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T1.2.1. REVIEW OF SCIENTIFIC TOURISM CONCEPTS AND PRODUCTS



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Review of scientific tourism and similar concepts

From an historical perspective, science tourism finds its roots in the Grand Tour, which is often seen as the beginning of cultural and educational tourism, although undertaken by aristocratic youth and elites from Britain, in the 17th-19th centuries (French, Craig-Smith and Collier, 2000). During the Grand Tour, participants were taught foreign languages, fencing, riding, dancing, and foreign affairs. Activities also included visiting universities and other aristocrats, often accompanied by tutors and servants (Ritchie et al., 2003). Nevertheless, in today's tourism practices and literature, several concepts have been used to term this educational purpose and/or learning experience in tourism, leisure and travels, and consequently, they all overlap each other, resulting in a nebulous idea of what might be science tourism. In addition, the extent and spectrum of travel experiences that fall within these various terms are still being debated (Lam, Ariffin & Ahmad, 2011; Pitman et al., 2010).

Educational tourism

A term widely used in the academic literature is educational tourism. Based on the several references, educational tourism grounded in tourists' motivations. According to Ritchie et al. (2003, p. 18), educational tourism refers to:

“Tourist activity undertaken by those who are undertaking an overnight vacation and those who are undertaking an excursion for whom education and learning is a primary or secondary part of their trip. This can include general educational tourism and adult study tours, international and domestic university and school students' travel, including language schools, school excursions and exchange programs. Educational tourism can be independently or formally organized and can be undertaken in a variety of natural or human made settings.”

This definition raises two key elements. First, educational can be undertaken either by tourists or by excursionists. By extension, this means that educational tourism products can last from a few hours long (allowing excursionists to take part in it and go back home in the same day) to several days long. Second, education as a goal

for taking part in the activity can be primary or secondary. In line with this, Ritchie et al. (2003) differentiate 'tourism first' and 'education first'. The authors termed the former as 'edu-tourism', whereas the latter is referred to as 'university/college students' and schools' tourism'. Edu-tourism is defined as "general travel for education and adult or seniors' educational tourism, where some form of education or learning is an important (and often motivating) part of the tourist experience (Ritchie et al., 2003, p. 12). However, in university/college students' and schools' tourism, "tourist experiences may be secondary to the educational aspect or intentions and may be considered 'education first' educational tourism experiences or products" (Ritchie et al., 2003, p. 12). As a result, according to Ritchie et al. (2003), educational tourism includes a range of activities as wide as a 30 minutes tour in a museum to a several years stay in a foreign university; from a general interest learning while traveling to a purposeful learning and travel (Canadian Tourism Commission, 2001).

This goes against Bodger's (1998) definition of educational tourism. Indeed, he defined the concept as follows (Bodger, 1998, p. 2):

"A program in which participants travel to a location as a group with the primary purpose of engaging in a learning experience directly related to the location".

In other words, his definition excludes Ritchie et al.'s idea (2003) of 'tourism first', where traveling might be the prime motivation, as well as the idea that educational tourism could be undertaken individually. However, both Bodger (1998) and Ritchie et al. (2003) agree upon the idea that the educational tourism product should be formed by the combination of a variety of actors. Bodger (1998) called them 'programmers', 'leaders' and 'participants'. Whereas Ritchie et al. (2003) categorized them as 'attractions and events', 'resource specialists', 'affinity travel planners' and 'tour and receptive operators'.

The first category refers to the experts, those who hold the knowledge and share it with the participants. They are what Ritchie et al. (2003) called 'resource specialists' and what Bodger (1998) termed 'the leaders'. In other words, they are responsible

for delivering the learning and should have the ability to communicate the knowledge with enthusiasm. They might be employees, curators, interpreters, lecturers, storytellers, researchers, academics, etc.). The second category is the tour and receptive operators, using Ritchie et al. words (2003). They refer to the programmers in Bodger's work (1998). Their role consists in developing the program, in collaboration with the leaders. They package experiences for customers and provide destination expertise, local knowledge or marketing services. The third category, only mentioned by Ritchie et al. (2003) is the attractions and events, which provide the venue for learning experiences. They might be national parks, historic sites, zoos, planetariums, wildlife sanctuaries, archeological dig sites, etc. The fourth category refers to the participants, which are of course the visitors, tourists, customers who will take part in travel or activity. What unites all participants together is their common interests in the subject of the scientific tourism product and the location.

