Feasibility study for cross-border digital science trails project

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Project leader Finland
Hannu Autto, University of Helsinki

Project leader Norway
Elina Hutton, SALT Lofoten

Authors
Hutton, Elina (SALT Lofoten) & Autto, Hannu (University of Helsinki)

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Elina Hutton

Summary
The first part of the report introduces a background of nature-based tourism in the cross-border project region: Enontekiö in Finland and North Troms and Mid-Troms region in Norway and the concept of science tourism. The second part introduces the potential and feasibility of a cross-border digital guide application based on scientific and other research-based knowledge.

Salt Lofoten AS post@salt.nu salt.nu
University of Helsinki, Kilpisjärvi Biological Station bio-kilpis@helsinki.fi www.helsinki.fi

CONTENT

SUMMARY

We investigated three global trends concerning tourism development in Northern Scandinavia: increasing interest towards nature, digitalisation of tourism experiences, and visitor monitoring and management. The feasibility study showed that while nature is the most important reason to visit the region, there is a need to provide better information about the local nature. Localised over-tourism and similar tourism-related problems also call for more information about local life and cultures. Visitor management in the region requires more accurate visitor information and new tools for monitoring and managing visitations.

As one possible solution to these needs, we studied the feasibility of a digital mobile application for knowledge-based content dissemination and visitor monitoring and management in the region. Tourism management organisations and municipalities considered the opportunity to develop such tools together as an attractive way to reach new visitors, prolong their stay, and reach out for visitor information. Digitalisation of tourism services is also one of the key development areas in the Norwegian national tourism strategy. Commercial tourism operators, destination marketing organisations and companies focus on products that bring them direct income.

Based on the online survey we conducted for potential visitors to the region, there is interest in using digital tools to learn more about the destination. Map-based information and information about local nature, culture, and services were interesting.

This feasibility study was carried out under the Interreg Aurora project "From Labs to Landmarks" 1.7.2023-30.1.2024 in partnership between SALT Lofoten AS and Kilpisjärvi Biological Research Station at the University of Helsinki.

SAMMENDRAG

Vi undersøkte globale trender innen reiselivsutvikling i Nord-Skandinavia: økende interesse for natur, digitalisering av reiselivsopplevelser og besøksovervåking og -forvaltning. Mulighetsstudien viste at mens naturen er den viktigste grunnen til å besøke regionen, er det behov for å gi bedre informasjon om den lokale naturen. Lokalisert overturisme og lignende reiselivsrelaterte problemer krever også mer informasjon om lokalt liv og kultur. Besøksforvaltning i regionen krever mer nøyaktig besøksinformasjon og nye verktøy for å overvåke og forvalte besøk.

Som en mulig løsning på disse behovene studerte vi muligheten for en digital mobilapplikasjon for kunnskapsbasert innholdsformidling og besøksovervåking og -administrasjon i regionen. Reiselivsorganisasjoner og kommuner vurderte muligheten til å utvikle slike verktøy sammen som en attraktiv måte å nå nye besøkende, forlenge oppholdet og nå ut for besøksinformasjon. Digitaliseringen er en av de tre premisser for utvikling på Norsk Nasjonal Reiselivstrategi 2030. Kommersielle reiselivsoperatører, destinasjonsmarkedsføringsorganisasjoner og selskaper prioriterer på utvikling av produkter som gir dem direkte inntekter.
Basert på nettundersøkelsen vi gjennomførte for mulige besøkende til regionen, er det interesse for å bruke digitale verktøy for å lære mer om reisemålet. Kartbasert informasjon og informasjon om lokal natur, kultur og tjenester var interessant.

Dette mulighetsstudiet ble utført under Interreg Aurora prosjektet «From Labs to Landmarks» 1.7.2023-30.1.2024 i partnerskap mellom SALT Lofoten AS og Kilpisjärvi Biologiske Forskningsstasjon ved Univeristetet i Helsinki.

YHTEENVETO

Tässä hankkeessa tarkastelimme kolmea Pohjois-Skandinavian matkailun kehittämisen globaalia trendiä: kiinnostuksen lisääntymistä luontoa kohtaan, matkailuelämysten digitalisoitumista sekä kävijäseurantaa ja -hallintaa. Toteutettavuustutkimus osoitti, että koska luonto on tärkein syy vierailla alueella, on siitä myös tarpeen tarjota enemmän tietoa vierailijoille. Paikoittainen matkailun ruuhakautuminen ja vastaavat matkailuun liittyvät ongelmat vaativat myös lisää tietoa paikallisesta elämästä ja kulttuureista. Kävijähallinta alueella edellyttää tarkempaa kävijätietoa ja uusia työkaluja kävijäseurantaan ja -hallintaan.

Yhtenä mahdollisena ratkaisuna näihin tarpeisiin pohdimme digitaalisen mobiilisovelluksen toteutettavuutta tietopohjaiseen sisällön levitykseen sekä kävijäseurantaan ja -hallintaan alueella. Matkailuorganisaatiot ja kunnat pitivät mahdollisuutta kehittää tällaisia työkaluja yhdessä houkuttelevana tapana tavoittaa uusia vierailijoita, pidentää oleskelua ja kerätä kävijätietoa. Kaupalliset matkailualan toimijat, kohdemarkkinointiorganisaatiot ja yritykset keskittyvät tuotekehityksessä tuotteisiin, jotka tuovat heille suoraa tuloa.

Alueen potentiaalisille kävijöille tekemämme verkkokyselyn perusteella matkailijoilla on kiinnostusta hyödyntää digitaalisia työkaluja ja saada lisää tietoa kohteesta. Karttapohjainen tieto ja tieto paikallisesta luonnosta, kulttuurista ja palveluista olivat etusijalla.

Tämä toteutettavuustutkimus tehtiin Interreg Aurora -projektissa "From Labs to Landmarks" 1.7.2023-30.1.2024 yhteistyössä SALT Lofoten AS:n ja Helsingin yliopiston Kilpisjärven biologisen tutkimusaseman kanssa.

THREE COUNTRIES REGION

Figure 1. Map of the region where the feasibility study was completed.

