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BOOK OF ABSTRACTS

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Extended Abstracts

Inspiring educational & aesthetic dimensions in glacier experiences: The case of ice cave tourism in Vatnajökull glacier, Iceland

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Background

In recent years tourism has increased significantly and Iceland has become a popular destination not only in summer but in winter as well. Various activities for recreation are available for tourists visiting the country. As most of the tourists visiting Iceland are seeking the scenery of the country´s nature and landscape, it is not surprising that most of the recreation offered is nature related, such as hikes or using special transportation vehicles for off road activities. The South Coast attracts most visitors as almost 80% of them coming to Iceland choose to visit the Glacier Lagoon, one of many attractions in that area. Glaciers have long been an attraction for foreign visitors and are popular for recreation activities. Many tourism companies are offering a variety of organized trips to the glaciers, giving their customers a unique experience and knowledge that they will not forget as the tours are educational experiences. The experiences perceived by the tourists are therefore the focal point of such trips and a crucial factor for the customer to be satisfied with the service and the likelihood of recommending it to others. During the winter months many seek to experience the magnificent ice caves.

This study focused on tourism-related concepts, service theory, the Grönroos service model, experience and experience economy presented by Pine and Gilmore (1999) which is the theoretical base of this research. Social changes have taken place in the world and are leading rapidly to the experience economy as products and services are increasingly sold through experience. The experience economy is classified into four dimensions: education, entertainment, esthetic and escapist. Experience is described as a scripted play where the company's service environment is used as a stage and the products the company sells as props, ultimately having customers participate in this play and are thus active in creating a memorable event for themselves.

Tourism is a good example of how the 21st century world is transforming more into an experience economy. Travel was mostly about visiting different places, now tourism is more about visitors' experiences. Consumers have begun to pursue unique experiences that are unrelated to and different from their daily environment. Travel has become a product and service and is about meeting the needs and expectations of consumers. Experience is very important when it comes to selling goods and services, therefore it should be done in a unique way so that the experience will be memorable. This is the foundation of the experience economy.

In the literature, Fiore & Jeoung (2007) tested a new method on guesthouses and transformed the ideology of Pine and Gilmore (1999) into a measurable model labeled the tourist experience scale, which can be used to explore the relationship between certain variables as this research attempts. More researchers have begun to use this experience scale to understand customers

experiences, as in cruise ships (Hosany & Withamm, 2010) and museums & festivals (Mehmetoglu & Engen, 2011).

Methods

This research focuses on ice cave exploration which has not been done before to the best of knowledge of the authors. The aim of this quantitative study is twofold: (1) to use the four dimensions (Pine & Gilmore, 1999; Oh, Fiore & Jeoung, 2007) to examine the experience of tourists in ice cave tours and (2) whether there is a connection between the dimensions and satisfaction and if visitors would recommend the company. The researchers worked with four local glacier companies that disseminated a questionnaire to tourists who went on an ice cave tour in Breiðamerkurjökull during the period November 2019 to April 2020. It was sent to 1,200 people and a total of 135 responses were received, making the response rate 11.07%. The questionnaire was based on previous research and consisted of three questions about the purpose of the trip to Iceland, twelve statements about the experience economy that were divided into four categories, as well as three statements about satisfaction: net promoter score (NPS) question, four background questions and one open-ended question. SPSS was used for the data analysis. Multiple regression analysis was used to answer the hypotheses which examined the relationship between the experience dimensions, the variables satisfaction, and NPS. The correlation between the variables was also examined.

Findings and discussion

The results showed that not all four experience dimensions influence satisfaction. Education and esthetics have a positive effect on customer satisfaction in ice cave tours. To connect this to the ice cave tours, we see that the nature has a huge effect on the esthetics and the tour guides have a big impression on the educational dimension. There was also a positive correlation between customer satisfaction and NPS scores, indicating that satisfied customers are likely to recommend the company. There was no relationship between the four dimensions and the NPS score.

The research findings are based on a limited response percentage, so it is not conclusive and needs further research in similar situations or with repeated data collection from more ice cave visitors. A qualitative or mixed method research could shed a brighter light on the real experience of ice cave visitors and reveal how the educational/esthetic dimensions leave a lasting impression on tourists that could lead to some impact on climate mitigation where the visitors strong experience makes them more likely to take action to preserve the glaciers. This study can also be used for further research for different kind of recreation, as well as for restaurants, guesthouses and even for specific destinations.

Lastly the results could be used as practical guide to design an appropriate marketing plan, such as if companies should use more beautiful images that show the ice caves, while at the same time highlight the educational last chance tourism aspect.

Keywords: experience economy, ice caves, service, satisfaction, regression analysis

Impacts of climate change on ski-driven second home values in Sweden

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Background

Climate change has and will have its impacts on the tourism industry, especially where weather-dependent amenities constitute the key attractions. In this respect, ski resorts and destinations have been the foci of exponentially increasing academic works (Demiroglu et al., 2013; Steiger et al., 2019), most of which have treated the ski lift areas as the units of analyses for climatic suitability and financial viability. Relationship of weather and climate with the business performances of other major components of ski tourism supply, such as hotels and restaurants, has been limited to few studies (Falk, 2010; Surugiu et al., 2010; 2011; Töglhofer et al., 2011; Damm et al., 2017; Falk & Vieru, 2017; Falk & Lin, 2018), although they together would have a significant contribution to the regional economy. In the case of Sweden, such indirect ripple effect has been estimated as ten times the revenues from ski-pass sales (Demiroglu et al., 2019). However, such an assessment still does not account for another major player, the second homes, which at certain locations may compete with and even exceed the accommodation capacity and its relevant impacts provided by primary facilities, such as hotels. Then the impacts of climate change on second homes become an essential research question, especially at rural and peripheral areas characterized by significant visits of second home owners and users. The question even gets more interesting as one acknowledges the trending business models in the ski industry where property sales and management are becoming the core elements of investment profitability (Scott, 2006). Under such circumstances, any future climate related risk of loss in amenity-based property value is transferred to the second home owners, who, as individuals with relatively limited capital and know-how may not have as strong of an adaptive capacity as the ski corporations may have. Such relative vulnerability then also implies a threat on the overall climate resilience of the regions. Indeed, a recent paper (Hoogendoorn & Fitchett, 2018) that examines a ski resort in South Africa and another one in Lesotho highlights how second home owners, as well as the businesses and locals, may suffer economic decline due to climate change.

Proposed Methods

To our knowledge, only a couple of studies (Butsic et al., 2011; Galinato & Tantihkarnchana, 2018) have assessed the impacts of climate change on house prices near ski resorts and areas, without any further distinction for second home values. In this study, our aim is to assess the impacts of climate change on existing and proposed second homes in and around ski lifts in Sweden, which are determined as among the most attractive locations for such development (Marjavaara & Müller, 2007; Back & Marjavaara, 2017). It is thought that, along with climate change induced natural disasters and phenomena such as landslides, avalanches, storms, floods and permafrost

thaw, property value loss (or gain) due to main amenity deterioration is a major climate change impact that needs to be considered in conjunction with the vulnerability of skiing-based second homes and their immediate and wider regions. For this purpose, firstly, corresponding (and lagged) states of the ski climate (Demiroglu et al., 2020) are treated as estimators for second home sales prices for the 1999-2017 period (Microdata Online Access) and, secondly, the quantified relationship is simulated according to future climate projections, based on data available from the Swedish Meteorological and Hydrological Institute and the European Center for Medium-Range Weather Forecasts. The results are mapped in terms of existing and proposed skiing-based second home regions, determined according to service areas provided by a highly realistic transport network dataset (ArcGIS Online) and the 208 ski area locations spread throughout the country (Demiroglu et al., 2019). Potential analysis methods are a Geographically and Temporally Weighted Regression (GTWR) (Fotheringham et al., 2015) and/or an Autoregressive Distributed Lag Model (ARDL), the latter of which may help us distinguish if a dependent value is affected more by an independent value that existed at an earlier stage – e.g. if a snowy winter happens to boost sales, not instantly, but two years later. We also aim to account for attraction coefficients such as ski lift power (Berard-Chenu et al., 2020) among others.

Expected Results

In the pioneering U.S. study, Butsic et al. (2011) found out that the housing prices are highly elastic to snowfall intensity under any configuration of their models. They further applied these elasticity coefficients to the IPCC's future temperature projections and concluded that these amenity-dependent housing values could fall as far as 50% by 2060s. In the follow-up study, Galinato & Tantihkarnchana (2018) confirmed the dropping prices with increasing temperatures, except in the Northeast – a region not covered in the Butsic et al. (2011) study as its focus was vacation resorts, not weekend ski areas, which are more common in the Northeast. In Sweden, we look forward to obtaining comparable results and projections. Indeed, our previous research (Marjavaara & Müller, 2007; Back & Marjavaara, 2017; Demiroglu et al., 2019) already shows that the three largest and the most revenue generating ski resorts are also at regions where purpose built vacation homes are clustered in the Swedish mountains. They also represent the mountain hot spots with the highest second home property values. Yet their and other ski domains' future performances and further implications on a wider picture remain to be disclosed and discussed.

Keywords: second home, tourism, climate change, ski, real estate, Sweden

The demand for downhill skiing in Sweden: The role of neighbourhood factors

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Background

Many studies investigate the relationship between natural snow depth and demand for snow-based winter sports activities based on historical data (see Steiger et al, 2019 for a review). A wide range of methods are used, such as econometric time series models based on aggregated data for a specific region, or panel data models using data at the ski area level. However, spatial econometric models are rarely used in this field. Consideration of spatial effects is important because ski areas are often geographically concentrated, and it may be possible that different ski areas complement each other.

The aim of this study is to examine the determinants of skier visits in Sweden. Beside economic factors (such as real income and prices) snow depth of the resort as well as that of the neighbouring resorts is taken into account. Panel spatial econometric models are used to estimate these relationships. Data cover information on the 50 largest ski resorts in Sweden for the winter season 1990/1991-2018/2019.

The study focuses on the ski business in Sweden, which has some special characteristics. First, ski demand increased in the last 20 years until the onset of the Covid 19 period, which is a development in contrast to the European Alps. However, climate change scenarios show that global warming is more pronounced in Northern Europe than in the European Alps (Wern, 2015). The literature show that skier demand in Sweden depend on natural snow depth despite massive investments in snow making facilities (Falk and Hagsten 2016). However, the relationship is becoming weaker over time (Falk and Lin, 2018, 2019).

Method

Literature reveals a variety of approaches to study the link between skier visits and snow depth. In this study, panel spatial econometric models are used. The theoretical model is based on an augmented tourism and recreation demand model where output depends on economic and non-economic factors. Skier visits may not only depend on the snow depth within or close to the resort but could as well relate to the snow conditions in neighbouring municipalities due to networking and cooperation linkages among ski lift operators. To allow geographical spillover effects of high-speed broadband access the spatial Durbin Model (SDM) is employed (Elhorst, 2010, Belotti, Hughes, and Mortari, 2017) where the spatial weight matrix based on the geographical distance between one ski resort to another. A generalised version of the spatial autoregressive model with spatially autocorrelated errors (SAC) is also used. The spatial weight matrix is calculated using the Haversine distance measure between geographical coordinates, where calculations of latitudes and longitudes for the ski resort (valley ski lift station) is based on information from Google maps

(Drukker et al., 2013). The Stata command spmat is applied as well as non-truncated and truncated distance matrixes with a cut-off point of 100 kilometres.

Results

Results of panel Spatial Durbin models reveal a significant but rather small direct effect of snow depth within the same resort. There is also some evidence that the snow depth in neighbouring resorts has a positive effect of snow depth. Skier visits of the neighbouring areas is significant indicating agglomeration effects. A high degree of heterogeneity is found in the results over time, where the relationship between snow depth and skier visits is far weaker in the last decade.

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Keywords: skier visits, snow depth, Sweden, spatial econometric models

Extreme weather event risk awareness among holiday-home owners and their economic and non-economic response strategies: Evidence from the Beskids Mountains in Poland

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Background

Global climate change has noticeable and increasingly drastic consequences on local geographies comprising frequent and recurrent extreme weather events such as heavy rainfalls, windstorms, and downbursts resulting in flooding and landslides. All the local community members, including permanent and seasonal residents (holiday-home owners) are exposed to these events and the after-effects. In Poland, most of the holiday homes are located in renowned tourism regions for instance, in the mountains. Given the specificity of the natural environment and the widespread dispersed settlement pattern in mountainous areas, they are particularly vulnerable not just for extreme weather events to occur but also for residents to deal with them and their consequences (due to distantly located and inaccessible neighbours or rescue services). Hence, the question arises as to whether holiday-home owners are aware of the natural hazards and the increasing number of extreme weather events that occur in their holiday area, as well as of the related seasonal housing and living risks.