The term educational tourism brings other divergences within the scholar community. Indeed, for example, in their paper on adult learning in educational tourism, Pitman et al. (2010, p. 220), considered educational tourism as "organized recreational tours (usually commercial), aimed at the general public (as distinct from, for example, for-credit study tours for students) which promote an intentional and structured learning experience as a key component". The authors view the learning component as explicit and core to the delivery of the product. They also emphasize on the recreational aspect, which reflect with Ritchie et al.'s (2003) 'tourism first' idea. On the contrary, many researchers conducted studies regarding educational tourism, with a strong focus on the 'education first' perspective, using teaching, university and school-related semantics, overlooking the recreational aspect. For example, Quezada (2004) looked at educational tourism as overseas learning programs and international student teaching in the context of education programs and for future teachers. Abubakar, Shneikat and Oday (2014) looked at how to better understand the motives of students seeking education in North Cyprus. With their study, Bhuiyan et al. (2010) ensured that school children become familiar with forest conservation issues and can learn information about nature and needs for biodiversity actions through educational tourism. It is worth noted, that this study is one of the very few that do not limit educational tourism to adult learning. Lastly, Lam, Ariffin & Ahmad

(2011) investigated the motives that encourage students to conduct their study in a Malaysian university.

All in all, in educational tourism, a distinct division can be observed: on the one hand, activities undertaken by those whose first motivation is learning ('education first'), and on the other hand, activities undertaken by those whose first motivation is tourism and/or recreation ('tourism first'). In the former, educational tourism practices range, for example, from several months abroad for studying a degree or PhD summer schools to several days tours entirely dedicated to birdwatching like in the detailed example below, or shorter products as long as the prime motivation is learning. The latter, however, might refer to all sorts of activities wherein one would learn about something during a longer holiday period.

Scientific tourism and science tourism

According to previous literature, the link between science and tourism experiences is twofold and can be referred to as both scientific tourism and science tourism (Räikkönen et al., 2019). There is still no consensus since, for example, authors do not put the same definition behind scientific tourism or some others might not differentiate science tourism from scientific tourism.

As raised by Räikkönen et al. (2019) and Slocum, Kline and Holden (2015), scientific tourism finds its roots in scientific explorations and discoveries of the 19th century, and now refers to travels for scientific enquiry – researchers going on the field, conferences, seminars, etc. Nevertheless, according to some other authors like Mao and Bournalon (2011) scientific tourism encompasses a much broader range of tourism activities and contexts. According to them, scientific tourism is divided into 4 subdivisions, namely adventure tourism with a scientific dimension; cultural tourism with scientific contents; something they refer to as scientific "eco-volunteering"; and scientific research tourism. However, in their view, scientific tourism is often strictly regarded as people – tourists or researchers – doing research, gathering data, rather than tourists undertaking activities and tours in order to learn about a given topic. In addition, they mostly refer to several-days-long form of trips and do not acknowledge

that scientific tourism can also be performed through other (shorter) forms of activities, products and attractions.

The first form, adventure tourism with a scientific dimension, refers to the combination of exploring, adventurous and sport tourism products with the scientific research dimension. In order to illustrate their argument, they use the many examples of organizations like the French Explorers Society, the British Alpine Club, the International Union of Speleology, the British Nautical Archeology Society, the French Geography Society or the Royal Geographical Society. As a result, scientific research can have a variable importance in the motivation in taking part in the trip, from a simple alibi to being the main reason to travel somewhere. In the case of the main reason to travel somewhere, this differs from Ritchie et al.'s (2003) 'education first', where the learning experience is also a prime motivation. Indeed, in Mao and Bourlon's (2011) view, motivations behind adventure tourism with a scientific dimension is more about doing research, rather than being educational. This form of scientific tourism has deep roots in history since it founds its origins in the many explorations aiming to discover new lands, sail new seas, locate resources or scientific phenomena like magnetic poles, open new trading routes. Also, in this first form of scientific tourism, scientific research is not only conducted by academics, but also by the various participants taking part in these specific trips.