Cross border nature

The region covers diverse landscapes and various nature types from high peaks and glaciers to open tundra-like fells, grasslands, and forests by the Norwegian coast. Geography in the region is full of signs of the past glacial eras, and some of the largest and easily accessible glaciers of Northern Norway are found in the region. The region's geological history is in many places accessible and visible for the visitors who know how to look for the signs.

The sub-arctic or oro-arctic climate combined with the limestone-rich bedrock allows the relatively small geographical area to be home to hundreds of arctic vascular plants, many of which are endemic, redlisted, or rare. Similarly interesting is the fauna of the region, from domesticated reindeer to large predators such as bears, lynxes, sea eagles, or wolverines can be encountered in the region. Thanks to conservation efforts, the arctic fox is recently increasing in numbers. In addition, several

butterflies and insects, which are unique and many near extinction, are of high interest to the scientific community. In addition to impacting the local climate, the Norwegian coast offers a rich sea nature to admire and enjoy. Fishers enjoy a variety of catches, while seals, otters, porpoises, and even larger whales such as orcas and killer whales frequent the coast. Countless sea birds nest in the area, and Arctic migratory birds are observed when they stop to rest and feed before continuing their long journeys.

There are several protected areas in the region: in Finland Malla Strict Nature Reserve, Saana Nature Reserve, Käsivarsi Wilderness Area, Annjaloni Strict Nature Reserve, Valtijoki Strict Nature Reserve, Tarvantovaara Wilderness Area, Pallas-Yllästunturi National Park, and Pöyrisjärvi Wilderness Area. In Norway: Reisa National Park, Kvænangsbotn Landscape protection area, Navitdaled Landscape protection area, påkenesøra naturreservat, Lyngsalpan Landscape protection area, and Nord-Kvaløya-Rebbenesøya Landscape protection area, Rohkunborri National Park and Øvre Dividalen National Park. In addition, there are several Natura2000 areas in the region.

Cross border community

Cross border cooperation is an integral part of the daily life in the project region. Municipalities, companies, and organisations run several joint programmes and projects ranging from a common library bus to cooperation of tourism development.

Before the border closure during the Covid-19 pandemic in 2020, the people who live in the cross-border region were used to daily commute and regular shopping trips across the state border. The pandemic made the borders visible, but also the cross-border community´s importance became obvious. Work, families, friends and holiday homes can reside cross the border today, but also traditions like outdoor life such as fishing, hiking, and snowmobiling are common. In addition, the region is Sami homeland and language, reindeer herding, and other traditions are shared in the three countries.

Cross border tourism and outdoor recreation

Tourism in the region has crossed borders since World War II when the road to Kilpisjärvi was built and car tourism spread to the North. Scandinavian and international tourists enjoy road trips, especially in summer, doing day hikes, and often camping in the wild. While summer tourism consists mainly of independent travellers, there are more organized and package tours in winter.

Day trips for shopping, sports, outdoor recreation, and sightseeing are commonly done across the borders by tourists and locals alike. Several cross-border tourism projects have been run in the region, which have facilitated developing products like Rovaniemi – Tromsø bus route that was opened in 2019 and direct flight between the two cities since autumn 2023[1].

[1] Visit Arctic Europe-project. www.visitarcticeurope.com

Fishing, hunting, berry and mushroom picking, and snowmobiling are popular activities and, for many locals, the reason to live in the region. Hiking, skiing, randonnée, ski expeditions and paddling are popular activities for both locals and visitors. Many routes cross state borders, the most well-known of these routes being the 800 km North Callotte Trail, which crosses all three countries in the project region.

Cross border research

There are three research stations in the region by two Universities and a state-run research institute, as well as several space data measurement stations. Research in Helsinki University Kilpisjärvi Biological Station (Finland) focuses on environmental and climate studies and has permanent staff and year-round international research; UiT Skibotn station (Norway) is mainly used by the university´s reseachers and courses as a basecamp; and Abisko Scientific Research Station (Sweden) is run by the Swedish Polar Research Secretariat with a wide focus on local life "from microbes to tourists" at they well summarize it.

KAIRA (Kilpisjärvi Atmospheric Imaging Receiver Array) is a project run by Sodankylä Geophysical Observatory (Oulu University) to study, among others, 3D imaging of the northern lights. The Kaira antennas are in Kilpisjärvi. In addition to Kaira, there are several international space weather and space data research projects in the area. The region will also soon host a state-of-the-art 3D EISCAT radar system by international Eiscat Scientific Association.

These infrastructures together guarantee the presence of the leading scientific organizations in the area. Research stations attract researchers and research projects to the area, which leads to a positive feedback loop. Decades of active research have created local data hubs that strengthen future projects and expertise in the area. This also helps in science communication and enables good conditions to make the scientific knowledge accessible to locals and travellers. The area hosts, for example, the second oldest data set on rodents in the world (dating back to 1940s) and the longest known data set on bill berries. It is also hard to put an exact measure on the importance of academic jobs created by this infrastructure to rather remote areas where job openings (historically speaking) have been for relatively low educated work force.

There are now lots of expertise in and about the area that interests not only the scientific community but can also be used in developing the area and meeting the challenges of tomorrow, such as creating economic activities, tackling climate change and mitigating its impacts, and addressing global loss of nature. The research in the region has helped, e.g. to spot some global trends that are affecting the globe. The region is likely to attract more academic interest in coming years especially in natural sciences. Partly this happens, because the climate is changing in the Arctic several times faster than the global average. The arctic will be used as a benchmark to assess future global trends. In addition,

growing geopolitical tension between the West and Russia has eliminated Russia as a potential partner and host for many research projects. More studies will be conducted in Scandinavia in the future.

At the same time the bulk of academic work is about the research itself. Conditions and resources for local community engagement must be created separately as career incentives of researchers are heavily tilted towards producing high-quality science. To summarize: Research traditions in the region are strong and they are likely to strengthen in the future. Creating more cross-border cooperation between research institutions would benefit both the region and its research institutions.