Method

Then, assuming the awareness differ among the owners the associated question arises on whether and, if so, what actions they undertake to be timely warned, as well as to protect, deal with and pacify the actual, sudden weather events and thus, how they adapt to climate changes in economic and non-economic terms that is: (1) the property investment (purchases of security, alarm and surveillance systems, relevant renovation and maintenance services etc.); and (2) the community self-organisation (involvement in the neighbourhood self-help groups as well as formal and informal local community cooperation). Thus, this study attempts to identify coping strategies and analyzes the motives of implementing economic and non-economic strategies for anticipating the effects of extreme weather events by the surveyed second-home owners. The geographical setting of the study is the tourism sub-region of Żywiec Valley in the West Beskids Mountains of Southern Poland - a holiday-home hot spot and, at the same time, an area particularly vulnerable to various climate change effects. The main climate change effects is shallow landslides due to high relative altitudes and the highly permeable type of soil on predominantly deforested slopes, potentially causing floods in the immediate zone of several local artificial water reservoirs. The data was obtained using a questionnaire, which for the purposes of the model included questions that specify the dependent variable (a strategy taken by the respondent to anticipate threats), and independent variables – respondent's socio-demographics and his/her opinion on the severity of weather events and the associated risks; second home characteristics including its location. The preferred form of collecting data was face-to-face interviews with respondents when holidaying

in their second homes. As a result, 94 observations were collected. Then, a C&RT interaction classification tree model was employed and developed in order to answer the research questions. Interactive classification tree makes it possible to combine advanced statistical methods with an expert knowledge. The following causal factors determining second-home owners' coping strategies were considered: personal traits (respondent's socio-demographics), contextual factors (second-home location; social amenities in the area; home characteristics), and some subjective factors (respondent's opinions on his/her community belonging, trust and collective problem solving).

Results

The second-home owners in the Western Beskids do not underestimate the dangers and threats of extreme weather events in the area. After direct or indirect experiences of local landslides, storms and floods, the vast majority of respondents perceived weather extremes as increasingly common and believed that they could cause serious damage to their summer homes. Based on data on the number of interventions by local fire brigades, weather extremes are occurring not so much more frequently as irregularly. However, as the landslide has clearly shown, one extreme weather event is enough for hundreds of properties to be damaged or significantly depreciate, and for a vibrant community to stagnate.

A significant proportion of second-home owners (not only affluent ones) adopted preparatory action by choosing a material investment strategy – alongside or instead of neighbourly help. Investments were made in security and early-warning systems, house renovations and, in the light of the explanatory model, the motive for such decisions was, among others, the limited trust in members of the local community. The respondents' most common strategy was to combine economic and non-economic strategies. However, a passive/reluctant strategy was also observed, which was not taking any measures to protect the house against the effects of extreme weather events. Such instances usually occurred when, due to the second-home location, the property was somewhat secured by the close proximity of emergency services, in densely-built-up areas with many neighbours (permanent residents) potentially helping out in a difficult situation and thus providing the owners with a real sense of security.

Anticipating the effects of extreme weather events, the majority of respondents used a strategy of combining material property protection with social assistance (often also insuring their home). On the one hand, this may prove a high awareness of natural hazards, and on the other a belief that when such an event occurs, the aid and support of local authorities, services and institutions would come too late or would be insufficient. More than a quarter of the respondents used only a material strategy. These were usually people who, for various reasons, did not integrate with the local community. Such second-home owners are on their own, so they are more exposed and vulnerable to material damage when extreme weather events occur.

Keywords: Extreme weather events, Risk awareness, Coping strategies, Holiday homes, Poland

Social vulnerability to hydrometeorological hazards as a factor for tourism development

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Background

Tourist activity is one of the most environmentally friendly types of nature management, since a favorable environmental situation and a wide distribution of preserved natural landscapes are among its main requirements. A rational choice of destinations can lead to a redistribution of the tourist flow and, consequently, to a reduction in the anthropogenic load on geosystems and a more rational use of the tourist resource potential. This work is aimed at determining the social vulnerability of the area to natural hazards for the correct and scientifically-based choice of tourist destinations.

Social Vulnerability Index (SVI) consists of three components: exposure to the risks of natural hazards; sensitivity of the social system of the region as the ability to resist the manifestation of danger; and the adaptation potential as an opportunity to take response measures to overcome the consequences of these disasters (Vittal et al., 2020). As a result, the SVI is a comprehensive indicator that allows us to assess the extent to which a given area is able to safely receive tourist flows, in order to identify the prospects for their development (Aznar-Crespo et al., 2020; Student et al., 2020).

Method

Our work focuses on hydrometeorological phenomena that limit many types of tourism activities (Zhou et al., 2020). The first step is to assess the risk of climate-and weather-related disasters. First of all, these are extremely high and low temperatures, which are manifested in the heat and cold waves. For example, during the summer period, it is necessary to take into account the impact of possible heat waves, which can affect negatively, up to a complete interruption, the tourism activity. Secondly, heavy precipitation and associated flooding can limit recreation. On the other hand, fires caused by a lack of moisture are dangerous phenomena. Natural focal diseases, such as tick-borne encephalitis, the development of which in the spring can have an explosive epidemic character depending on weather conditions, also limit tourist activity.

As the second step, the sensitivity of society to the effects of natural hazards is determined. First, the situation in the healthcare system is evaluated: the number of hospitals, emergency medical services and highly qualified medical personnel. Secondly, the transport and communication in-frastructure of the region, including transport service facilities and its capacity are considered. Further, the medical-demographic and epidemiological situation in the region is revealed. Thus, a holistic picture of the sensitivity of the regional social system to the onset of natural hazards and the ability to resist them is formed.

The third step clarifies how society as a whole is able to adapt to the emergency of dangerous situations. First of all, this is the gross regional product – a value that shows how much the socio-economic system as a whole will be able to overcome dangers and quickly respond to their manifestations. Secondly, it is the development of a system of protection against hazards and disasters. It also takes into account the level of urbanization and urban infrastructure. In general, the indicators of sensitivity and adaptive capacity reflect the extent to which the regional social system is ready to provide tourist services in the event of adverse natural phenomena.

Results

The methodology for assessing the social vulnerability of the region to natural hazards as a factor limiting the development of tourism is examined, with Priamurye at the south of the Russian Far East as a case study. The region is located in the temperate monsoon zone; it is characterized by severe frosty conditions in winter, hot, humid summers with heavy precipitation and the threat of severe flooding, and dry and fire-prone transition seasons in spring and autumn (Zhou et al., 2020). The periods during the year with high probability of dangerous hydrometeorological phenomena are identified. A detailed analysis of the quality of life of the population is carried out: some natural (climatic and biogeochemical), economic and social aspects are considered (Grigorieva, Sukhoveeva, 2019). Exposure, sensitivity and adaptive capacity, as three components of Social Vulnerability Index, are mathematically combined into a single composite indicator. The SVI is calculated as the sum of individual normalized indicators. The next step is a comparison with the results for other regions which allow approaching the scientific justification of the rational choice of tourist destinations.

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Keywords: social vulnerability index, dangerous hydrometeorological phenomena, tourism development

Climate change adaptive capacity of ski tourism in Western Asia

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Background

Alpine skiing is practiced on snowy terrains to fully developed ski resorts across 80 countries in the world. Ski tourism has been a significant tourism type conventionally in the Alps, Nordic Europe, North America and Japan, with rapidly emerging destinations elsewhere, such as those in Russia, China and Turkey. Besides, there is growing interest in snow sports from countries with naturally minimal or no ski offer, eventually triggering international tourism. That being said, however, a certain market maturity is observed among the conventional destinations which have been recording stagnating demand figures in the recent decades. On the other hand, climate change is accompanying such demographic change in shaping the future of ski tourism in not only the established destinations but also the emerging and the potential ones. Today, ski tourism is regarded as a sector that is the most immediately and the most gravely affected by the impacts of climate change.

With the impacts of climate change already becoming visible, and sometimes decisive, for ski tourism, various adaptation options have come to the agenda and been put into practice. These efforts have most often been centered on maintaining the snow sports product, as such offer is proven and regarded as the main socioeconomic driver of winter destinations. Besides the most betaken method of snowmaking; slope development, snow farming, slope shading and sheltering, snow transferring, glacier swaddling, indoor and dry skiing, and even cloud seeding are counted among the various techniques both to remain competitive and to combat climate change. Diversification from ski tourism, on the other hand, has been prioritized usually when snow sports can no longer be (foreseen to be) sustained physically, thus socioeconomically.

With the uneven spatial coverage of ski tourism and climate change literature that is mostly concentrated on North America and the Alps, there remains a major research gap to understand the climate change impacts on and adaptations of ski tourism in various regions of the world. In this study, ski tourism's challenges with climate change are exemplified through the case of Western Asia from an adaptive capacity perspective – which, together with the initial impacts, is a major determinant of the ultimate vulnerability/resilience.

Methods

This exploratory study aims for, firstly, revealing an inventory of ski tourism supply and demand in Western Asia, and secondly, following the latest research to drive implications on the climate change adaptive capacities of (potential) ski destinations in the region. In addition to the UN defined Western Asian countries list, the immediate neighbors, namely North Caucasus (Russia) and the Kopet Dag (Iran-Turkmenistan border), are also made part of the inventory work. In understanding the adaptive capacities, the Climate Vulnerability Index for Tourism (Scott et al. 2019)

and a more ski-oriented framework (Dannevig et al., 2020) at the national and resort scales, respectively, are followed.

Results

Western Asia presents a high climatic diversity, allowing for ski-based tourism development along its snow-capped mountainous terrains, yet also posing future vulnerabilities to be addressed and be prepared for. Many countries here have either optimally planned/developed their limited snowy terrains into ski areas (e.g. Cyprus, Israel, Lebanon, Syria), while some others (e.g. Armenia, Azerbaijan, Georgia, Iran, Iraq, Turkey) possess even larger potential ski zones in addition to their already established ski areas. All in all, the region is currently home to 121 operational and 17 planned ski areas, of which, 29 could be regarded as ski resorts due to their lift and accommodation capacities and varieties. Besides, most of the remaining countries without a natural ski tourism supply, especially those of the Gulf Cooperation Council, have been rapidly emerging to become significant source markets for international winter tourism destinations.

At high-altitude ski resorts, such as those in Iran and Northeast Turkey, relatively better climatic conditions persist for skiing, albeit with observed and projected negative changes, bringing further adaptation needs to agenda. In this respect, installation of snowmaking systems has been on the rise for the past decade. Such technical adaptation, however, is still challenged physically, financially, and environmentally, as increasing temperatures would require more snow production (and even halt beyond a threshold), stressing the already extreme costs of snow management and putting more pressure on water sources in a future characterised by more frequent and severe droughts. Along with snowmaking, expansion or relocation of ski areas to more snow reliable landscapes is another adaptation option to be considered in terms of Western Asia ski tourism's physical capacities. Moreover, there are many new ski resort projects in Western Asia which could make use of best location selections from a climatic perspective. Especially in Turkey and around the Caucasus and Iran, many (potential) ski areas have the physical capacities to be vertically extended/(re)located.

Regarding efforts to differentiate from or diversify the core product of lift-based skiing offer, helicopter or "cat" (groomers or snowmobiles) aided and human powered backcountry skiing vacations are trending in Georgia, the Russian Caucasus, Turkey and Iran, with vast untapped landscapes still awaiting to be transformed into playgrounds. Besides backcountry skiing, alternative forms of non-snow skiing such as dry skiing and grass skiing offers are also beginning to be implemented to increase the general appeal and the adaptive capacities of ski resorts in Iran, Iraq, the Russian Caucasus (Chechnya) and Turkey. Likewise, some ski destinations strive to become yearround mountain resorts by introducing more non-ski offers, such as mountain biking. However, the potential of these measures to compensate for the negative impacts of climate change on ski tourism is debated, while it is projected that more mountain destinations could benefit from "cool summer" tourism as many regions in Western Asia are likely to face worsening, and even life-threatening, (touristic) climate (dis)comfort on the seaside and in the urban areas throughout the 21st century.

Economic conditions can be considered as the most restricting determinant to adaptive capacities, but also the very reason to why the less developed regions should acquire aid and assistance for capacity building. Countries with the highest incomes per capita are unsurprisingly found to be the least vulnerable to climate change. In Western Asia, only Israel and Cyprus are counted among the developed, high-income economies. Among the rest, there are significant oil-exporting countries - namely the GCC, Iran, Azerbaijan and Russia - some of which have prioritized and started to finance tourism development for a transition to an oil-independent economy. While oil-based financing of tourism is somewhat paradoxical, as such climate-dependent sector's future will be further impacted by warming attributed to fossil fuel emissions, the eventual transformation may help ensure a sustainable development in terms of both adaptation and decarbonization goals.

Note: This abstract is based on the manuscript "Climate Change Adaptation: Capacity Building for Western Asia", currently under review for the Encyclopedia of the UN Sustainable Development Goals (Springer). The study is part of the project (Grant no: 118K191) supported by TÜBİTAK – The Scientific and Technological Research Council of Turkey.

Keywords: climate change, ski tourism, adaptation, adaptive capacity, Western Asia

"It's in our DNA": Climate change and perceived resilience and adaptive capacity in nature-based tourism in Lofoten, Norway

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Background

Tourism is often cited as a strategy for future development at national, regional, and local level, especially for rural regions where restructuring of primary industries based on natural resources has led to less workforce demand. Up to the COVID-19 outbreak, tourism was the fastest growing industry in the world. In 2018 international travel reached 1.4 billion international arrivals and the industry accounted for 10 percent of all jobs and 10.4 percent of the world´s GDP. The expectation that the growth will continue, however, has with the onslaught of the COVID-19 become highly uncertain. Adventure tourism, including nature-based tourism, is one of the fastest growing categories of tourism. Many destinations and regional and national governments prioritize adventure tourism in their development strategies because it is perceived to secure both ecological, cultural, and economic value creation.

