducing wireless microphones, walkie-talkies, you know, practical improvements. And the management listens and tries to improve things. For example, they actually added a few new items that we suggested to the souvenir shop. They listened to our ideas (Guide Delta).

Internal practices like brainstorm sessions are also important practices for reflection. For example, at Alpha one researcher wished to better promote the science on board the whale watching boats. She

made her master thesis available for tourists to read and wanted to create a 'research corner' on board with more information. Researchers and management began to have conversations about how to improve this link between tourists and researchers. This led to the idea to offer a guided tour in the exhibition room before people board the boat.

The role of researchers at Beta is less prominent. They are not working directly for the company but are connected via Beta's relationship to the research center and whale museum. However, while attending a national meeting, Beta managers learned about the possibilities of utilizing research, specifically whale sounds, within the tour experience, and reflected upon ideas for innovations.

I didn't know until I met the research manager of the Wild North Network how great the (whale sounds) study is, the sounds were just magnificent (Marketing manager Beta).

Recording whale sounds was done for scientific purposes but the company saw marketing value in them as a way to distinguish from the competition. In addition, the whale sounds on the website make the link between the company and research more visible.

A lot of people tell me they have heard the sounds on our website; I'm very proud of it! (Marketing manager Beta).

All three companies realize that research is valued by the tourists. Delta's management reflects on the marketing and commercial role of supporting whale-research:

I find research really important to build up in the company; people in the world are getting more knowledge, they want to know more, I think at least 80% or 90% of our visitors want to know more about the whales; they have an emotional experience when they meet the whales so I think putting emphasis on the research takes us a little bit further than others in the same area (Manager Delta).

Reflecting on tensions between guides and researchers, the management tries to ease the relations between different groups in the company. Alpha's manager recognized the importance of communicating why the researchers are on board.

There have been some problems between the researchers and crew and sometimes I think it is our fault because we are not always promoting why we are doing the research; that it is something we want to be done on board. There were 5 or 6 researchers with big cameras taking the place of the tourists, and the crew was not very happy (Manager Alpha).

Delta decreases the 'gap' between guides and researchers by only hiring biologists as guides. Communication between researchers and guides is easier because they understand each other's worldview. Also, they employ one manager to bridge science and commercial interests which helps the flow of knowledge between the different groups that inevitably improves products and processes:

.. when you know how the whales move in the environment, and you know the social structure of the whales you can predict when you have more whales or less whales, closer or further away. And even, because this research continues whole year round, it can help to develop new products or products outside the main season... (Researcher Delta).

However, not every new initiative will make it to a successful product. Nevertheless, new ideas are developed when management and researchers can openly brainstorm the possibilities, try things out and adjust them from one season to another.

Together with the manager we developed a photo-id course. I got the idea last year when I was doing it myself and thought it would be interesting to create something similar for the tourists. We have started this year but so far has not been very popular, however if this program does not work we will think about something else... (Researcher Delta).

Innovation outcomes

Certainly, interaction between guides and researchers has led to incremental process innovations in the tours, as the stories told by guides continuously get better with new knowledge about whales and their ecosystems. At Alpha, the researchers display their work on board the whale watching boats so that tourists can look at it, which enhances the educational experience for tourists. In case of Delta, the visit to the whale-museum is improved by researchers' oral and visual knowledge. Cooperation with researchers can also result in more radical process innovations. In case of Delta, cooperation with researchers led to a whole new system of finding whales using hydrophones:

...three researchers came to join us for a few trips. ...They brought a hydrophone and dropped it in the water to listen to the whales. They could tell where the whale was, we went there and the whale came up. So we developed these special hydrophones for the boat in 2000. I remember we started to listen and following and the whale came up just 50 meters away from us... Now we don't have to use a lot of oil to get close to the whales, and we can spend a longer time staying with them. So it was a kind of a revolution in 2000 with the hydrophones! (Captain/Owner Delta).

Cooperation with researchers has resulted in institutional innovations for the three companies. In case of Alpha and Beta, researchers, their data and their networks provide ammunition for the anti-whaling lobby. Being able to use this data helps the companies to build arguments against whaling and as such facilitates networking and political relations. Delta has innovated the way it attracts additional funding for research by founding a non-governmental organization to separate the commercial interests from the scientific interests. This organization also offers possibilities for product and marketing innovation for Delta:

We want to have a research centre, connected to researchers all over the world, where people can go and experience science, for example a laboratory with lectures. When we have this, we can include this in our marketing. People are very interested in eco-tourism and we want them to take active part in it (Manager Delta).