Connection to other projects

Several cross-border tourism and environmental projects are currenty run in the region, for example:

- Adaptation to climate change and communication in Nordic protected areas and visitor centres (Metsähallitus & Reisa National Park)
- Háldi Cross-Boundary protected area (Project is finished, but the co-operation structure is permanent) https://www.nationalparks.fi/halditransboundaryarea
- Kilpisjärvi Science Trails https://www.helsinki.fi/en/research-stations/science-trails/locations/kilpisjarvi-science-trails (finished, but works as benchmarking project)
- Auroral Horizon – project studies digitalization with tourism development https://www.auroral.eu/#/halogaland-tourism (Narvik, Smart Innovation Norway)
- Visit Arctic Europe www.visitarcticeurope.com https://www.interregaurora.eu/approved-projects/arctic-europe-tourism-cluster/ (Parts I and II finished, part III ongoing)
- Wonderskeekers www.wonderseekers.com https://scitour.interreg-npa.eu/ Science tourism development project, Arctic Center (University of Lapland) (Project finished, the Wonderseekers site remains active)

SCIENCE TOURISM

Definition of science tourism

Science, travel, and tourism combined is not a new trend, the first travellers were often scientists and explorers. However, contemporary tourism industry has only recently started to discover the potential value of science tourism.

Science Tourism (ST) as a concept can mean both a marketing segment and a form of sustainable or regenerative tourism. While there is no consensus about the definition of ST, the field can be divided to four segments depending on how important is the role of science in the tourism product and how strong is the participation in actual scientific work: exploration and adventure tourism with elements of science, cultural tourism based on scientific knowled, scientific research tourism, and scientific eco-volunteering[2]. Typical products can be, for example, cultural tours with educational elements, ecotourism with citizen science activities, study tours, eco-voluntary activities, sports combining scientific elements, expeditions with educational or scientific elements, or participation in scientific field trips. There is one common element, however: the dissemination and development of scientific knowledge as a part of the travel experience.

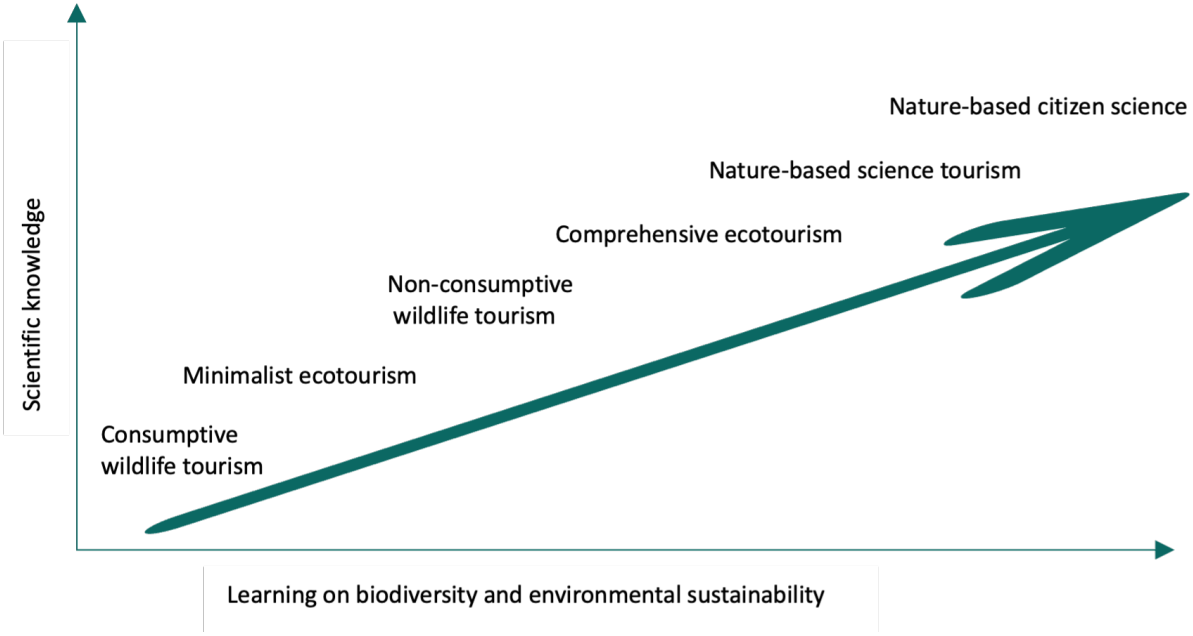

Figure 2. Different nature-based tourism forms involve science and learning in different levels (Räikkönen et al., 2019, p.75).

[2] Vialette et al., 2021

Potential in science tourism and digitalisation

Nature, learning, and digitalization are important trends in global tourism development. Northern Scandinavia traditionally attracts tourists who are interested in nature, and learning about the local culture and nature are important interests for the visitors. According to Nordnorsk Reiseliv´s visitor survey 2023, nearly 70% of the visitors to Northern Norway mention "nature" as their motivation to visit Northern Norway. Similarly, 62% of all visitors to Finland and 72% of visitors to Lapland mention nature as the most important pull-factor.

Digitalisation is not a new trend; globally, we are constantly moving further into digitalization of all sectors. According to resent studies, tourism industry uses digitalization mainly in booking and sales platforms, but the industry is not prepared for the digitalisation of tourism experiences and has very little to offer for the digital native generation who are keen users of all digital services. According to the Norwegian national tourism strategy 2030, augmented reality, Big Data, automatization and already changing the services and experiences[3]. In the strategy, Visit Norway highlights the importance of adapting digitalization in future competitiveness and growth of Norwegion tourism (p.25). Similarly, the Finnish tourism strategy mentions digitalization of tourism services and using digital tools in product development as one of the keys to future competitiveness of Finnish tourism[4].

Issues of overtourism in northern Scandinavia, albeit sporadic, raise concerns about an uncontrolled increase of tourism. Visitor monitoring and management needs more resources, and its improvement is written into the Troms og Finnmark regional tourism strategy 2030 paper.

In the light of the current situation in northern Scandinavia and international tourism research and industry strategies, developing new digital services for nature tourism can work as a positive factor for increasing sustainable tourism in the region. Knowledge-based content attracts visitors who are interested in the local nature, natural history, culture, and communities, which in turn enhances social acceptance of tourism growth and environmental sustainability of tourism.