Nature-based tourism in rural regions relies heavily on a broad range of more or less vulnerable ecosystem-services (ES), and changes in and degradation of these ES' will affect the tourism sector in ways yet not understood. Only a few studies have addressed climate change impacts and adaption strategies in the tourism industry in Norway, mainly focusing on winter-tourism and changing conditions of snow. Within the CLIM-TOUR project (2018-2021), we investigate impacts of present and future climate change on ecosystem-services (ES) crucial for Norwegian nature-based tourism and explore the resilience and adaptive capacity of nature-based tourism systems at different scale.

This paper takes a closer look at the Lofoten Islands in Northern Norway, where an increase in nature-based tourism over the last two decades has happened in parallel with a restructuring of the traditional fisheries. The archipelago of Lofoten has been populated for millennia, and the inhabitants have always been intrinsically tied to the sea as a main source of food and income. The close connection to the sea, and indeed to the Lofot-fisheries (Lofotfiske) that takes place every winter when the Arcto-Norwegian cod (skrei) migrates to Lofoten to spawn, is an important identity marker for people in Lofoten and should not be underestimated in understanding the recent development of the tourism sector.

With the Lofoten Islands as point of departure, this paper seeks to explore how the consequences of climate change impact nature-based tourism today, and how projected futures through modelling influence actors' perceptions of the future. The paper will present what stakeholders in nature-based tourism perceive as crucial ES for their activities and assess the resilience of nature-based tourism as a system as well as the adaptive capacities of actors within the system. Specifically, we will present and analyse the relation between specific ecosystem services (ES) identified by invited actors as crucial for the tourism sector in the Lofoten Islands, Northern

Norway, what climatic changes they expect in the future, and outline and explain how the practitioners in the nature-based tourism perceive their ability to withstand or adapt to these and other changes.

This paper takes both a retrospective view on the tourism sector´s resilience and adaptive capacity before the onslaught of COVID-19 and will seek to analyse reflections in light of overarching systemic transformative tendencies. The consequences of the Covid-19 pandemic has made specific vulnerabilities of the tourism sector apparent – and the discussions about how to build a sustainable industry more pertinent. We will discuss how the resilience and adaptive capacity has been pushed to its limits and initiate a more forward-looking perspective and suggest how development of a more sustainable tourism sector can contribute to both a more sustainable climate change adaption and a more resilient tourism sector.

Method

The assessments developed and presented in this paper takes a broad approach through stakeholder perspectives and are based on co-production of knowledge between representatives of different scientific disciplines and stakeholders representing the nature-based tourism segment. Through interviews and a workshop where representatives from nine small nature-based tourism business participated, stakeholders were challenged to identify ES' crucial for outdoor activities and attractiveness in Lofoten. With the aid of models depicting potential future climate scenarios, the practitioners were challenged to propose which climate change indicators they found to be related to specific ES of relevance for their activities, and to discuss how they foresee their future vulnerabilities, resilience, and adaptive capacity to climate driven (and other) changes.

Results

We found that the nature-based tourism in Lofoten relies on a great width of different eco-system services, which reflects the wide range of nature-based activities offered in the region. This great diversity indicates a high level of risk spreading, and a resilient system. The majority of operators perceive themselves as flexible and with a high adaptive capacity to what they expressed as constant changes in weather conditions.

We found a shared sense among the practitioners that the weather has been changing, especially the last 10-20 years, and that some operators already have adapted to this fact. Most stakeholders were concerned that climate change-induced temperature increase can cause more bad weather, less snow and that extreme weather will impact infrastructure. Still, even if most of the practitioners perceived themselves as highly adaptive in the short run, they found it hard, and even irrelevant, to "look too far into the future", beyond the lifetime of their own business. We found that the tourism actors have only to a small degree sought to develop strategies to increase their resilience to climate change with the goal of strengthening adaptive capacity. Several of the stakeholders point out that they actually fear the consequences of climate policy more than climate change and its ramifications.

COVID-19 has shown how the global and national tourism market is beyond local stakeholder's control, and thereby illustrates how deep dependence on global markets limits the resilience of the whole tourism system. We argue that a transition process towards a more sustainable tourism industry (on both environmental, social, and economic parameters) is not only a moral issue, but necessary, as a more resilient tourism system that is able to cope with external shocks, is a desired outcome.

Keywords: climate change, resilience, adaptive capacity, sustainable, ecosystem-services

A participatory approach towards a climate-resilient and climate-friendly tourism sector in Erzurum, Turkey

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Background

Climate change has become a dominant force on the tourism industry to transition to more adaptive and sustainable solutions (Knowles, 2019) while collaboration among all actors and stakeholders has been highlighted to be a vital aspect in achieving such transitions that help maintain socioeconomic development and environmental sustainability at and beyond tourism destinations (Hill et al., 2010). Located to the north of the Eastern Anatolia Region of Turkey, the Province of Erzurum is yet another destination that faces climate change adaptation and mitigation challenges.

An economic impact assessment study (Saglik, 2011) has found out that the tourism sector ranks 4th within the Province of Erzurum in terms of its contributions and is highly linked to all other sectors – especially agriculture, manufacturing, and banking. While cultural attractions, health, educational services, and commerce and trade are important in boosting tourism, Erzurum's main offer is winter-based, with various skiing (Palandöken, Konakli and Laleli downhill skiing areas, Kandilli cross county and biathlon circuit, Kiremliktepe ski jumping ramps) and ice sports (climbing, skating, curling, hockey) venues. The region has been long acquainted with skiing, since at least as early as during World War I when Austro-Hungarian officers trained Ottoman troops for ski warfare (Kilic, 2019). Over the years, such battling purpose of skiing evolved into a sportive and recreational one, with the year 2011 becoming another milestone to inject substantial investments into the province's hosting of the Winter Universiade.

Today, the modernized and the internationalizing tourism sector in Erzurum has made climate change a priority on their agenda, where a multidisciplinary and participatory approach is most needed. In response to such a call, the project "Determination of Climate Change Adaptation Strategies for Winter Tourism in Erzurum with a Participatory Approach", supported by the Scientific and Technical Research Council of Turkey (TÜBITAK Grant No. SOBAG 118K191), has been launched in late 2018. This abstract summarizes the methods used and the preliminary results obtained during the project, which is at its final synthesis reporting stage.

Methods

The project consists of several work packages that provide the inputs for the subsequent ones. At the first stage, a desk-based SWOT analysis on tourism and climate change in Erzurum was carried out by the research team. This was followed by mapping of actors and stakeholders on the one hand, and scenario building out of tourism specific climate projections (Demiroglu et al., 2016; 2020a; 2020b; Morin et al., 2021) on the other hand. Following these findings, an initial workshop

was held in June 2019 with actor and stakeholder representatives to improve the SWOT analysis with a participatory and empirical perspective.

The outputs of this first phase were triangulated (Kulozu-Uzunboy et al., 2020) to come up with semi-structured interviews tailored for different actors and stakeholder groups. Following a pilot study, answers to questions on perceived risk and opportunities of observed and expected climate change impacts and the likely responses were gathered from 47 private, public, and nongovernmental sector representatives, 58 tourism sector employees, 61 foreign and 61 local/domestic visitors – altogether totaling 227 respondents. These findings then laid the grounds for two consecutive actor-stakeholder workshops in December 2020 and January 2021 where the participants first carried out a self-assessment of their vulnerabilities and then identified/proposed and prioritized adaptation strategies.

Preliminary Results

Despite an expected increase in warming effects, the current skiing altitude (2100 m – 3100 m) is projected to remain reliable on the upper terrain throughout the century. On the lower terrain, reliability can be maintained only technically with the help of snowmaking. Indeed, ski area operators note that the ski season now can be extended to as long as 210 days with improved snowmaking and grooming and the recently applied snow storage practices. Such improvements take place thanks to the increasing adaptation and competition needs and the recent professionalization of ski area management. In relative terms, Erzurum holds a comparative advantage as some of its main competitors are or will be facing more severe snow reliability issues. However, Erzurum is also relatively more remote to the source markets such as Istanbul and therefore most often requires air travel. This is seen as a disadvantage in a future where carbon policies, but more importantly, consumer awareness make air travel less desirable. In this respect, the province's fairly good railroad connectivity is considered as an alternative to be strengthened in terms of achieving the environmentally conscious visitors. Likewise, alternative measures such as rainwater harvesting is on the agenda to combat with the ever-increasing demand for snowmaking.

Most actors are keen on research, development, and innovation for improved competitiveness, sustainability and climate change adaptation. One of the pioneering attempts has been to apply a grass skiing field on the actual ski slopes. Plans to lay dry skiing material on the slopes are also considered but questions remain regarding its costs and practicality (higher frequency of injuries is reported for these materials). Besides ski-oriented strategies, other tourism types are also being developed, among which one can count high altitude camps for athletes, thermal springs (an exploration survey is still ongoing), integration of local gastronomy and heritage (Silk Road, martyrdom etc.) with the ski product (cultural skiing). Moreover, plans to take further advantage of climate change are in place, e.g. to develop cool summer tourism in a warming world.

Actors of Erzurum seem to be in agreement to capitalize on their relative climate resilience and develop the tourism product accordingly, while remaining as sustainable as possible. A master

plan to connect the main ski areas and to found a ski village on the foothills of Palandöken Mountain is on its way. Entire design is to follow green principles, including a forestation belt between the ski areas and the City of Erzurum (which is literally a couple of kilometers away from the ski zone). However, experts note that, while such investments could make the destination even more resourceful in terms of its adaptive capacity, a stable transformation may not take place unless destination governance is institutionalized. Without a strong Destination Management Organization operating in the region to lead and coordinate all actors and stakeholders, many physical investments and capacity building efforts undertaken by temporary actors such as municipal governments could be jeopardized.

Note: This study is part of the project (Grant no: 118K191) supported by TÜBİTAK – The Scientific and Technological Research Council of Turkey.

Keywords: winter tourism, ski tourism, sustainable tourism, climate adaptation, participatory approach, Erzurum

Voluntary simplicity, tourism and sustainable transformation in the wake of the climate crisis: The case of the ski bum

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Background

The UrbanDictionary.com provides two definitions of a "ski bum" as "a skier, usually male, in his late 30's or older, who generally spends the entirety of his life at ski resorts" and "one who works for low pay in exchange for benefits for example free ski passes or the coveted multi area season's pass as well as good deals on gear". These popular definitions reveal some links between the specific lifestyle that might also help us understand this small community in relation to ongoing debates about sustainable transformation from a critical perspective. Moreover, in a time when increasing focus is put on criticizing the modern Western way of life, the ski bum is on his way to becoming extinct. The resource sustaining his lifestyle is decreasing, not only because of climate crisis but also due to corporatization (Clifford, 2002) and "over-resortification" (Sykes, 2007) of the ski landscape. This means that the geographical possibilities are decreasing and might evoke feelings of this being a 'Last chance' among ski bums themselves.

Method

The suggested methodology is two-phased where a deductive review is followed by qualitative empirical research. In order to broaden the discussion, we explore some of the avenues suggested in recent literature on voluntary simplicity and its connections to sustainable transformation both at an individual level but also as part of systemic change in society as a whole. We address issues that are temporal, spatial, and motivational to understand the concept of voluntary simplicity and we depart from a systems perspective to understand how the example of the ski bums might be used to discuss some of the challenges we face in the wake of climate crisis. We further aim to explore the Swedish ski bum community and the push and pull factors driving them to this alternative lifestyle through snowball sampling based qualitative techniques.

Expected Results

The results are expected to shed light on the spatiotemporal patterns and the sociocultural and economic trends pertaining to ski bums. Further, we aim to discuss the results against the wider backdrop of sustainable transition and voluntary simplicity as phenomena. In other words, we try to discover if and how this niche perceives and interacts with the socionature and what role environmental concerns play in their quests, and how they may fit or not to the contemporary climate activist profiles within the ski community (Demiroglu & Turhan, 2021). We also try to connect the insights to a more critical framework vested in the literature on the gig economy and "bullshit jobs" (Graeber, 2018) as the flip side of being 'free' and to the global sustainability goals recently criticised for not being able to fundamentally change and transform our society to

becoming truly sustainable (Hall, Lundmark and Zhang, 2021), while also acknowledging the practical challenges of radical transition alternatives (Büchs & Koch, 2019).