The second form, cultural tourism with scientific contents, is the only form analyzed by the authors where there is knowledge to be shared with the participants. Although Mao and Bourlon (2011) used the term "cultural", they also included tourism in natural environments. According to them, the scientific knowledge is shared through a specific framework they called "scientific mediation", whether in practice it might be displays, scientific interpretations and demonstrations, etc. In addition, the authors acknowledge that other terms have been used to refer to this specific form of tourism such as 'scientific-learning tourism' or *turismo pedagógico* (educational tourism) (Hora and Cavalcanti, 2003), which again, shows how terms can overlap according to authors' definitions. This specific form of tourism includes industrial tourism (visits of mines, meteorological observatories, power plants, industrial heritage sites and associated museums); space exploration tourist sites such as planetariums, the Space City nearby Toulouse, France or the Kennedy Space Center in Cape

Canaveral, Florida; all sorts of museums and exhibitions, including zoos, memorial sites; etc. In addition, Mao and Bourlon argued that this cultural form of tourism also includes natural spaces and their ecosystems, typically national parks, as well as sites with archeological, historical or ethnological values and interests. As such, scientific tourism tends toward ecotourism. This is supported by Mieczkowski (1995), Rovinsky (1991) and Breton (2004), who all highlighted the essential role of science in ecotourism, since it *de facto* respects ecological constraints and is compatible with requirements regarding the protection of natural environments. Indeed, ecotourism instills knowledge and environmental ethics to participants. Mao and Bourlon (2011) illustrated their argument with the example of the Escursia travel agency (website only available in French in the reference list), which offers trips from a couple of days to about 10 days, based on different themes (naturalist trips, safaris, nature photography, family trips, cetaceans, ornithology, wildlife, biodiversity, northern lights, geology and volcanoes) (see Box 1). Escursia developed a partnership with the French National Centre for Scientific Research, so scientists join these various trips and act as guides, sharing knowledge.

The third form of Mao and Bourlon's (2011) vision of scientific tourism refers to scientific eco-volunteering. It depicts tourists volunteering in doing scientific research. These volunteers are managed by scientists and they become actors of scientific research, while taking part in methodology protocol or in the gathering of data. This refers to what is commonly named citizen science (Bonney et al., 2009). According to Bonney et al. (2009, p. 977), "citizen science enlists the public in collecting large quantities of data across an array of habitats and locations over long spans of time". In addition, it is argued that by doing citizen science, participants can learn both about the phenomena they are working on and the practical processes in which scientific investigations are conducted. Ellis (2003) also named this trend "participatory environmental tourism". Citizen science become even more relevant areas that are expensive to go to and difficult to reach, like in some regions of the Arctic.

The fourth and last form of scientific tourism discussed by Mao and Bourlon (2011) is scientific research tourism and simply refers to researchers, scholars or academics traveling for fieldwork, seminars or conferences. This tends towards business

tourism since these travels are part of the job of being a researcher, scholar or academic. This was also called “research tourism” by some authors like Benson (2005) or Novelli (2005). Only this fourth form of scientific tourism refers to Räikkönen et al. (2019) and Slocum, Kline and Holden’s (2015) definition.