The economic potential of science tourism depends on the local commercialization efforts. The development of ST products is a rising trend globally, as the travelers seek more meaningfull content for their holidays, or so-called transformative travel options[5]. Science tourism can become one of the forms of alternative tourism also in the Arctic regions[6]. Currently, there are some commercial science tourism activities available in Scandinavia, mostly citizen science initiatives in large research projects, for example:

[3] Visit Norway, 2021
[4] Työ- ja elinkeinoministeriö 2022, (p.41)
[5] Cavender et al., 2020; Räikkönen et al., 2021
[6] Hall & Saarinen, 2010

- The Grand Shift seaweed forest restoration EU-Horizon project (Tromsø, Norway) https://thegrandshift.pukkatravels.com/en-us
- Wild Lab Projects NGO several citizen science projects from bird monitoring to seaweed restoration (Tromsø, Norway) https://wildlabprojects.org
- SNOWPACE, snow sampling by ski tourists, finished project (Bjerknes Centre for Climate Research & Department of Geosciences, University of Bergen, Norway) https://sodemann.w.uib.no/snowpace/snowpace-measurements-citizenscience/
- Tour operators offering citizen science tours in Scandinavia, for example, Exodus Travel, Responsible Travel, Viator, and Interpid Travel offer typical holidays in the north with northen lights, huskies, reindeer farm visits and small elements of scientist lectures, guiding or citizen science activitities.

In addition, the idea behind science tourism, “acquiring knowledge in order to value and protect”, enhances tourism which gives value to ecosystems and local communities, thus supporting sustainable and regenerative tourism strategies. As such, the scientific participation can be more about learning than creating new data, for example:

- Kilpisjärvi Science Trails by Helsinki University (Kilpisjärvi, Finland),
- Visitor Centre nature lecture series in various locations around Lapland (Parks and Wildlife Finland),
- Skervøy Winter Lectures, Series of whale survey lectures for the locals and tourist, whale watching safaris with scientists (Skervøy, Norway).

The science trails project will develop tools for nature-based tourism with elements of knowledge and learning. The science trails can be used by the visitors independently, and in addition we will develop science tourism products together with local tourism companies. The depth of scientific involvement of these products can vary according to the interest of the companies.

MARKET FEASIBILITY – A REGIONAL NEED FOR DIGITAL APPLICATION AND CONTENT

We studied the possibility to develop digital science trails for tourism and local recreation use. In the texts, when we speak about the *trails*, we mean existing trails with suitable infrastructure for recreational activities for locals and visitors. The digital content (*digital trail*) includes a simple map of the trail and several points of interest with information. When the user walks along the trail, the application will notify once they reach one of these points of interest. The content can be information about the geology, nature, or culture and history in the region, and it aims to give visitors a deeper understanding and connection with the local environment.

Content will produced together with scientist, researchers, and local communities. The possible technical solutions we have focused on is the use of an existing white-label application template, such as Voice of Norway, QuestUpon, STQRY, or similar. Alternatively, it would be possible to also use QR codes with links to a website. In addition, we have studied the possibilities to use Virtual Reality and Augmented Reality as part of such digital experiences.

Sustainable and regenerative tourism aims to give memorable experiences and facilitate meaningful interactions with the local nature and culture, thus fostering a more holistic understanding and appreciation of the destination. Educational content in nature-based tourism increases understanding and interest towards nature and promotes conservation of the natural values. Research has shown that when educational content such as facts and stories are made available through exploration and interactive methods, virtual platforms can enhance nature experiences. A combination of real environment and virtual or digital knowledge content can foster stronger emotional connection, thus learning as a part of nature-based activity.[7]

Tourism strategies in Finland and Norway[8] highlight developing tourism with a holistic perspective which adds positive value to the local communities and the global environment as much as the industry itself. The involvement of local community through schools, outdoor clubs, village clubs, and similar, in developing tourism products such as the science trails enables social acceptance of the end-product, but also engages the locals to try the product and learn about their homeplace.

[7] Harrington, 2023; Pimentel, 2022, Simaika & Samways, 2010
[8] Työ- ja elinkeinoministeriö, 2022; Visit Norway, 2021

Tourism products and content which takes the locals into account enhances local social and cultural wellbeing and empower locals instead of just using the local nature for tourism.

We organized several meetings with regional interest groups to study the need for digital applications and science trails. These meetings revealed that there is both interest and concern related to producing digital content for tourism, as we explane in the following.

The main concerns are related to planning the content so that it interests the regional target visitors and marketing the existence of the science trails app to the visitors and local users. Several examples of tourist-guide apps were mentioned during the meetings to highlight the importance of careful planning, communication, and marketing of these apps to avoid building something which will not reach the audience.

Local tourism industry had a two-sided attitude towards the project idea. On one hand, the tourism industry recognizes the need for developing digital tools for tourism, while simultaneously there seems to be reservations about how interesting such digital services would be for the tourists. Tourism industry representatives recognize visitors´ increasing interest in nature and learning about local life and are keen to provide services to meet this interest. In Kilpisjärvi (Finland), where similar science routes are in use already, the local entrepreneurs consider the digital trail content highly useful for improwing their knowledge and tour planning.

Some representatives of tourism organisations highlighted their focus on marketing and sales rather than developing tourism products without direct income possibility.

Land use management in recreational areas has shown interest in guiding visitors to desired locations by providing more content to those areas. They also see the potential to utilize digital tools for visitor monitoring. The importance of planning locations in collaboration with land management was highlighted on several occasions in the meetings. It was also highlighted that all content should be developed in places with existing infrastructure to accommodate a potential increase in visitations.

Visitor survey about the attitudes towards digital tourism guide applications

We conducted an online survey in November 2023-January 2024 to understand the visitor attitudes towards digital tourist guide applications. Link to the survey was shared via various Facebook and LinkedIn accounts in Finland and Norway. We received 365 answers to the survey, 92% of them from Finland, 5% form Norway, and 3% from other countries. In previous online surveys in the region,

there has been a similar bias towards responses from Finland[9]. In the survey we asked people what experiences they are likely to seek on their holidays in Northern Scandinavia, if they have used digital guide-apps, Virtual or Augmented Reality applications, and what are their thoughts on digital guide-applications.