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Keywords: lifestyle/amenity migration, voluntary simplicity, sustainable transformation, snowball sampling, climate crisis, ski bum

Development of summer skiing days in Austrian glacier ski areas in the first two decades of the 21st century

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Background

The decline of summer skiing in the Alps is not a new phenomenon (Abegg et al., 1994), and a wide array of determining factors such as climate change leading to glacier shrinkage and worsening snow conditions, demand shifts, negative image and low price-performance-ratio have been identified (Mayer, 2012). However, this process has not been well-documented so far (Abegg & Mayer, in prep.), despite serving as a significant socio-economic indicator of climate change impacts in high-mountain environments (Sommer et al., 2020) and being referred to as one of the first tourism victims of climate change (Mayer, 2012). Mayer and Abegg (in prep.) fill this gap by illustrating the negative diffusion curve of summer skiing in the Alps since the Mid-1980s. However, to complement their macro-level indicator whether a glacier ski area offered summer ski in a certain year or not, we shed a more detailed light on the decline of summer skiing on a daily basis. Thus, we are able to analyze the shortening of summer ski seasons even for the glacier ski areas (GSAs) which still offer this activity. For these reasons, we show in detail the development of summer skiing days in Austrian GSAs in the first two decades of the 21st century and combine them with glaciological and weather indicators as well as information on the operating companies' strategies.

Method

As detailed skier days numbers of the summer season are not available, we analyze the development of the number of operating days in the summer half year (SHY), the meteorological (MET) and the astronomical summer (ASTR) for the nine Austrian GSAs for the 2002 to 2019 period. We compiled the daily operating status from various sources: operators' internal data, user reports in skiers' online communities (mostly sommerschi.com), newspaper articles as well as website and webcam archives. We aggregated the summer ski operation days and calculated their share in relation to potential maximal operation days. Weather data (seasonal means of temperature and sunshine hours) representative for the higher altitudes of the Austrian Alps are taken from Hoher Sonnblick station (ZAMG, 2021). Glacier mass balances, elevation of the accumulation area ratio (AAR) and equilibrium line altitude (ELA) for the respective summer seasons come from two long-term time series: Vernagtferner in Tyrol (Bayerische Akademie der Wissenschaften, 2021) and Stubacher Sonnblickkees in Salzburg (Slupetzky & Ehgartner, 2014; Zagel, 2021), representing Western and Eastern Austrian glaciers. These data were correlated to the number of operating days using Pearson correlations. Background information about operators' strategies come from personal interviews, own observations, press releases and newspaper articles.

Results

In the SHY 2002 the nine GSAs offered 1217 ski days of a potential maximum of 1656 (73.5%), followed by a pronounced decline for seven of nine GSAs. Even though all nine Austrian GSAs still offer skiing in the SHY, the share of operating days declined by 48.3% to 38.0% (2019). MET summer ski was offered in 2002 by eight of nine GSAs with 64.7% of potential operation days. As for 2019, only four GSAs offer MET summer ski adding up to only 22.6% (-65.2%). ASTR summer ski offer reduced from nine GSAs (61.4%) in 2002 to six GSAs (23.2%), which corresponds to a decline of 62.3%.

A closer look at the temporal dispersion of these declines is also revealing. Comparing the monthly averages of the years 2002-04 and 2017-19 (to control for varying weather/snow conditions), the strongest decline in summer ski operation in Austrian GSAs occurred in August (-59.9%), followed by July (-53.2%), June (-49.9%) and September (-46.0%). The shoulder months May (-22.1%) and October (-13.6%) have considerably smaller declines. The difference between May/June and September/October clearly shows that snow conditions/abundance do not solely explain the decline in summer (half year) ski operation as the late spring/early summer season is usually not hampered by a lack of snow but of demand – for late summer/early autumn exactly the other way around holds true (Mayer et al., 2018).

The correlation analyses with glaciological and meteorological data show that the mass balance of Vernagtferner is positively correlated with SHY (R 0.436, $p<0.1$), MET (0.379, $p<0.2$) and ASTR (0.489, $p<0.05$) operating days. This shows that the less negative the mass balance (mostly due to lower summer temperatures, higher precipitation in winter), the higher the number of summer ski days which indicates better skiing conditions. However, the correlations with SHY (April to September) (SHY: -0.744, $p<0.001$; MET: -0.633, $p<0.01$; ASTR: -0.708, $p<0.01$) and summer (June to August) temperature means are even stronger (SHY: -0.583, $p<0.02$; MET: -0.574, $p<0.02$; ASTR: -0.630, $p<0.01$). Obviously, the warmer the summers, the less summer ski operation. The sunshine duration in summer and ELA of Vernagtferner are not significantly correlated. In contrast, the AAR of Vernagtferner is positively, more strongly and significantly related to the number of operating days (SHY: 0.507, $p<0.05$; MET: 0.447, $p<0.075$; ASTR: 0.525, $p<0.03$).

These significant correlations notwithstanding, the results are far from being weather- and climate deterministic as the operators' finally decide about summer ski operations. For instance, both GSAs in Sölden stopped ski operations from May to Mid-September beginning in 2003 and 2006 respectively (but occasionally offered training possibilities for athletes also in high summer), while Mölltal even increased its operating days due to extensive climate change adaptation measures in the form of depot snowmaking on the remains of Wurtenkees glacier. Similarly, in Hintertux the operators decided to remain the only Austrian GSAs to offer year-around skiing, also using snowmaking, depots and snowfarming (and also skiing with debatable conditions in late summer). Pitztal glacier in contrast stopped high summer operations already in the Mid-1990s despite offering the highest altitude of all Austrian GSAs.

Thus, our study reveals that the decline of summer skiing is even stronger when analyzed in detail and based on daily data compared to the assessment on the Alps-wide scale which is much rougher due to data availability. Decline of summer skiing is indeed a tourism symptom of progressing climate change but not one-dimensionally caused by global change.

Keywords: glacier ski areas, climate change, summer skiing, decline, operating days, Austria

The relationship between last-minute cancellations and weather conditions for winter safaris

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Background

The region above the Arctic polar region is more affected by global warming. In recent decades, weather variability has increased in Finland and the winter of 2019/2020 was the warmest meteorological winter since weather records began (source FMI). However, despite the significant year-to-year variability in Christmas weather in Finland, a white Christmas is almost guaranteed in Lapland (source: FMI). A large number of studies investigate the relationship between actual demand for winter sports activities (e.g. skiing or cross-country skiing) and indicators of climate variability, as well as how demand is influenced by extremely mild winter seasons compared to climatically normal seasons (Steiger, Scott, Abegg, Pons & Aall, 2019 for a review of the literature). However, winter safaris are less studied in this context. Shorter husky safaris typically require minimal snow cover, but the large network in Finnish Lapland opens in late December. There is a wide variety of safaris available for tourists in Lapland destinations. The biggest operator is Lapland Safaris Ltd. which has activities in seven locations across Lapland. The most popular among tourists are snowmobile, husky and reindeer safaris, especially among foreign tourists.

This study investigates the individual cancellation behaviour of guests who have booked a winter (Husky) safaris. The idea of the analysis is that last minute cancellations have more to do with the weather at the destination than early and medium-term cancellations which have other reasons, as temperature and snow conditions are not predictable long in advance. Therefore, the survival model is used that allows to model the probability and timing of cancellation. Previous studies mainly have investigated the probability of cancellations using a probit or logit model without exact information on the cancellation date. Knowledge of the cancellation date is important because late cancellations are more likely related to lack of snow or high temperatures than early cancellations. Cancellations can be seen as the termination of an existing booking and can be interpreted as a reverse demand.

The main contribution is that besides the use of a duration model the study explicitly focuses on outdoor snow safari cancellation, which has not been studied before. In addition, new variables are introduced such as the geographical distance to the city of the origin country.

Method

The relationship between the cancellation probability and the weather indicators is modelled using a survival model. The survival model is estimated separately for each winter month (from December to April). Amount of daily snow (in centimetres) and daily average air temperature (in Celsius) is measured at the nearest Finnish Meteorological Institute's weather stations linked to the planned event date of the booked safari trip. The database contains information on the exact

cancellation and arrival date which allows to identify whether the cancellations are due to weather factors or due other factors. Control variables consist of size of the travel group, travellers with children, country of residence and length of planned stays. Husky safaris are dependent on sufficient snow cover. Unlike skiing or, to a lesser extent, cross-country skiing, the trails are not supplied by snowmaking equipment when there is a lack of snow. The main hypothesis is that snow cover and temperatures are related to short term cancellations particularly in the early and late season. Poor snow conditions might lead to short tracks for the safaris which in turn leads to a higher likelihood of cancellations. The data is based on about 22000 booked winter safaris in the village of Ylläs in Finland for the period 2014 to April 2019.

Empirical results

Of the 22000 bookings for winter safaris of the tour operator 18 per cent are cancelled. The majority of bookings are for the core winter months January (35 per cent) and February (31 per cent), followed by December (18 per cent) and March (15 per cent). April accounts for less than 1 per cent of the bookings. The cancellation rate varies across month with highest in March. The cancellation rate also varies by years between 15 per cent in 2016 and 22 per cent in 2019. Small groups (1-2 persons) have the lowest cancellation ratio. The cancellation rate also differs by country of origin (Germany 26 per cent, the Netherlands 31 per cent, Switzerland 15 per cent, UK 3 per cent). The average cancellation time is 54 days and the lowest in March with 40 days. The results of the duration model show that snow depth and temperature on the planned day of arrival are significant determinants of the last-minute cancellation behaviour in the late winter season. In addition, the relationship between weather factors and the cancellation probability differ across types and location of the individuals.

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Keywords: winter safari, cancellations, weather, bookings, survival model

Tourists' perception of and reaction to extreme weather events

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Background

Weather and climate are important factors for the tourism industry, both for the demand and supply side. Both have a crucial role in different phases of the decision-making process (including motivations, timing, activity and destination choice) and influence tourist´s holiday experience, destination images and revisit intention (Besancenot 1978, 1989; Bigano et al. 2006; de Freitas 1990, 2003; Hamilton & Lau 2005; Lohmann & Kaim 1999; Scott & Lemieux 2010, Scott et al. 2012).

Research on relationships between weather/climate and tourism can mainly be divided into three methodological approaches: (1) climate indices (e.g. Mieczkowski 1985; Moreno & Amelung 2009; Scott et al. 2004), (2) econometric analyses of tourism flows (Falk 2010, 2014; Hamilton et al. 2005; Köberl et al. 2015) and (3) studies on weather preferences and behavior (e.g. de Freitas 1990, Dubois et al. 2009, Scott et al. 2008).

This paper wants to contribute to the latter stream of the literature by investigating how extraordinary weather events influence tourist´s perception and behavior by using a retrospective survey. The objective is to get insights into the interaction of perception, emotional processing, and behavior and with regard to extraordinary weather events.

Methods

To assess tourist´s experiences of extraordinary weather events on a holiday, their perception as well as the short- and long term behavior, a standardized questionnaire was developed. In contrast to existing tourism surveys, which assess the impact of hypothetical weather/climate situations on tourist perception and behavior (e.g. Dubois et al. 2009, Rutty & Scott 2010, Hewer et al. 2014), this study investigates perception of and reactions to actual experienced situations. The questionnaire was based on a qualitative study from Gössling et al. (2016) and supplemented with aspects regarding behavioral adaptation options from studies of de Freitas (2003) and Dubois et al. (2009), as well as regarding future travel behavior (return intention) from a study of Hübner & Gössling (2012). It was carried out in German, because the target groups were German speaking citizens from the Austrian city Innsbruck and the German city Freiburg.

In order to verify whether the type of experienced weather event influenced the perception, emotional processing and behavior of respondents and to identify differences between subgroups concerning the perception (negative, neutral, positive) the Chi^2-test, Mann-Whitney-U test and Kruskal-Wallis test were used depending on the data level.

To obtain more in-depth understanding of the relation between perception, emotions and behavior, the data was analyzed from two viewpoints: (1) the weather event perspective and (2) the perception perspective. In this context it should be examined (1) whether perception,

emotions, and behavior (reactions) differ depending on the type of weather event experienced and (2) if the kind of perception influences emotions and reactions.

In order to improve the understanding and optimize analyses concerning emotional processing in the course of weather-related holiday experiences, an Emotion-Intensity-Value (EIV, range between 0-25) was developed, that provides a better comparability of emotional processing between different tourists.

Results

In total, 899 valid questionnaires were collected, of which nearly three quarter (69.5%) of respondents stated experiences with at least one of the six prompted weather events during holiday. These 625 questionnaires were used for further analyses.

From the weather event perspective, it was found that the perception differs significantly based on the type of weather event experienced, with heavy rain, storm, intensive/severe cold and lack of snow being perceived more negative than intensive/severe heat and heavy snowfall. Further, storm and heavy rain events were perceived significantly more threatening than other weather situations. Moreover, it was found that the emotional processing differs significantly depending on the type of weather events experienced, with storm (EIV mean: 5,79, SD: 5,311) and heavy rain (EIV mean: 4.27, SD: 4.402) being associated with significantly stronger emotional processing than intensive/severe heat events (EIV mean: 1.62, SD: 3.144) ($p=0.000$). Revisit intention differs significantly between the types of experienced weather events ($p=0.005$), with storm and heavy snowfall events being related to the highest and severe/intensive heat as well as lack of snow events being related to the lowest return intentions.

From a perception-based perspective it was found that stronger short-term reactions are related to higher EIVs. In other words, respondents who cancelled their holiday, changed their accommodation and/or location due to the experienced weather event had higher EIVs (mean: 8.17, SD: 6.031) than respondents choosing more weak reactions like “change of activities” and/or “wait and see” (mean: 4.27, SD: 4.511). Respondents who showed no short-term or long-term behavioral adaptations had the lowest EIVs in this sample (mean 1.91, SD: 3.461).