Table 2
Summary of findings.

Interaction in practice
Knowledge of researchers (whale identification), captains (locating whales) and guides (telling stories) exchanged during tours
Knowledge shared during internal staff meetings, training, workshop sessions and newsletters
Knowledge, jokes, and anecdotes shared during informal gatherings and free-time
Researchers' networks increase contacts with external stakeholders
Guides and researchers report to the management
Strategic reflexivity topics
Making research accessible for tourists
Using research insights as input to increase network and other cooperation
Employing data to fight against whaling
Making the connection between research and the company visible
Easing tensions between guides and researchers
Connecting research with product development/new income streams
Innovation outcomes
Improved quality of guiding (product innovation)
Researchers act as guides during the tours (managerial innovation)
Efficient ways to find whales (process innovation)
New experience products (product innovation)
Wild North Network (institutional innovation)
Including whale and dolphin sounds on the website (product innovation)
New souvenirs and research products (product innovation)
Improved whale museum tour (product innovation)
Organization of research within the company (managerial innovation)
Logo jackets for researchers (marketing innovation)
Political munitions for anti-whaling lobby (institutional innovation)

Related to marketing innovations, the publication of whale and dolphin sounds on Beta's website can be seen as a technique to attract new customers, and emphasizes the scientific aspect of this type of tourism. Beta also provides jackets to the scientists on board adorned with the company logo, which can also be understood as marketing innovation. Customers immediately recognize the researchers and see that the company supports them, which in turn may increase favor.

In addition to marketing innovations, researchers on board have contributed to organizational and managerial innovations. They help out on board as if they were employees by caring for customers and answering questions from both guides and tourists. In case of Delta, cooperation with researchers has contributed to product-innovations like the option to be a 'researcher for a day'. Cooperation with researchers can also result in new side products. Delta has developed items ranging from inexpensive bracelets to more exclusive membership-based products, such as adopting and naming a whale and becoming a member of the Royal International Whale Safari Club. Within these three companies, the staff, management, and researchers share knowledge while interacting during practice, and engage in strategic reflexivity, resulting in innovation outcomes. [Table 2](#) below summarizes the aggregation of actions (both in practice and in reflection) and their influence on innovation.

Conclusion

This study explores the contribution of scientists to tourism innovation and proposes a model for sharing of knowledge for innovation through co-creation. The cases of researchers working together with three whale watching firms have allowed us to illustrate examples of value-co-creation, knowledge sharing and reflexivity during tourism firms' innovation processes. Flows of knowledge are intimately linked to social capital developed in the tourism companies through intensive and frequent shared practice, and deliberate reflection is a key activity in stimulating company innovation. This has resulted in the *Innovation through Co-creation* model ([Fig. 1](#)), depicting a process in which innovations have occurred in whale-watching tour operations.

Different innovation types are resulting from knowledge-sharing through interaction in co-created practice, building social capital through these interactions, and strategically reflecting on ways to produce innovative outcomes. Actors in nature based tourism practices are the tourists, scientists, guides, crew, and managers, however, the model allows a wide variety of stakeholders to potentially be represented. The conceptual model offered in [Fig. 1](#) is applied to the context of this study, whereby tacit and explicit knowledge is shared among the tour company employees (managers, guides and crew) and scientists. The type, intensity and duration of interaction varies within Alpha Iceland, Beta Iceland, Delta Norway, however, each interaction serves to build social capital among all actors. Within [Fig. 2](#), specific examples of co-creation found within the study are offered to clarify how the conceptual model is embodied in the findings.

In their article on tourism innovation in The Gambia and Tanzania, [Carlisle et al. \(2013, p. 61\)](#) call for "integrative frameworks that understand the multiple interrelationships between disparate stakeholders." The above model serves as a framework to capture the scope, duration and type of interactions that foster the full range of innovation outcomes within a tourism business. Service and experience improvements are associated with collectively held knowledge and explicit knowledge is easier to circulate than tacit knowledge ([Leiponen, 2006](#)), however in this study we saw that collective knowledge in tourism organizations is mostly tacit and shared between stakeholders in various practices. Its circulation depends on frequent, intensive interactions and on collective learning by doing. This tacit knowledge is important for both the incremental improvements of tourism products and services and the introduction of new innovations.