Based on the survey, the most common activities visitors in the region are looking for are nature experiences (92%), physical activities (60%), and visiting famous landmarks (34%). A third of the respondents had previously used some kind of digital guide-applications and based on their experience 93% of them would use similar applications again. Majority of those who had not used such applications (68%) said they had not heard of these applications before, 13% said they would have liked to, but had not had a change yet, and 12% were not interested in such applications. One procent think that the use of digital applications would ruin their experience.

While the most popular medias used were maps (88%) and text (57%), the least popular option was quizzes, which only 2% of the respondets had used, and 1% found interesting. According to the survey, 11% of the respondents had used Virtual Reality (VR) or Augmented Reality (AR) products at holidays, most of them AR function on mobile phones. Most (63%) of those who had used VR or AR products and 11% of those who had not tried them yet, thought VR & AR can bring added value to the holiday experience.

If they were to use digital guide apps in the future, the respondents would want to have information about the practicalities such as parking or services in the region (63%), information about the local nature (50%) and historical events (47%), natural history (37%), and indigenous culture and history (31%). Prefered medias for the information would be digital maps (80%), text (62%), video (48), and audio (27%). Three procent of the respondents say they would not use such apps.

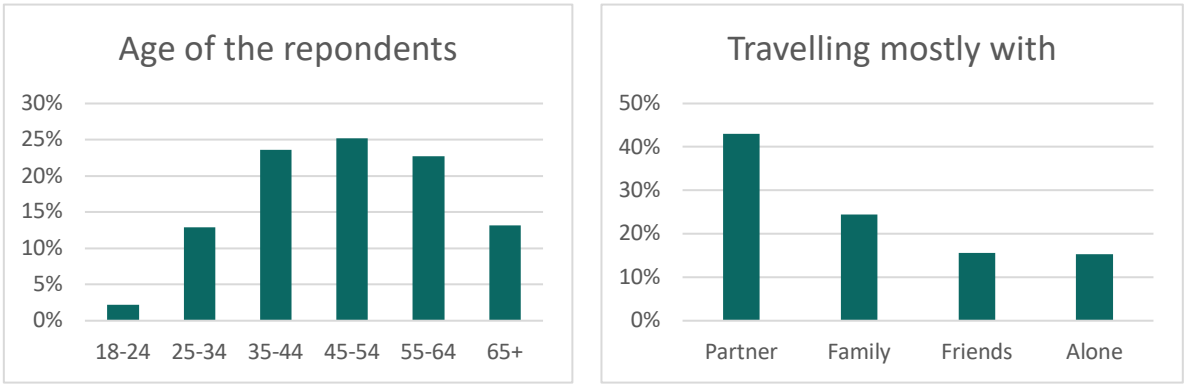

Figure 3. Demographics of the respondents.

[9] Busk – Building shared knowledge, Northern Periphery and Arctic Programme, Luonnonvarakeskus, Finland 2016-19 and Halti Cross boundary cooperation, Interreg project, Reisa National Park & Metsähallitus Parks and Wildlife Finland, 2018-2020

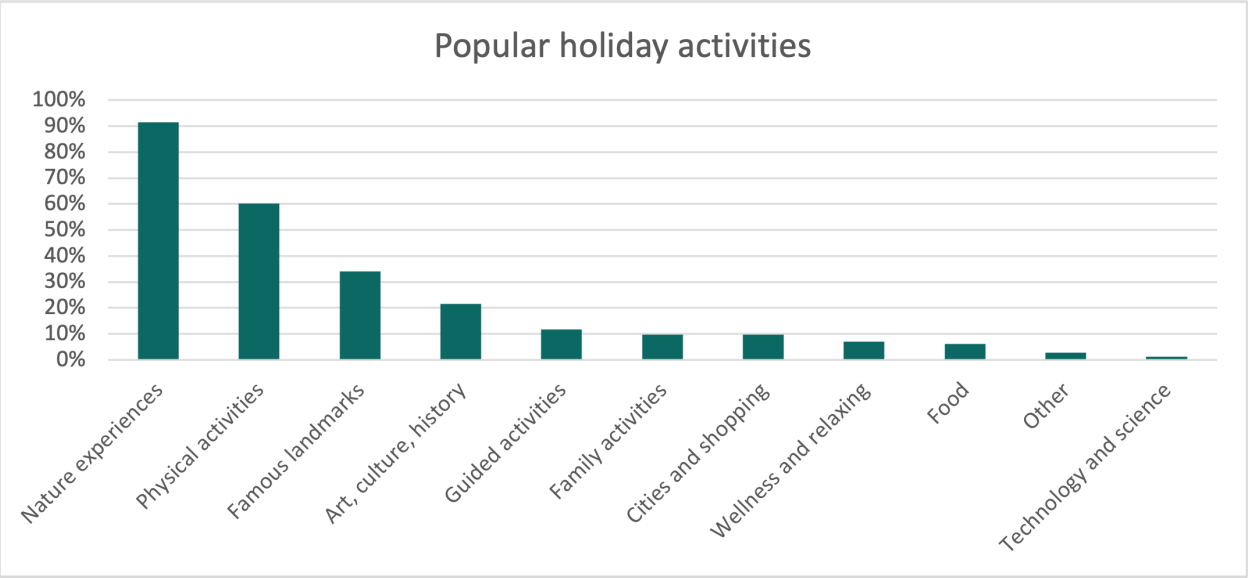

Figure 4. Most seeked after experiences for holidays, there was a possibility to choose up to three answers.