Conclusions

Results showed that emotional processing and related behavior are influenced by the kind of perception. The more negative the perception, the stronger the emotional processing and reactions. Therefore, destinations should develop solutions to avoid negative perceptions and emotions in the case of unusual weather events (i.e. through alternative offers, increase of comfort, (risk) communication). Information about occurrence and potential impacts of weather events in affected regions could help reduce negative emotions of tourists in such situations.

Keywords: tourist behavior, weather perceptions

The impact of climate on tourist arrivals to Kyrgyzstan

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Background

Climate is a key factor influencing a tourist's destination choice (Hamilton & Lau, 2005, Hadwen et al., 2011). Kyrgyzstan's great distance from the oceans and its topography strongly influence the country's climate (Sinor, 2021). Tourism activities are mostly dependent on climatic elements such as the amount of rainfall and temperature. Several studies in relation to the connection of climate and tourism have increased in the past years (Becken & Wilson, 2013), yet there is still a dearth of literature in the case of Central Asian countries like Kyrgyzstan. The role of climate in tourist destination choice has been analyzed for 178 countries for the period 1995 - 2010 using gravity model. Results show how climate change implies a greater loss of attractiveness for traditional warm destinations while increases attractiveness for colder countries (Rosselo & Santana, 2014). In the case of Kyrgyzstan, although the economy relies much on agriculture and mining, tourism is also a significant economic contributor with 8.3% contribution to GDP (WTTC, 2019). More than 85% of tourist arrivals to Kyrgyzstan are from neighboring countries - Uzbekistan and Kazakhstan (UNWTO, 2019). This can be related to a study by Tol & Walsh (2012) that suggests tourists' preference to stay relatively close to their home country while those from warmer origins have stronger climate preferences. Analyzing the impact of rainfall and temperature on tourist arrivals would provide a clear proposition for tourism policy planning and destination management.

Data and Methodology

The gravity model has been applied to estimate the effect of climate change on tourist arrivals in Kyrgyzstan. Gravity model is widely used to analyze international trade flows (Anderson & van Wincoop, 2003), immigration flows (Lewer & Van den Berg, 2008), and extensively in tourism flows (Rosselló-Nadal, 2014; Waqas-Awan et al., 2020).

The augmented version of gravity model can be written as follows:

$$\ln Tour_{ijt} = \beta_0 + \beta_1 \ln GDPpc_{it} + \beta_2 \ln GDPpc_{jt} + \beta_3 \ln Distance_{ij} + \beta_4 Border_{ij} + \beta_5 Temp_i + \beta_6 Temp_j + \beta_7 Rain_i + \beta_8 Rain_j + \partial_{ij} + \lambda_t + \mu_{ijt} \quad (1)$$

Where, Ln defines natural logarithms; i and j are sub – indices, denote to the country of origin and destinatin; t is time period for 2008-2018; μ_{ijt} is a well-behaved disturbance term; ∂_{ij} and λ_t shows country-pair and year fixed effects; β_0 is an intercept; and $\beta_1,..,\beta_8$ are parameters to be estimated. The gravity equation is estimated using Fixed effect estimators introducing country-pair and year fixed-effects in the model.

Data

The following data were used in this study. Tourijt is used as a dependent variable and represents the number of international tourist arrivals in Kyrgyzstan from 48 countries of origin for 2008 - 2018. Data were obtained from the World Tourism Organization database (UNWTO, 2019).

A set of explanatory variables was adopted. Specifically, GDPpcit and GDPpcjt indicate GDP per capita (current US dollars) in the country of origin and destination. These are time-variant variables and used as a proxy of income (Crouch, 1992; Lim, 1997), and obtained from World Bank Development Indicators (WDI). Distanceij indicates a distance as the number of kilometers between countries of origin and destination. The distance is used as a proxy for transport cost (Mayer and Zignago, 2011). Borderij is a dummy variable which takes 1 if origin and destination country share a common border, 0 otherwise. These variables were obtained from Research and Expertise on the World Economy (CEPII).

Regarding variables of interest, Tempi and Tempj show annual average temperature (in Celsius) in both origin and destination countries. Raini and Rainj denote the precipitation (in millimeters) in the origin and destination countries. These variables were obtained from Tyndall Centre for Climate Change Research database.

Results

The findings reveal interesting outcomes. Tourist arrivals in Kyrgyzstan is highly dependent on temperature and precipitation. A surge in average temperature in Kyrgyzstan would cause a decrease in the number of tourist arrivals. A moderate temperature in Kyrgyzstan tends to attract more tourists. Interestingly, the pleasant temperature in the origin countries indicate that tourists prefer to stay in their home countries than Kyrgyzstan. Similarly, the high amount of rainfall in Kyrgyzstan leads to a decline in the number of tourists. In contrast, the high amount of rainfall in the origin countries would generate more tourists in Kyrgyzstan. Tourists from neighboring countries of Kyrgyzstan are highly sensitive to precipitation and less sensitive to high temperature. Moreover, GDP per capita has a strong positive effect on the number of tourist arrivals in Kyrgyzstan.

Conclusion

Kyrgyzstan is an emerging country of Central Asia and tourism contributes a significant share to the whole economy of the region. Kyrgyzstan attracts thousands of tourists annually due to its pleasant weather and natural attractions. However, there are only a few studies that have been conducted exploring the determinants of tourism demand. There are no studies that have been analyzed yet about the effect of climate on tourists traveling to Kyrgyzstan. Based on this research gap, this study contributes to the literature, analyzing the impact of climate to tourism in Kyrgyzstan. The findings suggest that a moderate temperature and low amount of rainfall in Kyrgyzstan highly encourage tourism. It is strongly recommended to increase the number of tours during the seasons of low and moderate temperature, especially for tourists traveling from neighboring countries - Kazakhstan, Tajikistan and Uzbekistan.

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Keywords: Climate, tourist arrivals, gravity model, Kyrgyzstan

Use of (bio)climatic information in high altitude sportive camping tourism, the sample of Edremit, Van Football Camping Centre

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Background

Tourism is among the fastest and consistently growing sectors all over the world for the last 3-4 decades. Contribution of tourism sector to national and local economies depends strictly on the types and quality of tourism services and the amount of money in return for them. Tourism is responsible for 10.3%, 6.8%, 28.3% and 4.3% of global GDP, global total exports, global service exports, and global total investment, respectively. Turkey witnessed a period of uninterrupted growth in the tourist number and receipts by 2000s and achieved record increases in the years without crises. In the last three national development plans of the country (9^{th} ,10^{th}, and 11^{th} Development Plan), measures and policies have been proposed to increase tourism revenues compared to tourist number and spatial and sectoral strategies have been developed to diversify whole – year tourism activities.

One of the most prominent tourism activities to contribute to the country's these targets is high-altitude sportive camping, which;

• Can use the infrastructures completed for other tourism types (e.g. winter tourism) with little extensions,

• Needs no large – extended infrastructure and promotional investment – expenses,

• Can offer higher rate of tourism revenues compared to mass tourism activities even though the camping season is shorter, and expenses are lower,

• Enables the destination to have a precious brand, a positive image and be promoted more effectively.

• Lastly requires the areas with the elevation of higher than 1500m and suitable (bio)climatic comfort conditions.

High – altitude sportive camping is based on the idea that training at high altitude can enhance sport performance and trainers prefer to prepare and complete programs including this training type. High altitude sportive camping has been accepted as an important type of tourism since it can contribute greatly to the promotion and branding the destinations, provide greater amount of receipts to the host city, region and country in a shorter time and per person compared to mass tourism activities, attract large number of additional tourists to the sport teams coming to a destination for training. Therefore, the destinations which are aware of the benefits of this tourism type struggle to develop infrastructure for the sportive activities, make promotion to the teams from all sportive branches and conduct campaigns including short-term championships with a small number of teams. In this respect, weather conditions and thermal comfort levels (heat stress)

are important parameters for not only the satisfaction of training sport-men/women with the air which shouldn't make them feel discomfort but also the visitors coming to see their favourite teams performing outdoor.

Use of the (bio)climatic comfort information in the determination of suitability of a given location for the proposed tourism activities is not a new development. In the previous studies, several tourism climate indices were proposed and used for the sample areas. Some of these indices use climatic parameters together with other tourism potentials while others prefer to adopt combined effect of climatic parameters on tourists as bioclimatic comfort conditions as well as the effect of individual climatic elements. In this respect, bioclimatic comfort information is important for tourism sector since it can give insights about the satisfaction of visitors with the ambient air conditions, these values can provide opportunity to compare the destinations related to their suitability for some leisure and outdoor activities.

This study is aimed to mention about;

a) the definition, necessity, and importance of high-altitude sportive camping in terms of tourism,

b) the use of bioclimatic comfort information for the determination of a destination for high – altitude sportive camping activities

c) on a prospected example sportive camping in Edremit district on the coast of Van Lake in Van Province, Turkey by determining the suitability of (bio)climatic conditions in the area.

Method

In order to determine the suitability of Van city centre and its surrounding (Edremit), for high altitude sportive camping from tourism perspective, following stages are adopted in the study.

• Present situation and potentials of tourism in Van province and its region are evaluated.

• Prevalent climatic characteristics are analysed in terms of their suitability for this type of tourism activity considering also bioclimatic comfort conditions calculated by using Physiological Equivalent Temperature (PET; Höppe 1999) to determine the level of thermal stress to show if the training sport-men/women are comfortable during the training hours,

• In the camping season (from May to September), climatic elements are also evaluated individually,

• Physical accessibility (transport types, distance etc.) is also considered for the city centre,

• Usability of infrastructure for touristic facilities (like accommodation etc.) in the city is determined for sportive camping activities.

Expected results

The results show that (bio)climatic conditions are highly suitable for the sportive camping season in the area and the city can accommodate sportive teams not only from football but also all types of branches including swimming and athletics.

Keywords: sportive camping tourism, high altitude, climate change, bioclimate, tourism branding, promotion

Willingness-to-pay for sustainable alpine skiing experience

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Background

The alpine skiing industry is forced to look for new and "smarter" operational strategies as it highly depends on the natural environment and simultaneously creates significant environmental impacts (Polderman et al., 2020). Achieving sustainable profitability, when services are both profitable and environmentally friendly in the alpine skiing industry could be complicated. Switching to more environmentally friendly and sustainable strategies imposes significant additional costs on the ski area (Kim, Lee, & Fairhurst, 2017). Despite the fact, that already two decades ago Hudson and Ritchie (2001) found that the majority of skiers intend to pay more to visit a ski area attempting to reduce its environmental impact, the research has not addressed the possibilities to combine pricing schemes with environmental consideration to make alpine skiing more sustainable. Therefore, the aim of this article is to fill this knowledge gap by examining the skiers' attitude towards a ski area's initiatives to improve its environmental performance and skiers' willingness-to-pay (WTP) for an opportunity to ski at an environmentally friendly ski area.

Method

We use the choice-based conjoint questionnaire to gain a better understanding of the skier's decision-making processes with regard to their WTP for a more sustainable skiing experience. The study was conducted in Norway and Switzerland in the period between September 29 and October 12, 2020. Five-hundred Norwegian residents and five-hundred Swiss residents were recruited from a large online panel to participate in an online questionnaire.

Choice-bases conjoint questionnaire was used to determine attribute importance because of its ability to simulate a realistic decision-making situation (Rao, 2014). Interviews with alpine skiing industry experts in Norway and Switzerland were used to select the environmental attributes and their levels to be included in conjoint choice sets. We ended up with three environmental attributes (environmental certification, carbon-neutral skiing, and usage of artificial snow) and the price attribute with four levels (EUR30, EUR40, EUR50, EUR 60). Additionally, we included a control question capturing the respondents' self-identity as a "green" consumer, as it may also influence their preferences for a sustainable skiing experience (Olson, 2013).

Expected results

- Skiers are willing to pay more for a one-day ski lift ticket in the ski area that is environmentally certified.

- Skiers are willing to pay more for a one-day ski lift ticket in the ski area that participates in carbon offsetting projects to balance out the ski area's climate impact.

- The skiers that make up the environmentally-conscious segment have a higher WTP for more environmentally friendly alpine skiing than the environmentally unconscious segment.

- Skiers are willing to pay more for a one-day ski lift ticket in the ski area that ensures reliable snow cover by artificial snow production.

The findings of this study would provide insights on how the ski area can incorporate environmental properties into the pricing strategy and justifying incremental changes to pricing.

Keywords: ski area, alpine skiing, sustainability, willingness-to-pay, Switzerland, Norway

Green social entrepreneurs & carbon binding touristic theme park: CO_2 mitigating cosmetics production in the Blue Lagoon, Iceland

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Background

There is an ongoing paradigm shift toward greater open innovation and new responsible business solutions with foundations of cooperation and strong relationships with customers and network partners. This study looks at the possible role of social entrepreneurship and lead users in mitigating climate change through responsible cosmetics.

Lead users are at the leading edge of an important market trend(s), and so are currently experiencing needs that will later be experienced by many users in that market. They tend to innovate because they anticipate relatively high benefits from obtaining a solution to their needs. Lead-users have tastes or demands that are ahead of the general market. They will most likely be less than 10% of all users (von Hippel, 1986, 2005).