This study supports the supposition of [Hall et al. \(2008\)](#) and [Weidenfeld et al. \(2010\)](#) that people outside a firm, or immediate operating environment, can bring important tacit knowledge to bear. Or as [Pikkemaat and Weiermair \(2007\)](#) argue, the pursuit of innovations can rarely be seen exclusively as an internal activity in individual enterprises. Practices in which different stakeholders are brought together can be seen as repositories of competence and knowledge, and parts of this knowledge are unique, inimitable, and crucial for the development of tourism products and services. To date, the tourism innovation literature has emphasized the relation between the tourist and the tourism

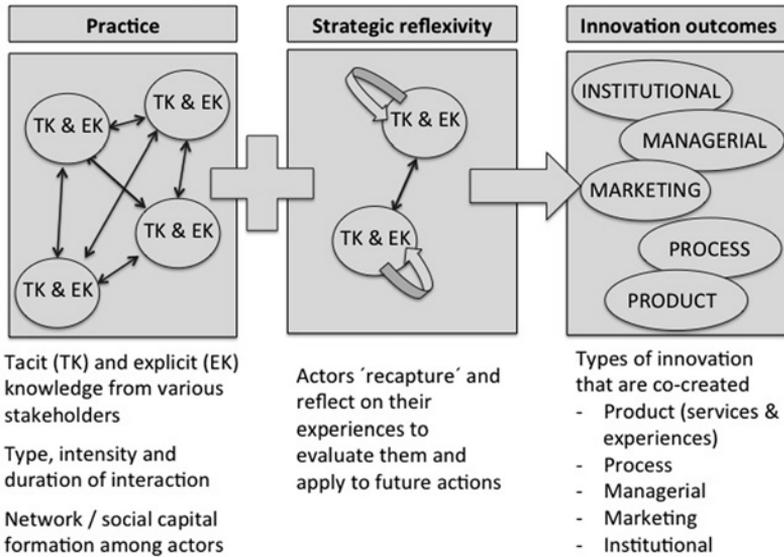


Fig. 1. Model of innovation through co-creation.

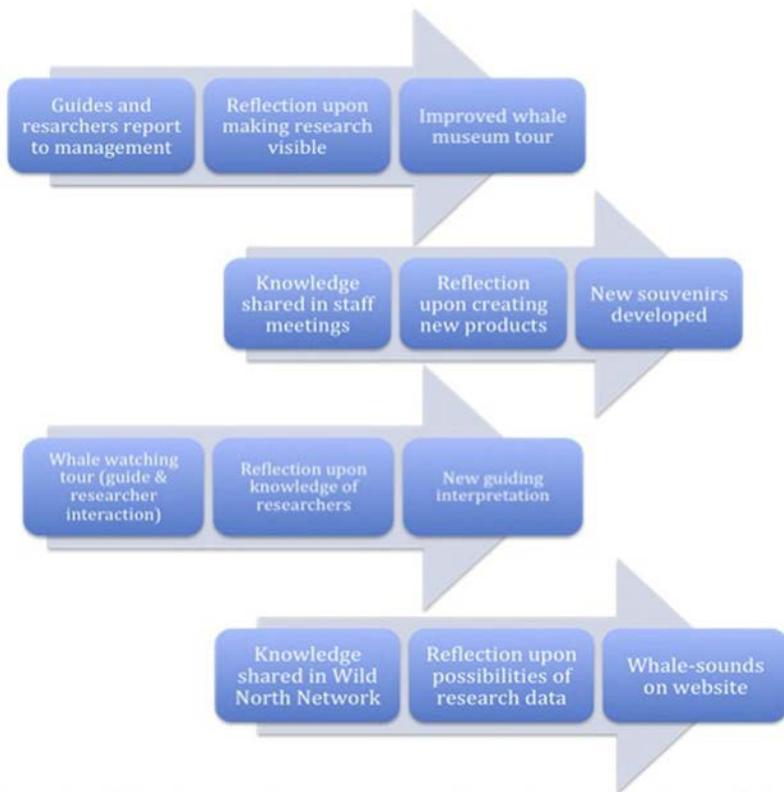


Fig. 2. Alpha, Beta, and Gamma examples of innovation through co-creation.