Contrary to Mao and Bourlon (2011), Räikkönen et al. (2019) clearly differentiate researchers going on the field and people taking parts in these other forms of learning experiences by using the term ‘science tourism’. In science tourism, “science and scientific knowledge are understood as resources for tourism experiences and product development” (Räikkönen et al., 2019, p. 72). In that case, knowledge is either passively shared with participants or actively produced together with them. Therefore, here, contrary to educational tourism (which was based on motivation), the chosen scope is the relation towards knowledge: either knowledge is shared (to tourists) or created, under the form of citizen science for example. Box 2 illustrates this dual relation in regard to knowledge in the context of polar cruise tourism. It is worth noting that in Räikkönen et al.’s (2019) view, the sharing of knowledge through science tourism only applies to tourists and does not include students going abroad for several months for getting a degree or some experience.

Special interest tourism and serious leisure

Special interest tourism was defined by the World Tourism Organization (1985, p. 3) as “specialized tourism involving group or individual tours by people who wish to develop certain interests and visit sites and places connected with a specific subject”. Read (1980, p. 195) goes further and defines it as follows:

“Travel for people who are going somewhere because they have a particular interest that can be pursued in a particular region or at a particular destination. It is a hub around which total travel experience is planned”.

This approach is similar to motivation-based educational tourism mentioned earlier since it’s the particular interest (the hub) that determine the travelling logistic (the total travel experience). Other authors have written their own definition for special interest tourism, also based on the motivation perspective. For example, Hall and

Weiler (1992, p. 5) proposed that special interest tourism occurs when the “traveler’s motivation and decision-making are primarily determined by a particular special interest with a focus either on activity/ies and/or destinations and settings”. Following that idea, Swarbrooke and Horner (1999, p. 38) expanded this definition by pointing out two perspectives of special interest tourism. The authors suggested that participants taking part in special interest tourism are motivated by a desire to “either indulge in an existing interest or develop a new interest in a novel or familiar location”. Another definition of special interest tourism has been brought by Douglas, Douglas and Derrett (2001). They defined it as “the provision of customized leisure and recreational experiences driven by the specific expressed interest of individuals and group” (Douglas, Douglas and Derrett, 2001, p. 4).

In addition, Read (1980), argued that special interest tourism should follow the REAL notion that he developed himself:

- Rewarding
- Enriching
- Adventuresome
- Learning experience

Throughout these various references, it is generally argued that special interest tourism is the opposite of mass tourism, since it has the potential to adapt at the level of individuals and to meet the needs of both tourists and hosts (Trauer, 2006). As such, special interest tourism also has been analyzed as a tool for delivering sustainable tourism (Douglas, Douglas and Derrett, 2001).

Nevertheless, ‘special interest’ remains relatively vague. Indeed, it seems to encompass interests in learning a particular topic or skill, but also interests in taking part in an activity without necessarily having a learning experience (Trauer, 2006). In the latter case, that could include for example going somewhere to attend a football game (sport tourism), going to spa and health resorts (health tourism), to go to some festivals, concerts or events, or tourism of vice (sex tourism, casinos, purchasing

cheap products across a border, etc.). In other words, special interest tourism partly fits with the vision of our project.

In spite of these considerations, Ritchie et al. (2003, p. 28) argued that “special interest tourism is also known as serious leisure, or leisure where participants are able to find personal fulfillment, enhance their identity, and express themselves, as opposed to casual or un-serious leisure”. Serious leisure was developed by Stebbins in 1982. According to him, more and more people are and will be enrolled in meaningless jobs that are not fulfilling and do not provide any form of interests. These jobs were later on termed “bullshit jobs” by the anthropologist David Graeber as jobs that do not require any training, learning nor specific skills. As a result, people are and will be seeking this skill and learning fulfilment in leisure activities, where leisure offers opportunities for the development of personal expression, self-identity enhancement and self-fulfillment. This is what is defined as serious leisure by Stebbins. If Stebbins, here, did not refer to tourism activities and products per se, an interesting parallel can be drawn between his vision of serious leisure and learning experiences in tourism. According to Stebbins, serious leisure can be divided in three types: amateurism, hobbyist pursuits, and career volunteering, with amateurism being the “softer” version of serious leisure and career volunteering representing a strong commitment toward a serious leisure experience. This resonates, for example with the purist scale, often used in tourism, for assessing tourists’ visions of nature and wilderness for example (see Sæpórsdóttir, 2010). Similarly, to Stebbins (1982) and the purist scale, a specific scale, applied to learning experiences, from soft-learning to hardcore-learning products, activities and practices could be beneficial at the conceptual level in order to better categorize and in fine, to better distinguish the types of products we put within our vision of science tourism.