Social entrepreneurship incorporates co-creation and a strong network lens and strengthens the perspective that innovative actors can be anywhere in the network of the potential organization. Social entrepreneurs as social innovators (Casson, 2005; Certo & Miller, 2008) is connected to the "triple bottom line" concept. Green social entrepreneurship uses opportunity spaces that can be based on environmental or sustainability trends (Cohen & Winn, 2007; Dean & McMullen, 2007).

Methods

The main research question is to look at the role of social entrepreneurs and lead users in the green innovation field of health & spa tourism destinations. This is a case study using historical data from Iceland and interviews with managers, customers and network partners of a geothermal destination, the Blue Lagoon spa. The case was chosen with a two-step selection process. The first step was to consult with reference groups of experts from the tourism and travel field in Iceland about the most innovative organization in the country. Then, pilot interviews with target cases to find out which companies would be the most pertinent case studies. A total of 27 interviews were used in the data analysis. The interviews were all in the form of digitally recorded semi-structured interviews. The data was organized into topic themes and analysed with theme coding.

Findings and discussion

Initially, the Blue Lagoon idea came from the individual trials of patients with psoriasis, who experimented with the silica- and mineral-enriched wastewater from a geothermal power plant. These treatments led to development of a world-famous health clinic over the course of 25 years. The healing effects of the water have been scientifically confirmed. Parallel to this innovation, the organization developed a mass tourism spa with more than 1 million visitors annually. An increasing field has been skin care and anti- aging products using the water from the lagoon. The

production of the cosmetics is an increasing part of the Blue Lagoon brand. One project has increased algae production rate 10 times. A ´carbon footprints free´ process has been designed that binds CO_2 from the geothermal plant in growing the algae. The company has been emphasizing its brand as green organic nature related in a high price range, almost as a luxury brand in competition with cosmetics. "To create energy for life through the forces of nature" is the Blue Lagoon mission. The R & D department has green chemistry as its core ethos. The Blue Lagoon´s proximity with clinic patients and spa customers has a test bed effect for the new products. At the same time this is an opportunity for the company to educate customers with green initiatives and catalyst change of mindset as a true agent of climate mitigation. They have started this process by using the ´crazy lab´ among lagoon guests in a playful way like in a Disney theme park, using cast of young actors to engage with the guests and create the ´magic´ experience. Here is a short line over to the Experience Economy (Pine & Gilmore, 1999) where the Blue Lagoon could incorporate ´green magic experiences'.

We argue that a new green tourism destination could be based on extreme (health) needs of Lead users. The pioneer in the Blue Lagoon case could be classified as a social entrepreneur that leads to the contribution of Shah and Tripsas (2007), describing the accidental entrepreneur as a heavy user with own experience and then makes a better service offering in a start-up company. There is an opportunity for expansion of both concepts, looking more closely at the impact and evolution of health and spa organizations that start with a community-based non-profit mission. Both theoretical frameworks could be relevant in the hospitality industries striving for more responsible solutions mitigating the climate change. Could also easily be connected through the double and triple bottom line frameworks, in this case balancing the social and economic dimensions. Social entrepreneurs can be locally embedded with knowledge of the needs in a special situation, needs that individuals can solve themselves or help others with. It is the same with Lead users, who need to innovate to increase the likelihood of survival or performance for the individual or his peers. There are many similarities between these concepts that could lead to more fruitful research opportunities and more thorough testing and comparison.

There appears a possible role of non-human actors in the case, in form of the silica & algae that form the cosmetics ingredients. Actor Network Theory is one avenue to explore since there is an interesting link between tourism innovation and SD logic through Callon (1991, 1992, 2002) where both Sundbo et.al. (2007) and Vargo (2009) connect to the techno-economic networks. One of the first psoriasis patients in the BL took the mead (silica mud) of the lagoon and experimented with it in his bathtub, it later led to marketing of a new skin product. Nature and other non-human actors are common in the tourism setting, so why should we not include them as possible drivers (actors) of innovation?

Keywords: social entrepreneurs, lead user, cosmetics, Blue Lagoon, green tourism, health & spa

Applying sustainable tourism in protected areas: Case of Zombitse Vohibasia National Park – Madagascar

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Tourist destinations across the world are facing an increasing number of challenges. Entertainment markets, tourist destinations and interests and habits are constantly developing. Tourists then are more experienced, more critical, and more conscious of quality and are seeking better experiences as well as 'good value for money'.

Therefore, the principle of sustainable tourism can most fundamentally have been seen as an application of ideas for sustained development to the tourism field (Weaver, 2006). The World Commission on Environment and Development (WCED, 1987) described sustainable development as a mode of development that meets the needs of now without impacting the ability of future generations to meet their own needs.

The motivations, expectations, and perceptions of tourists impact the tourism resource itself in the sense that they evaluate what object or destination becomes a tourist attraction and its relative market value. The diverse structure and the changing value of the distinct forms of tourism products can largely be explained by the evolution of the demand towards tourism.

Sustainable tourism, afterward, has become an increasingly popular area of research since the 1980s and the 1990s. However with false assumptions and arguments, the debate regarding sustainable tourism is now fragmented, disjointed, and often imperfect (Liu, 2003).

The concept of sustainable development has its sources in environmentalism, which gained fame in the 1970s. The International Union for the Conservation of Nature and Natural Resources (IUCN, 1980) first highlighted the concrete idea of sustainable development in its World Conservation Strategy.

As a local product, tourism requires three levels of resources: tourist attractions, including natural, cultural, and purpose-built attractions; infrastructure to support tourist activities; and social and physical environments, including community hospitality.

Sustainable tourism or alternative tourism is thus, at best, a micro solution to what is ultimately a macro problem (Wheeller, 1991). It remains to be seen if the International Year of Ecotourism 2002 introduced by the WTO and the United Nations Environment Program (UNEP) really led to the advancement of the world tourism.

The World Tourism Organization (WTO, 2001) presented a definition of sustainable tourism as the following: "The development meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while

maintaining cultural integrity, essential ecological processes, and biological diversity and life support systems".

Sustainable tourism focused on the preservation and conservation of natural resources (Liu, 2003). Natural assets or resources can be categorized, based on availability, into three main groups: ubiquity, which exists everywhere; commonality: commonly accessible in many areas; rareness: it occurs in very few locations place (Healey & Ilbery, 1990).

Zombitse Vohibasia National Park

Zombitse-Vohibasia National Park is a national park located in southwestern Madagascar, 147 km northeast of Toliara (Tuléar) in the Atsimo-Andrefana region, created in 1997. It has a surface area of 36,308 ha, divided into three plots: The forest of Zombitse (16,845 ha); The Isoky Vohimena sites of (3,293 ha); and Vohibasia (16,170 ha).

The park is situated at an altitude between 485m and 825m and has a dry tropical climate with an average temperature of 23° to 24°C. Rainfall ranges from 721 to 833 mm and the dry season is from April to December, while the rainy season is from January to March.

This park has a tropical dry forest. Zombitse Vohibasia National Park is famous for its richness in rare bird species, endemic to Madagascar. It also counts 8 species of lemurs, some of which are almost threatened such as the case of the Phaner furcifer pallescens. This Protected Area has an exceptional amount of biodiversity, and because of it; the national park becomes a great site for research area by excellence. The National Park is home for about sixty birds, 47% of which are common to Madagascar, 24% endemic to the Malagasy region and one local vulnerable species (Phylastrephus apperti).

To go deeper into the research, a semi-structured interview was sent by email to the manager of the national park, in order to discover the protected area and the sustainable tourism applied in this zone.

There were 15 questions, some of them were treating the protected area presentation: name, surface area, date of creation, meeting with the IUCN definition, management category, and others questions regarded the International convention that the protected area is enrolled in, Convention on the Conservation of Migratory Species, Ramsar and Wetlands …, action to obtain the "World heritage", the "Green list" labels, IUCN Red Listed species, and about the sustainable tourism activities and protected area threats that the park is dealing with.

We could finally say that the sustainable tourism activities managed inside of the national park help to ensure the operative and involvement in spite of the threats and pressures that the national park is suffering from such as Habitat loss and degradation, too much extraction (hunting, mining, logging, fishing), biodiversity decline, IUCN Red Listed species, and climate change.

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Keywords: tourism, national park, Red List, sustainable tourism, IUCN, World heritage

Determinants for the withdrawal of companies in the tourism and leisure industry from the UN Global Compact programme

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Background

Between 2000 and 2020, 818 companies from the tourism and leisure industry signed up to the UN Global Compact guidelines, which cover ten principles in the field of labour, human rights, environment, and anti-corruption. Three out of the ten principles refer to the environment (Principle 7: Businesses should support a precautionary approach to environmental challenges; Principle 8: undertake initiatives to promote greater environmental responsibility; and Principle 9: encourage the development and diffusion of environmentally friendly technologies). While most of the principles are easy to fulfil, the environmental goals are more difficult to achieve.

It is therefore not so surprising that many companies have failed to report on their performance against the UN Global Compact goals and have fallen out of the programme, eventually being delisted. Over the sample period, 60 per cent of the tourism and leisure businesses were de-listed from the programme. This is higher than the 50 per cent for all business sectors. Another 3 per cent are non-communicating, meaning they do not currently report to the UN. Only 37 per cent of tourism and leisure companies worldwide are still active and report regularly to the UN Global compact initiative.

The reasons why tourism and leisure companies stop signing up to the UN Global Compact Guidelines are not well understood. It is well known that tourism and leisure companies have a high carbon footprint (Lenzen et al., 2018), which challenges its environmental sustainability. Another challenge that has received much attention in the last decade is the problem of overtourism, which is both an environmental and socioeconomic challenge (Oklevik et al. 2019). This may suggest that this sector struggles with several aspects of commitment to the sustainability goals of the UN Global Compact.

One factor stands out, which is the company's home country. While in Europe the percentage of deregistered tourism companies is 54 per cent, while in Asia and Africa 73 and 68 per cent, respectively. The lowest proportion of de-listed firms can be found in the five Nordic countries with 29 per cent (of 49 firms in tourism and leisure that signed up, 14 per cent are de-listed). This differences across countries may suggest that companies in non-OECD countries face greater external challenges in committing to the three environmental goals of the UN Global Compact.

The aim of this paper is to examine the UN Global Compact reporting status, differentiated by active, non-listed and non-communicating. Factors include company-specific factors such as size, ownership (private, government) and country-specific factors (indicators on CO_2 emissions, air pollution, tree cover loss). Other control variables include components that measure various dimensions of the political environment faced by companies operating in a country (political

stability and absence of violence, stability of government and control of corruption) as well as GDP per capita as a measure of economic development. This work builds on Rasche et al. (2020) who analysed delisting status using a survival model. The main contribution is that account country-specific factors related to environmental performance and institutional and political factors are included.

Method

A Cox proportional hazard model is used to estimate the probability of exit from the UN global compact programme. The data consists of the UN global compact database linked with information on environmental performance and institutional quality at the country level. The estimation sample is based on 820 tourism companies, including airlines, hotels, rental services and event organisers in about 110 countries for the period 2001-2020. About 6.6 percent are NGOs, foundations and public sector companies (e.g. DMOs) and 5.5 percent are listed companies. Large firms (250+) are overrepresented in the sample with a share of 32 percent.

Results

Estimation results show that the rate of losing the active UN global compact status depends on firm characteristics and environmental performance indicators. Public companies, foundations and NGOS in the tourism sector have a 35 percent lower rate of being delisted, while listed companies have a 64 percent lower rate. The latter is related to the fact that there is more pressure on these companies from investors to do their part in solving societal challenges. The environmental performance indicators are highly important in determining UN Global Compact status. The indicator measuring the growth rate of greenhouse gas (GHG) intensity is significant at the 5 per cent level. The results imply that tourism businesses in countries that have made progress in decoupling emissions and economic growth are more likely to remain in the UN Global Compact programme. The air quality index indicator is significant at the 1 per cent level. The lower the PM2.5 exposure (measured as the number of age-standardised disability-adjusted life years lost per 100,000 persons due to exposure to fine particulate matter smaller than 2.5 micrometres), the higher the rate of retention in the programme. The regional dummy variable shows that tourism businesses in North America have a significantly higher rate of being removed from the programme after controlling for the environmental performance indicators. Interestingly, rule of law, regulatory quality of government, political stability and absence of violence, and GDP per capita are not significantly related to UN Global Compact status. Loss of tree cover, measured as average annual loss of forest cover over the last five years divided by total forest cover, is only marginally significant.

The findings that environmental progress at the country level is the main driver for the decision to join or leave the UN Global Compact programme shows that the commitment of society and government to corporate environmental sustainability goals is of great importance. Three out of ten UN Global Compact goals relate to the environment, and here it is difficult to make progress at the corporate level if there is no general commitment. The findings that institutional and

political factors, such as levels of corruption and economic development, do not matter is a surprising result. This might indicate that this is not the main obstacle to staying in the programme.