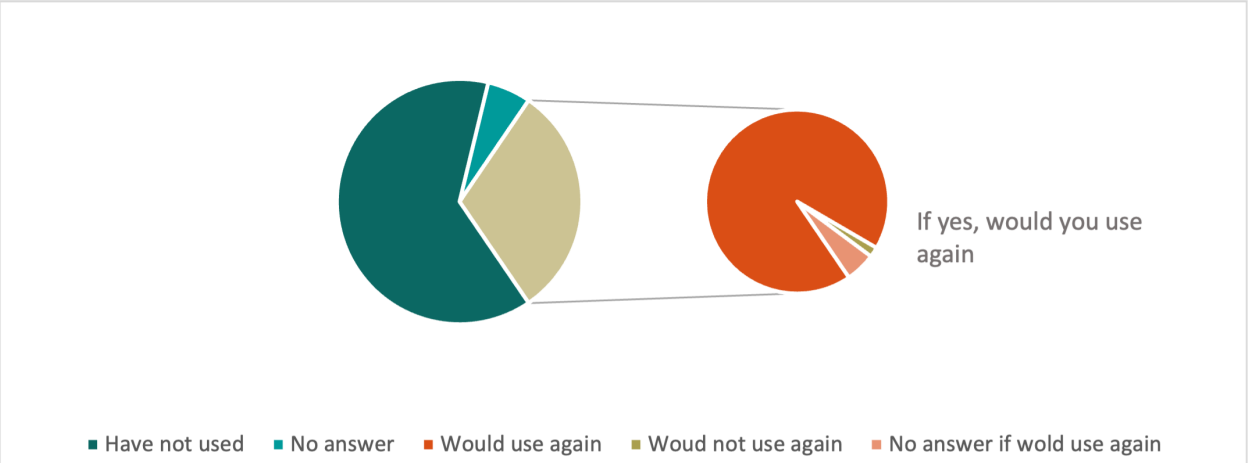

Figure 5. Previously used digital tourism guide applications, and interest to use them again.

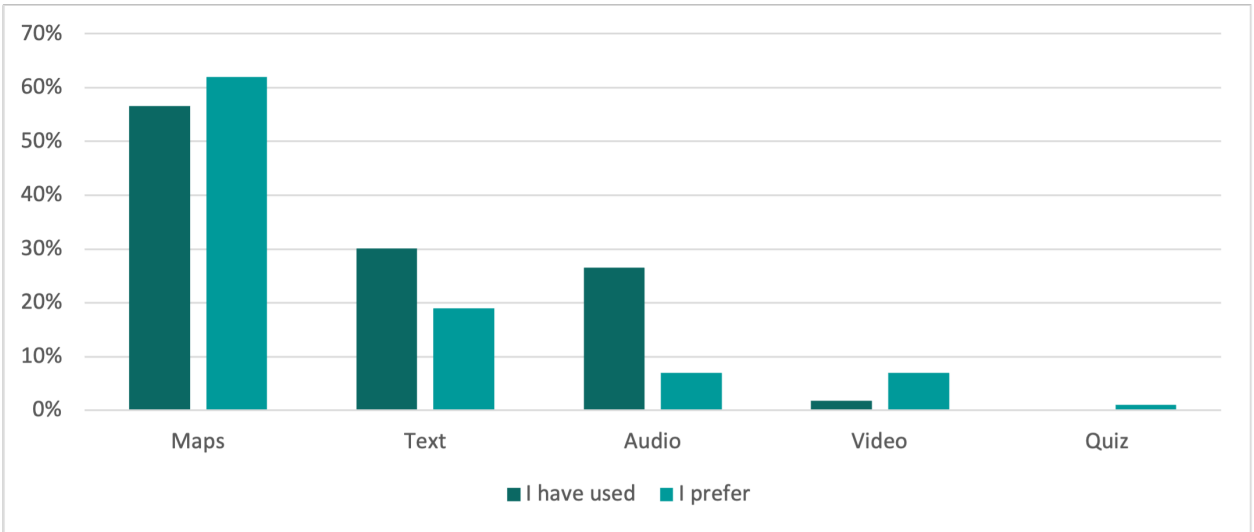

Figure 66. Previously used and preferred media in digital tourism applications.

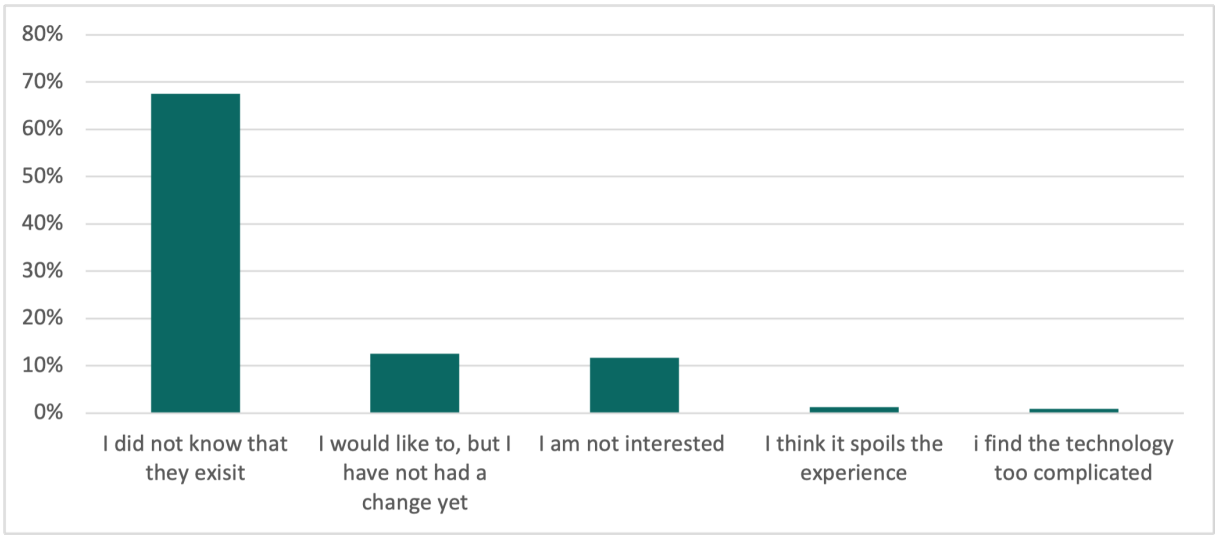

Figure 77. Reasons why they have not used digital tourism guide applications before.