A review of scientific tourism products

Below are a few examples of available scientific tourism products. They include various types of tourism products from Polar cruises and wildlife safaris to World Wars memorials, and from a few hours to several days long experiences. Such types

of tourism products are endless. Therefore, this short list of examples aims to illustrate the various possibilities rather than being exhaustive.

In Polar cruises:

On polar cruises, there are usually 4 different ways in which passengers can acquire knowledge. Firstly, there are up to 6 formal 45 minutes long lectures. Secondly, there might be more informal chats, called “recaps”. These are a few minutes long and can take place right before an on-shore excursion. Thirdly, there are the various talks passengers can have with the specialists, at dinner, at the bar, where one would like to discuss a specific topic. These would be individual talks taking place when lecturers would be available. Fourthly, there are guiding tours during on-shore excursions.

On polar cruises, and particularly on Arctic cruises, up to 10 specialists can join onboard in order to share knowledge with passengers. Typically, on a single cruise there will be an historian, an archeologist, an Inuit guide, a glaciologist, an ornithologist, a specialist on marine mammals, a naturalist, a photography coach and sometimes an artist that will teach drawing or painting skills. Nowadays, those specialists recruited for these cruises also need to have field and excursion skills (piloting a zodiac, guiding on a glacier). Therefore, in a polar cruise, the educational dimension can be understood as a prism, with the different facets referring to the various forms and possibilities of learning. It involves different topics, it can be collective learning (lectures) and more personalized learning experience drawn by one's curiosity to engage deeper in discussions with experts.

In polar tourism literature, a particular phenomenon has been analyzed, that is ambassadorship. It is claimed that passengers will become ambassadors for environment conservation and protection when they go back home after their polar journey. Although some have criticized this ambassadorship trend, by raising ethical issues like can we be sure that this is not voyeurism (spotting the last glacier or the last emaciated polar bear). Nevertheless, this widely discussed ambassadorship phenomenon can be analyzed as the direct result of what passengers have learnt

during their journey. Indeed, the knowledge they gained from experts might then be shared with their relatives, on social media, etc.

In addition, polar cruise tourism can meet with science in two other ways. Both deal with direct activities in doing science. It refers to when those who are recruited for giving lectures are researchers that will take the opportunity to get onboard to gather data for their own research, as well as to when passengers are collecting data themselves as in a citizen science fashion. In the latter, it often involves partnerships with scientific organization.

Nevertheless, seaborne tourism in Polar regions is not only about 50 to 500 passengers cruises, but it also includes private pleasure crafts. These includes privately owned sailboats, where the owner takes up to 10 tourists or offer his skills, experience and a bed onboard to scientists that need to gather data in remote locations. Therefore, in this specific setting, there are two ways tourism and science meet. First, similarly to the commercial cruise industry, tourists can learn about navigating techniques in ice-infested waters or in regions with unknown bathymetry, but also about local cultures, history and wildlife. Second, when sailboat owners are planning their journey, they might offer the opportunity to a researcher to join them onboard. A popular example of this type of collaboration is the “Under the Pole” expedition (<https://www.underthepole.com/>). In this expedition, professional sailors and divers are collaborating with scientists by offering their diving skills to gather samples – typically of algae – that can be found on the ocean floor, below the Arctic sea ice. This very last example tend towards citizen science.

Ornithological tours in Costa Rica:

Escursia offers “naturalist tours”, where tourists can experience natural wonders and wildlife in small groups and with a guide. Although in French, the website clearly promotes learning experiences. They have different types of knowledge shared, so that they are tours suitable for beginners in a given topic related to biodiversity, those that are experienced and those that are already highly qualified. However, they add that it is not really important to have some knowledge before leaving, curiosity is enough according to them.