Keywords: UN Global Compact programme, environmental challenges, environmental responsibility, environmentally friendly technologies; emissions, tourism and leisure firms

Sustainability achievement differences between online and offline "green" events

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In this study MICE industry (meetings, incentives, conferences, and exhibitions) will be referred to events. There is an awareness of the effect of climate change on tourism practices and the importance of sustainability, especially "green" interest has been crucial in green strategies of the event field (Laing and Frost, 2010). Sustainable events are identifying the energy costs and carbon footprint of events, as well as complete economic, cultural, social, environmental impacts (Getz. 2008). So that organizations that support sustainable and green events can be the institutions permanently support community, sustainable growth, and long term social and environmental prosperity. Green event can be defined as "an event that has a sustainability policy or incorporates sustainable practices into its management and operations" (Laing and Frost, 2010: 262). Green events are part of sustainable growth that all events accept the measurements to re-use, recycle and reduce (Getz. 2008). Sustainability has become a critical strategy in organizations (Epstein, Buhovac, and Yuthas, 2010) and should be embedded into every aspect of these organizations beginning from their mission, vision, their strategy formulation, stakeholder communication, employee management to marketing and communication activities. Ludema, Laszlo, and Lynch (2012) have stated that one of the key drivers of competitive advantage for organizations is creating a sustainable value. Moreover, now an international discussion has been on rise about how to motivate the event industry to become more environmentally sustainable (Dickson and Arcodia, 2010).

"Sustainability and green events are increasingly relevant and the topic is popular in trade publications such as Meetingsnet.com's 'Green Meetings' page and CVENT's 'Green Meetings Made Easy' page, while the MICE industry has various standards such as ISO 20121 and APEX/ASTM to guide planners in the execution of more sustainable events" (Tinnish and Mangal, 2012: 234). In this study case studies are taken from Meetgreen.com`s page that this organization "works with progressive global organizations to integrate leading event sustainability practices and produce conferences and events that deliver targeted business results" (https://meetgreen.com/about/).

In this research, four different sustainability reports have been downloaded from MeetGreen`s page as secondary data resources. These events had been organized offline in 2019 however because of pandemic situations the same events were done online in 2020. The aims of the study is to determine the sustainability achievement differences between online & offline green event and compare the outcomes with the goals of United Nations Sustainable Development Goals (UN SDGs). The reports were analysed by content analysis from qualitative research methods. In the final part of the study the results give a picture of the sustainability achievements of green events, such as the reduction of environmental footprint in energy, emissions, waste, and water, to measure the benefits of sustainable practices and promote food & beverage operations at the

event. One of the common key sustainable achievements of these events given in 2019 reports is usage of sustainable food options that means in the events local, seasonal, ethically produced meals are served. In addition to this donation and utilization of leftover food are carried out successfully that aims zero hunger in SDGs goals. All operations in these events take into consideration of SDGs "Responsible consumption and production" item therefore glass, paper, plastic materials are recycled, and electronic signage are used in the venues. Printed material utilization is also reduced. Especially rented and reusable furniture is preferred for the decoration and branding. Carbon reduction via transportation is another topic that is paid attention in these events program for example walking distance hotels from venues or city centres for public transportation are chosen. However, after the pandemic in 2020 all these events are organized in a virtual setting and their sustainability achievement reports have been changed completely. For example, instead of four days face to face 407 attendee conferences were organized within 10 hours and 63% participation was increased. Moreover, total CO_2e savings is 616,510 kg that is equivalent to 78,624,089 smartphones charging. Another example in one if these events about CO_2e savings is total saving 942,196 kg equals to eliminating the greenhouse gas emissions from an average passenger vehicle driven more than 2.3 million miles. By meeting virtually, 8 SDGs goals are achieved, which are different from SDGs goals of 2019 reports. In the conclusion part of the study opportunities that should be developed by organizers and event companies are explained. Some of them involve attendee education about green events, raise awareness, and create an event team about sustainability. Some recommendations are given for planners regarding how to be environmentally friendly and be aware of environmental outcomes of events. Some event organizers can think that the sustainability achievements of comparison of online and offline events can be a disadvantage of their revenues in the future so a further study can be the done about the acceptance or implication level of sustainability or green event issues into the events' marketing, design and operations. Wong et al., (2015:310) has stated that "when attendees become more involved in an environmentally friendly event, they are better able to realize the value of it, and therefore, to spend more money on it". For this reason, supportive studies of this statement should be done by researchers.

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Keywords: sustainability achievements, green events, MeetGreen, online events

Some perspectives on the Covid19 / winter tourism nexus in Austria, France and Russia

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Our aim is to compare some of the current and future impacts of Covid19 on winter tourism in Austria, France, and Russia. When Covid19 got out of hand in March 2020, nobody could anticipate the impacts on society and winter tourism. International winter tourism changed from a globally significant economic activity, still growing in Austria and Russia but declining for 8 years in France, to become one of the hardest-hit sectors, crumbling in all European countries. The UNWTO anticipated USD$1 trillion loss for the overall tourism sector in 2020 (about 30%) due to the pandemic and the associated travel restrictions. Two countries primarily affected were Austria with the highest per capita income in snow-based winter tourism, and France, formerly number one country in number of tourist-days. Russian and Asian tourists with a lower-end domestic winter tourism structure were major customers, especially in the larger ski resorts of these two Alpine countries.

The pandemic situation is unexpected and severe in all three countries, but the impact on winter tourism largely depends on the respective Covid19 situations and policies. Since tourists could no longer travel abroad, the demand for winter domestic holidays increased in Russia as national and local governments applied few restrictions. Sochi, Russia's largest mountain tourism resort and site of the 2014 Winter Olympic games, had a record number of domestic visitors in summer 2020, bringing significant income to the local community. This boom is continuing in the current winter season with over-tourism in Sochi and significant frequentation in Siberia.

In France and Austria, the winter season 2019/20 was shortened by 6 weeks (-18% of guest nights registered in Austria, 20-30% decrease in skier visits in France). Whereas Austria allowed ski resort operation since Christmas 2020 (without hotels and restaurants), while France has kept them closed since November 2020.

After decades of climate induced concentration of Alpine and European winter tourism destinations and closure of smaller ski resorts, Covid19 will accelerate this process at an unprecedented speed. While climate change has gradual impacts on snow depth and length of snow cover, Covid19 has prevented or restricted the entire operation of ski resorts and support services (such as hotels, restaurants, ski rental etc.) independently of meteorological conditions. This lack of revenue is all the more damaging because the costs for winter tourism are largely inelastic: Austria and France have furlough regimes co-paid by the employer and some maintenance costs are incompressible. Most importantly, artificial snow production remains near-constant, and needs to be prepared ahead of the season. In 2019/20, the costs for opening the season were already incurred and could not be fully recouped due to premature closing. In 2020/21, almost all ski resorts gambled on an improved health situation / derogatory measures

and prepared for opening. Yet, ski resort operation was restricted in Austria and quickly stopped in France. The direct effects of Covid19 could last until 2022/23.

This enormous one-time operational loss will be most painful for ski resorts, businesses, and local governments with a high debt-to-equity rate, further degrading their financial position and reducing their investment and climate change adaptation capacity. The European winter tourism offer is likely to experience significant concentration. After years and decades of internationalization and even globalization, winter tourism may become once again more regional. Austria with approximately 66% international tourists is more exposed than France with approx. 27% and Russia with approximately 5% international winter tourists [Vanat 2020]. Snowmaking will continue to become more expensive especially at low altitudes. Luxury high-altitude winter resorts should profit the most from the concentration of the winter tourism industry and the growing climatic pressure, while mass winter tourism in lower altitude resorts will suffer from increasing regulatory and customer pressure for a higher space use per tourist.

Keywords: Covid19, winter tourism, European ski resorts, climate adaptation, financing snowmaking

Smart specialisation strategy, recovery, and transitions in tourism sector

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Background

The world is experiencing an unprecedented situation. The COVID-19 outbreak is the third recognised disease transmitted from animals to humans in only two decades that has resulted in a major epidemic (Gorbalenya et al., 2020). Nevertheless, the singularity of the current situation lies in the spread of the virus, its geographical coverage and the measures implemented by governments to stop its dissemination (mobility and travel restrictions, lockdown, confinement, closure of shops and hotels, etc.).

The tourism sector is one of the most affected in terms of revenue and employment (del Rio-Chanona et al., 2020; Fana et al., 2020), as any restriction on people movements within and between countries has a negative effect on this sector. Even if the COVID-19 outbreak is affecting all countries and regions of the world, the magnitude of the effect depends on their sectorial patterns and diversification. Therefore, policy actions for recovery are likely to be place-based and not global.

Furthermore, new consumer behaviour and preferences are emerging from this health crisis. Recent studies (e.g. Marques Santos et al., 2020) are showing that the COVID-19 effect on tourism demand is expected to persist beyond the short term. For example, the acceleration of digitalization in business model could have a negative and permanent effect on the traditional business tourism. On the other hand, once consumers are more aware about the effect of climate change on human health, they will tend to look for more eco-friendly solutions (Global Data, 2020; Booking.com, 2020), which will also push supply side in that direction. So, how can regions react? We know from previous studies, that investing in innovation during a crisis can foster the recovery process (Amore, 2015) and help firms to survive (Cefis and Marsili, 2005). So, there is no doubt, that innovation will play a key role in the recovery process and in making regions more resilient to exogenous shocks. However, it is important to identify the right innovation priorities for the regions/companies and to ensure the alignment of the recovery process with the mitigation of megatrends negative effects, such as climate change issues. Smart Specialisation Strategy, as a place-based approach to regional innovation policy where priorities for public investment are 'discovered' through a dialogue with the innovation and entrepreneurial communities (Foray et al., 2009), can help in the recovery process and in the direction of the transitions.

Objective, Data and Methodology

Combining several methodologies, the study aims to show the role that Smart Specialisation Strategy can play in tourism sector recovery, resilience, and the twin transitions in EU27. After a review of the literature to understand new market trends for the tourism sector in short and me-

dium term, it will provide an analysis about the relationship between tourism vulnerability and investment in innovation, using data analysis technique (t-test for differences of means and regression analysis). Data used comes from different sources, including EUROSTAT, S3 Platform and Batista e Silva et al. (2018) for the tourism vulnerability index.

Preliminary Results and Conclusion

Tourism-related activities as innovation priority of Smart Specialisation Strategy (S3) was selected by 97 European regions. These regions are essentially divided into two groups: those who selected tourism for the purpose of diversification and those who intend to reduce the sector's vulnerability. Indeed, tourism is selected as a priority for innovation not only for regions with a strong tradition in the tourism sector, but also for regions that see their regional assets as an opportunity to develop tourism activities. In both cases, tourism is considered a priority for knowledge-based investment due to their competitive advantage (natural resources and landscape, cultural heritage, etc.). Furthermore, preliminary analysis reveals that tourism vulnerability index is also negatively correlated with the regional educational level (% of population with a higher education level), and R&D expenditures in the region. This could suggest that regions with lower levels of innovation and skills are more vulnerable to shocks in tourism sector, confirming the relevance of innovation for regional resilience. Nevertheless, the objective and specificities of such investment also needs to follow new market trends and climate change challenges. Analysis of changing consumer behaviour has shown shifts in preferences towards more digitalisation and sustainability, in line with the new European Growth Strategy (European Green Deal) and could therefore be prioritised.

The paper relates the development of a sustainable tourism to policy options that require associated policy leadership and stakeholder involvement. Smart Specialisation Strategies can help in the recovery process, in building this leadership and engagement, and in setting the direction for such transitions, namely through the so-called Entrepreneurial Discovery Process. For instance, companies/business actors play an important role in sharing experiences and identifying market trends, opportunities, and challenges. Therefore, together with the other stakeholders, they play an important role in the definition of innovation priorities for the region. Indeed, regional resilience to shocks in the tourism sector will depend upon the ability for innovative tourism diversification. S3 has the potential to develop innovative tourism and promote diversification in relation to its type and nature of actors and activities to reflect changing choices of consumers in a post-COVID19 scenario.

More widely the results have relevance for implementing the EU resilience agenda, which includes apart from a social and economic dimension also a green, digital, and geopolitical one. The analysis in tourism shows the potential of linking stronger the European policy agendas on climate, recovery, innovation, and strategic autonomy and seek synergies between the funding opportunities related to them.

Keywords: Tourism; COVID-19; Recovery; Transitions

Retaining recreational tourism through digital solutions

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Background

Due to the COVID 19 induced restrictions in international travel and tourism activities and indoor activities, there has been huge surge in outdoor recreational tourism at both local and national level. In fact, it has strengthened the potential at the local area with increasing interest in authentic nature experience on holidays in Denmark (Kirkegaard Larsen, 2020). This is evident through the increase in visitor numbers in nature areas and attractions with open areas. For instance, Sagnlandet Lejre received 97,728 visitors in 100 days in 2020 compared to 61,130 visitors in 160 days in 2019 (Fasmer & Jørgensen, 2021) and Bøtø Naturepark received 55,000 visitors in 2020, 10,000 more than 2019 (Guldborgsund, 2020 & Bech, 2021). Similarly, there was 49% increase in mountain bike users in Hareskoven in between January-August 2020, compared to 2019 (Dansk Mountainbike Klub, 2021) and there is even a boom in angler fishing in urban areas like Copenhagen (Raagevang, 2020).