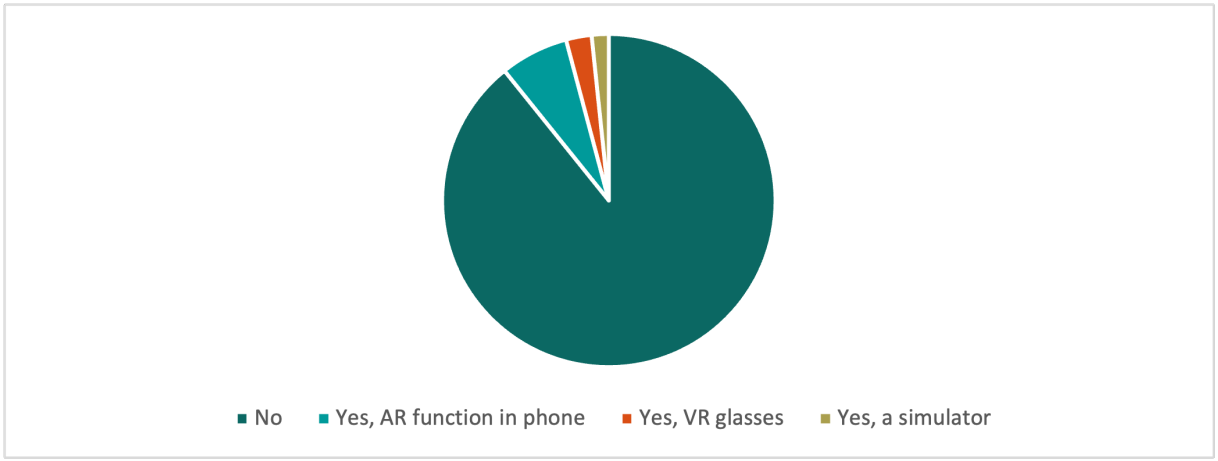

Figure 88. Previous use of Virtual Reality (VR) or Augmented Reality (AR) products in holiday destionations.

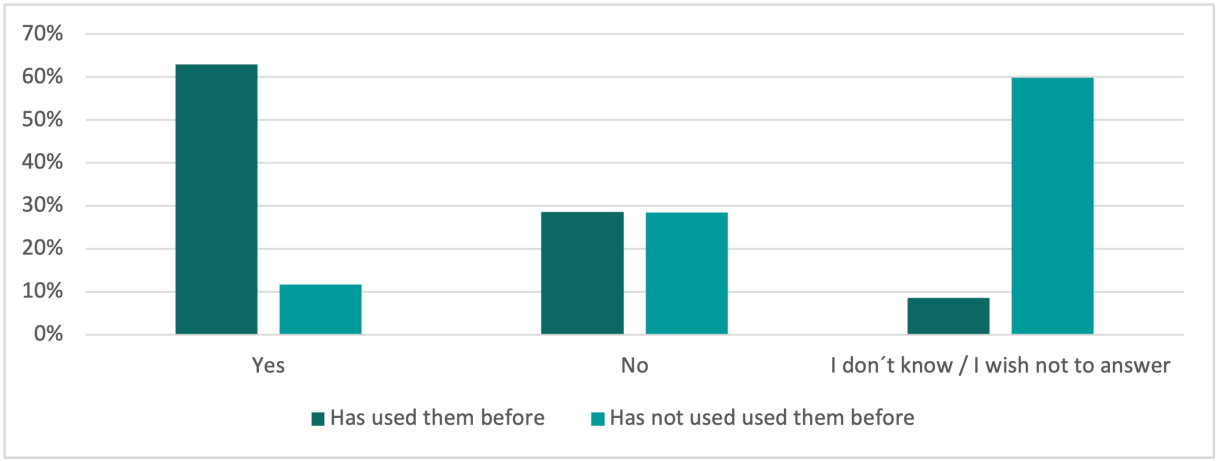

Figure 99. Experiencing added value from the use of VR/AR products as a part of a holiday, based on has the person used them before or not.

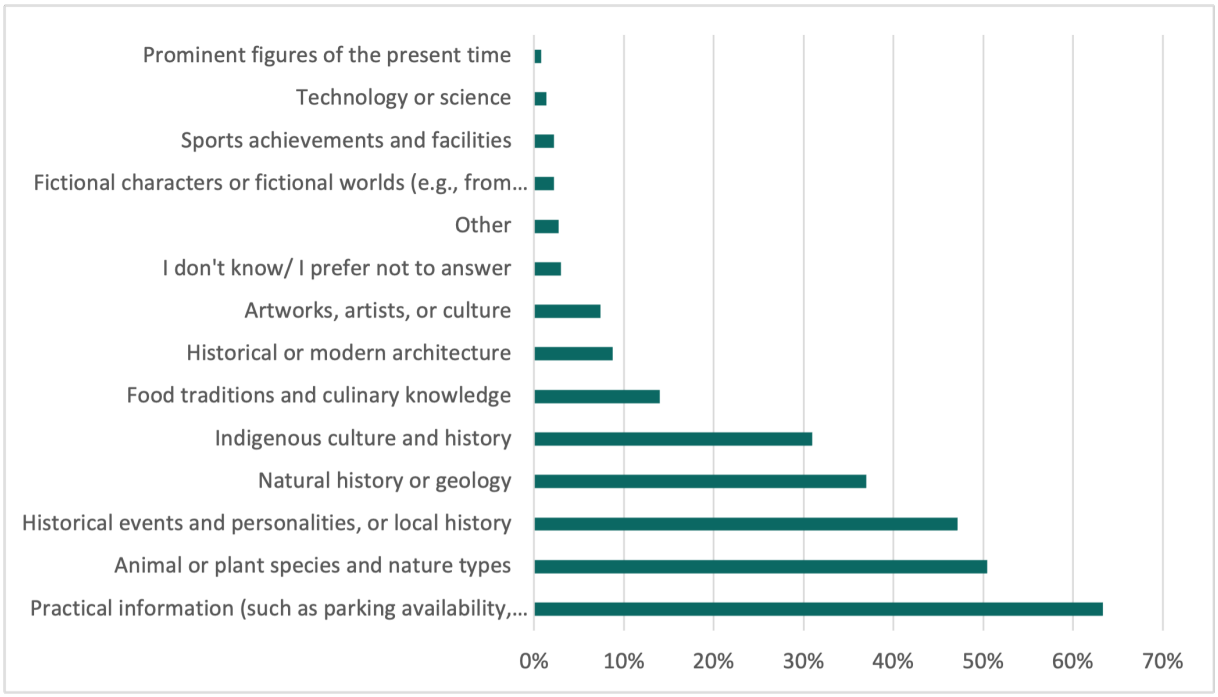

Figure 10. Information that the repondents would like to learn from a digital guide application. There was possibility to choose several options.