business. Voss and Zomerdijk (2007) have argued that innovations can be seen as resulting from ‘customer journeys’, characterized by critical touch points (practices) between the tourism organizations and the tourists. Cabiddu et al. (2013) also argue that as firms position themselves to fulfill evolving customer needs, they increasingly must move beyond an internal focus and dynamically engage complementors. Within this line of thinking, the proposed model explains innovation as a journey, a perpetual process, where critical moments of interaction and practice, interpretation and reflectivity define the direction of the journey. However, the journey can be undertaken with other stakeholders beyond customers and research and development organizations. The marine researcher in this study is the “outsider” to the tourism industry, however other “experts” with their own tacit knowledge stocks might also be considered in such a model. Cabiddu et al. (2013) found that firms combine their resources to create value by pursuing the potential synergies that exist between them. Synergy typically occurs when the resources are different but interdependent and mutually supportive (Cabiddu et al., 2013). But beyond commercial firms, cooperating actors could include other stakeholders. As long as the actor is pursuing an activity for its own sake (e.g. research in the case of the marine biologist) while interacting with members of the tourism industry, the *Innovation through Co-creation* model could apply. The interesting case here is that a community of practice has evolved around and operates within a tourism practice. We distinguished a tourism practice from a community of practice based on the fact that the tourist is an unstable actor in the community (they come and go). However, the other stakeholders have developed common knowledge, overlapping values and a shared identity while repeating the tourism practice. In this way, tourists participate as ‘visiting stakeholders’ in communities of practice, thereby refreshing knowledge and values every time they come and go.

This study has adopted and further developed a relational perspective of knowledge and strategic reflexivity. The cases of Alpha, Beta and Delta support earlier work that asserts that the long-term viability of a company is cultivated through a culture of innovation based on strategic reflexivity (Dunphy et al., 2007; Finkelstein et al., 2008; Sundbo & Fuglsang, 2002). All three companies have been in operation for over 15 years, have worked with scientists for over a decade, and continually innovate. They deliberately inject forums for reflection within their business meetings, and while there is inherent tension between parties with different perspectives, there is also great value to be gained when these parties work toward a mutual goal, thereby increasing the social capital that “bridges” their two perspectives (Novelli et al., 2006). As such the community of practice is the source and platform for both knowledge sharing and the development of new knowledge.

The interaction with researchers and strategic reflexivity upon scientific knowledge has resulted in all five types of innovation outcomes at Alpha, Beta and Delta. The main finding is that intensive interaction with researchers pays off in terms of organizational learning and development. Although the aim of this study was not to measure a direct causal relation between interaction with scientists and innovation, it does pose an interesting hypothesis about how scientific knowledge can be leveraged by tourism practitioners. Co-created practices like tours, meetings, discussions and social events brings the worlds of science and industry closer together. In this process, tourism companies are able to see business opportunities and develop new ideas based on knowledge that would not be accessible without these shared practices. The results from the study reveal insights as to *how* innovative processes, products, and other outcomes are co-created, therefore provoking the need for further inquiry into how science and industry could work together more closely in all sorts of tourism contexts.

Managerial implications

The managerial implications from this study are many. Notably, knowledge-sharing opportunities take many forms; managers should incorporate formal and informal networking situations into practice on a regular (daily, weekly, monthly) basis thereby laying the foundations for a community of practice and the development of social capital within the community. Meetings that include a reflective component where all employees contemplate the last week’s/month’s operations or on a particular tour could encourage “cooperative” strategic reflexivity and result in new ideas for the company. If done regularly, it could encourage an unconscious habit of reflexivity among employees, and becomes a community of reflexivity as well. This study also revealed that tacit knowledge that comes from outside the company (scientists, community, tourists) is also valuable. Tourism managers must

find ways to encourage knowledge sharing, transfer and capture among all parties within the system but also outside of their immediate sphere of influence. While many innovations were born out of deliberate reflection, some innovations occurred spontaneously and “in real time” on the boat. Managers should consider ways to have individuals with different roles work together at regular points during the workweek.

Limitations and future research directions

This study was conducted in three settings and cannot be generalized to other nations, nor to other nature-based activities. While this study explored the similarities between companies, certainly the differences in each stage are worth noting as well. Future research directions would include additional comparison of cases contrasting the various types of interactions in practice, modes and frequency of strategic reflexivity, and the range of innovation outcomes. While the model was tested with one type of tourism product (whale-watching tours), it was supported in both a Norwegian and an Icelandic environment, indicating that it may apply in various cultural contexts. The *Innovation through Co-creation* model must be tested in different nature-based environments, with different tourism companies, in non-profit tourism organizations, and in various other sectors of tourism, such as the cultural or culinary tourism sector. With additional inquiry into knowledge sharing with external stakeholders and strategically reflecting upon learning processes, the tourism industry can begin to harness tacit and explicit knowledge vital to innovation.

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