<https://www.escursia.fr/> (only available in French).

This tour across Costa Rica takes tourists through several national parks and reserves of the country. It is limited to 12 participants per tour and lasts for 12 days. The tour mostly focuses on bird watching, although encounters with other local wildlife (sloths, monkeys, etc.) are also expected. It is also worth noting that the tour also offers very limited amount of free time for participants.

Because this tour is mostly focusing on bird watching, it does not offer as much as variety in terms of sights and learning themes. Therefore, this tour follows a constant pattern: only visiting national parks or nature reserves and using lodges located nearby as accommodation. In these various national parks and reserves, activities such as 'observation of fauna and flora' or 'interpretative hikes'. Other activities include boat tours with stops for bird watching, 'pedestrian explorations' and photography sessions. The tour takes tourists to the Selva Verde lodge, a place dedicated to educating travelers in regard to the 'beauty, complexity and vulnerability of Costa Rican rainforests'.

Learning history at WWI and WWII memorials:

The first goal of these sites is for remembrance and for people to do pilgrimages and mourn the loss of family members, although it has also attracted tourists. In Normandy, these sites have become significant sources of incomes for local economies. However, as time passes, there will be less and less people with direct connections with those buried in those war cemeteries. Therefore, these sites had to re-invent themselves, in order to maintain their attractiveness. In line with this, the Normandy American Cemetery and Memorial developed side activities, besides visiting the various memorial landmarks and tombstones.

As a result, they incorporated a learning experience to the visit. The knowledge shared refers to the timeline of the D-Day, to the actors who took part in this event, to military strategies. All this information is shared in various ways or through various visual supports. There are explanatory maps of landings, of air and military operations. On the beach, is an orientation table, explaining the various operations

on the site. In 2007, opened a visitor center, wherein historical knowledge was combined with a remembrance insight. For example, a permanent exhibition was created, showing soldiers' belongings, artilleries, etc. and at the same time, a soundtrack was listing the names of those who perished in the D-Day operations. Still in that same visitor center, archival footages are also screened, participating in the shared knowledge, and some VR devices have been installed so visitors can have more immersive learning experiences. The memorial also has been using (for a longer time) more traditional ways of sharing knowledge like guiding tours and brochures, both in several languages. However, the traditional guiding tour recently evolved by proposing an alternative guiding option: one can download an app on his/her smartphone and can digitally learn about the D-Day and the site through archival footages.

Although the Normandy American Cemetery and Memorial does not promote itself as a site where one can learn about the historical events of the D-Day, the learning experience is jointly offered to visitors with remembrance purposes.

"The visitor center is designed to complement and enhance the experience of visiting the cemetery. By relating the global significance and meaning of Operation Overlord, the center pays tribute to the values and sacrifices of the World War II generation".

<https://www.abmc.gov/news-events/news/new-normandy-american-cemetery-visitor-center-opens>

Northern lights safari in Finnish Lapland:

Some companies offer opportunities to learn about northern lights and photography prior to the safari. In Rovaniemi, for example, the small company Beyond Arctic (<https://beyondarctic.com/>) offers 1h workshops in their facilities. According to their website, they will provide information about the northern lights as a natural phenomenon; they will teach how to properly photograph them; and provide tips about the where, when and how to find them. The workshop is divided into two parts. First, a 45 minutes lecture-like session with a "professional northern lights hunter" and a photographer, and second, a 15 minutes session for personal instructions with camera settings.

In terms of knowledge, Beyond Arctic promises that one will learn on:

- Northern lights, and particularly:
 - What are northern lights and how do they form.
 - The science behind them.
 - What are the ideal places to spot them.
 - Best tips for aurora hunting.
 - As well as forecast for the next 2 days.
- Photography:
 - Cameras and useful equipment.
 - What settings to use and how to set the camera.
 - How to adjust focus in the dark.
 - How properly use your camera in Arctic weather conditions.