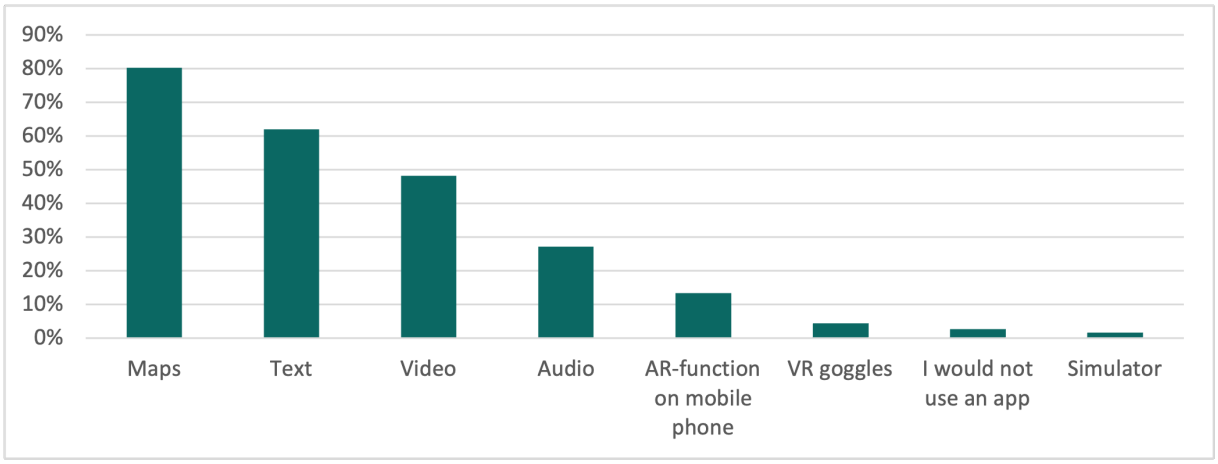

Figure 11. Prefered media for a digital guide application.

TECHNICAL FEASIBILITY

Available applications

There are several available applications to be used.
QR codes with links to websites containing the created content are the technically easiest alternative. However, this method requires an internet connection that works throughout the entire route. Some foreign visitors might also be reluctant to use data roaming and prefer using the internet only where WiFi is available. Thus, QR codes work best when the provider can also offer WiFi connections, or the route includes only 1-2 stops with good internet coverage.

It is recommended to choose digital platforms which are already in use in regions to avoid overlapping structures, and platforms that require little maintenance. Kilpisjärvi Science Trails, for example, uses **Stqry** and several Norwegian destionations use **Voice of Norway** white labe applications. The term “white label” refers to a ready-made application template, in which the content provider can customize the design and content of their destination. In addition to the start fee, there is an annual fee which covers the technical maintanence of the application. The user interface resembles editing web pages and is simple enough for new employees to learn as there is no need for technical maintanence. Outsourcing the coding and the ease in maintenance makes it possible to focus on content creation during the project and gives longevity for the product.

While label mobile applications offer ready-made templates that can be customised to unique content. Adding logos, colors, and themes is possible to align with destination branding. All options allow features such as:

- Downloading content pre-tour (no internet connection needed on route),
- Choice between allowing/not allowing opening of the content before the geo-located mark,
- Content can be text, video, image, audio, or a combination,
- Quizzes and surveys can be part of the apps,
- Including augmented reality elements,
- Alerts when in geolocation, eliminating the need to keep the mobile device at hand all the time,
- The customer is the owner of the content, and content can be edited in-house or through a purchased service from the app-provider,
- Showing other locations where the same application is in use, along with maps of locations to find other routes. When a user visits one route, it might encourage them to seek other locations with similar content.
- International operators tend to offer customer service only in English.

FINANCING

The cost of the opening and the first year, for example, with 5 routes, each with 10 stops, is approximately 40,000-50,000 NOK, and around 15,000-20,000 NOK annually thereafter. Longer contracts and larger customers typically receive discounts.

Other costs include the production of content: planning, interviewing experts, writing, recording, photographing, filming, and potentially producing AR/VR content.

After the application is running and in use, there might be some small alterations to the content, but the aim is that there will be no need for major edits in the upcoming years. Adding new routes and stops is possible, but these might incur additional costs for the application's annual fees.

The future gainings from the Science Trails app are indirect and related to creating opportunities for local tourism companies to promote and develop sustainable tourism activities around knowledge.

ORGANISATION OF DEVELOPING AND FUTURE MANAGEMENT OF THE APPLICATION

Development of scientific and research-based content which is interesting and engaging for tourism, and recreation, is time consuming and requires good local knowledge, nuanced understanding of tourism industry, and familiarity with the research fields. Consequently, the optimal approach involves collaborative efforts among professionals with expertise in said fields to ensure the best results.

If there is one entity who can manage several routes in the application, there is only one start fee and consequeunt annual feels for those routes in the region, routes in individual destinations should be grouped in meaningful clusters to avoid multiple fees. When selecting the manager of the application, it is important to ensure that the entity is realiable, has the resources to oversee the routes long-term, and the required technical knowledge to implement any possible updates. Such entities could be, for example, regional visit-organisations, municipalities, museums, or other public sector actors.

The project will plan and produce the digital content and manage the launch of the digital routes. Project partners establish the management of the digital content for after the project. Each destination partner will own the content created for them. One of the selection criteria for the while lable application is, that the management of the content must be simle enough for each destination to handle independently. Content is created so that there is little or no need to edit the content in the future.

The project will plan a marketing strategy and develop products together with local tourism businesses around the digital content and trails to support the long-term success of the application.

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LIST OF FIGURES

Framtidstro for havet,

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Salt Lofoten AS post@salt.nu salt.nu