Although outdoor recreation, mainly nature-based tourism, as a trend has been growing steadily for the last couple of years (European Tourism Future Institute, 2019), COVID-19 has pushed the newer (recreational) consumer at a faster pace towards the nature and recreational activities. Evidently, the Danish government allocated 25 million DKK for recreational infrastructure in 2020 amid the crisis, to encourage outdoor recreational trends (Kirkegaard Larsen, 2020a).

As summer 2020 witnessed the increased local tourism activities, a post COVID-19 scenario could be that tourism mobility is transformed not only temporarily but over the long-run (Ioannides & Gyimothy, 2020). This would require Danish tourism businesses to design their tourism experience products focusing even more on the changing customer segment for longer term and not just improvise at the moment of crisis.

Amid travel restrictions and limitations, digital adoption and consumption are on the rise, with consumers now expecting contactless technologies, among others, as a basic prerequisite for a safe and seamless travel experience (WTTC, 2020). Hence, digital technologies have become essential during 2020, as the tourism businesses found alternative ways such digital queues and interfaces to interact with their costumers when the physical interaction was not a possibility due to the social distancing requirements (Kirkegaard Larsen, 2020b).

Camping business (Blokhus by Camping) in Århus has introduced a platform called Digital Guest, similar to a visitor logbook, to secure communication with their customers, before, during and after the service (Friss Sørensen, 2020a). Bigdata collected on tourists' behavior, preferences and movement through social media, traffic data and weather data have helped Café Fru Dax on Rømø Island get better insight about their customers, resulting in better planning of sales and human resources (Friss Sørensen, 2020b).

While these innovative steps worked well as response to the immediate crisis, the tourism businesses now must find ways to retain the customers even after the crisis is over.

This paper intends to explore the potential of digital solutions to small tourism businesses to understand the changing consumer behavior and improve the business model through digital transformations as a long-term business development.

Methodology

The research design will have a pragmatic approach and will collect data through mixed method. A questionnaire will be used to collect the primary quantitative data to identify businesses in Sealand region in Denmark with needs for digital solutions while literature within consumer behavior tourism trends, destination development and digital transformations will be the departure point in order to understand the changing scenarios while case studies within digital transformation will be the sources of recommendations for idea inspiration.

Expected results

It is expected to identify the need of tourism business with regards to digital solutions. Thereupon, it is expected to come up with recommendations to these businesses with inspirations that can help improve their business model.

Keywords: Recreational tourism, Digital tourism, Changing consumer behaviour, Changing business model

From last chance tourism to gone destinations? Future narratives of Svalbard as a post-Arctic tourism destination

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The main objective of this paper is developing the idea of last chance tourism destinations further and connecting it with the concept of post-Arctic tourism (Varnajot, 2020), using Svalbard as a destination of reference.

Background

When thinking of Arctic tourism, the cryospheric component can be seen as an integral part of Polar regions which also characterizes them. However, with the fading of snow cover and sea ice coverage amongst the Arctic as a region, this cryospheric component fades. Therefore, it is argued that the term 'post-Polar' would be better suited to describe the future of those regions (Mered, 2019; Varnajot, 2020, p. 80). Post-Arctic tourism then takes its point of departure the current imagery and tourist attraction systems of the Arctic and views them in the light of climate change. Unarguably, with the Arctic experience being very much dependent on the "cryospheric gaze", how Varnajot (2020, p. 79) words, a certain vulnerability of the Arctic as a destination arises. Therefore, tourist activities tied to and largely dependent on this cryospheric gaze are expected to fade, posing certain changes to the overall Arctic imagery and image communicated through tourism marketing and the destinations themselves. As Varnajot argues, the indirect share of this cryospheric experience through exhibitions could become increasingly important in Arctic tourism which entails strong linkages to the segment of heritage tourism. This is also coherent with the viewpoint of Lemelin, Dawson, Stewart, Maher & Lueck (2010) and their conceptualizations of the Arctic tourist gaze.

As Lemelin et al. (2010, p. 477) maintain, last chance tourism destinations or specific Arctic landmarks are treated as "a collection of 'exhibits' for our viewing pleasure", which allows for parallels to be drawn to Varnajot's (2020) conception of post-Arctic tourism. An extensive literature review suggests that those destinations are thus treated like we are already viewing something that is going to vanish, no matter what. It adds a feeling of 'on-spot' heritagization and museumization through transiency and thus also a certain weight and nostalgia to the experience. Even though technically, the feeling of nostalgia might arguably not be appropriate here as the destination is not gone yet. All in all, the process of the destination practically becoming heritage in front of the tourists' eyes and the specific landmarks being treated with a notion of remembrance upon visiting would be interesting to explore further. What is so remarkable in this context, however, is that this all happens based on a feeling evoked through marketing efforts and when visiting on site, when in fact, the destination itself is still very much 'alive'. This raises the question whether a destination can thus be treated as extinct, when in fact, it is not (yet)? Is this discourse already paving the way for the future narrative on last chance tourism destinations? And how might this affect constructs such as place identity and sense of place?

Based on Stedman (2002), Zerwa (2018, p. 236) argues that "the special relationship individuals can develop with a place is not related directly to its physical features, but with the meanings that they symbolize through the experience-in-place that is had". Deriving from that, one could argue that the place would preserve its meaning and purpose, its very character and identity, even after what contests and shapes our perception of what that place is about is physically gone. The way 'last-chance' destinations are treated and advertised, with the experiences sold being largely based on a specific feeling evoked, one could thus pose the question whether this feeling would work even better if, in fact, the physical attraction would have vanished. Ultimately, the whole concept of Arctic last chance tourism is based around exactly that seemingly inevitable outcome; inevitably making the Arctic slip into a 'post-Arctic'- state – a gone destination.

Methods

The paper is based on my master's thesis, in which I use a two-step approach. First, I analyse the current narrative on last chance tourism destinations in academic and media material. I have conducted an extensive literature review on last chance tourism from when the phenomenon first surfaced in academic discussions to how it is approached in more recent contributions. As for media related material, I have mainly focused on newspaper articles and independent writer contributions on travel related webpages.

Based on the first step I will now be concentrating my studies on the future narratives in Svalbard. Taking as a point of departure the themes from the two pre-materials, I will be doing semi-structured interviews to see how tourism representatives of Svalbard construct their idea(s) of the future narrative(s) at their destination.

In this paper, I discuss the preliminary findings from the literature review as well as ongoing contemporary discussions on last chance tourism.

Results

There are three dominant themes/ narratives coming up from the academic literature on last chance tourism destinations, which will be discussed in more detail: place stewardship/ ambassadorship (narrative of hope), a tension between dark tourism and ecotourism (narrative of demise), and an active heritagization component (narrative of remembrance). Setting these findings in the context of post-Arctic tourism, especially the latter two narratives seem to pose an interesting angle in the context of my thesis endeavours. Overall, these themes are partly coherent with the contemporary discourse on last chance tourism destinations, in which the term is increasingly used as a catchphrase to increase interest in those places perceived at high risk of disappearing. The aim is to then use these findings later as the basis for the interviews, in which I will go more deeply into the themes found in the analysis of the pre-materials and apply them to the context of Svalbard.

Keywords: last chance tourism, Arctic tourism, Svalbard, narratives

Impacts of fake media on climate change and tourism in Victoria Falls, Zimbabwe

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The tourism sector plays a major role in the economic development in a number of countries in the Global South, particularly Southern Africa. One such country is Zimbabwe, which struggles with significant economic hardships and relies heavily on the tourism sector. The Victoria Falls, a key tourism attraction of Zimbabwe on the Zambezi River was the subject of a plethora of news articles published between November 2019 and January 2020. The media suggested that the world's largest waterfall was drying up due to climate change-induced drought. These reports arose during the dry season and were thus arguably ill-founded and downplayed the natural seasonal characteristics of the Zambezi River. This paper presents content analysis of these media articles and the thematic analysis of interviews conducted with tourism operators at Victoria Falls during this. Although some of the articles published within this period strived for accurate reporting, some articles claimed that the Victoria Falls was dry, which were inconsistent with experiences of tourism operators. This inaccurate reporting is argued by the tourism operators to have negatively affected the tourism sector and destination image of the key attraction. This paper highlights the need for accurate science-based media reporting on weather, climate, and climate change in the tourism sector.

Keywords: media, climate change, drought, Zambezi River, tourism, destination image

Warmer and wetter: Local hydro-meteorological impacts of global climate change on nature-based tourism in Norway – destination Lofoten

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Background

Norway's unique landscape with a long coast, deep fjords and mountains makes the country an attractive destination for nature-based tourism based on activities, such as hiking and skiing, or enjoying the landscape scenery. Such activities strongly depend on suitable weather and climate conditions that i) simply allow to conduct the activity, e.g. enough snow to go skiing, and ii) to conduct the activity safely. Usually, the bulk of tourists that consume nature-based tourism services (e.g. guided skiing tours) are international, mostly travelling from EU-countries to Norway. However, during unprecedented travel restrictions due to the ongoing Covid-19 pandemic, the nation is experiencing a new boom of locals who rediscover nature-based recreational activities close to their homes and or cabins. Given the fact that Norway's climate has become warmer and wetter and will be even warmer and wetter in the future due to climate change, we investigate if the country will still be an attractive tourist destination. Within the CLIM-TOUR project (2018-2021), we investigate impacts of present and future climate change on Norwegian nature-based tourism.

In close dialogue with practitioners within the tourism sector, we identify and develop relevant and well-defined climate indices for single destinations such as Jotunheimen, Flåm, Hardanger and Lofoten. Here, we focus on destination Lofoten, because its popularity as a tourist destination has increased during the last decade, and Lofoten is today one of the most popular nature-based destinations in Norway. The region is a group of islands located in the northern part of Norway at 67-68° North in the county of Nordland. The region consists the four municipalities (island groups) of Vågan, Vestvågøy, Flakstad and Moskenes, connected by roads and bridges, and two island municipalities Værøy and Røst, that can be accessed by ferry routes. The attractiveness is closely related to the spectacular nature with its combination of alpine landscapes, white sand beaches, fjords, and open sea. During the last decade, Lofoten has experienced an increase in registered commercial overnight stays from 370,000 to almost 500,000. From January to April 2017, Lofoten had 86,000 commercial stays, more than twice as many as in the same period in 2010. Lofoten has mainly been a summer destination, and over 60% of the total visits take place from June to August. Still, the destination experiences a high growth in winter tourism with the northern lights as the most important attraction. Furthermore, Randonnée skiing has become increasingly popular and may be considered as a market segment with potential to grow in the future. Popular outdoor activities are: skiing, cross-country, Randonnée, alpine, winter hiking, snow-shoeing, bird watching

and landscape photography. Obviously, these activities depend strongly on local weather conditions either for safety reasons or simply for the tourists' positive experience.

Method

Within the Euro-CORDEX initiative (Jacob et al., 2014) an ensemble of different combinations of Earth System Models (ESMs) and Regional Climate Models (RCMs) have been downscaled for Europe on a horizontal grid of 12x12 km. Wong et al. (2016) has bias-adjusted a sub-sample consisting of ten model combinations to a horizontal grid of 1x1 km for Norway by using the gridded observational data seNorge as 'ground truth' and applying an empirical quantile mapping method. This data set is openly available at https://nedlasting.nve.no/klimadata/kss for two climate gas emission scenarios based on the representative concentration pathways RCP4.5 and RCP8.5 for a 130-year long period from 1971 until 2100. For this study, we analyse projected high-resolution data on temperature, precipitation, and snow water equivalent. We combine these fields to calculate meaningful climate indices relevant for nature-based tourism. We developed a simple index indicating if precipitation falls as snow, sleet, or rain. Its calculation is based on the criteria if daily temperature is above 1°C (rain), between -1°C and 1°C (sleet) or below -1°C (snow). We combine these thresholds with information on elevation. As an ultimate product towards the end of the project, we aim to publish a selection of climate indices for the whole country on the webpage of the Norwegian Centre for Climate Services, https://klimaservicesenter.no. As many nature-based activities are happening in the mountains we calculate these indices for different elevations.

Results

By the end of the century, assuming the high emission scenario, RCP8.5, the climate in Lofoten will be approximately 4°C warmer compared to the period 1971-2000. Model results show an increase of total mean precipitation amount by 250 mm during December until May. We have identified a shift in the precipitation regime leading to more precipitation falling as rain instead of snow. This change becomes explicit for altitudes above 500 m above sea level. Days with a snow depth > 30 cm are almost not existing since the 2010s in low altitudes. The skiing season will probably be no longer than approximately 2-3 weeks after 2050. After 2070, skiing days will be rare. We expect that the impact will be less dramatic under the emission scenario RCP4.5 (yet, this has still to be analysed). We foresee that the change in the precipitation regime can have impacts on i) safety related issues, e.g. more frequent rain on snow events, more wet snow avalanches by the middle of the century and more intense rainfall triggering landslides that can possibly interrupt infrastructure, and ii) a change in nature-based tourism interest and their behavior.

Keywords: nature-based tourism, climate projections, Lofoten, Norway

The possible impacts of climate change on the tourism season of Hurghada city, Egypt

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Note: Figures and Tables are omitted.

The objective of this research is to investigate the impacts of climate change on the tourism sector and the future tourism performance of cities. The research has chosen Hurghada, the leading attracting coastal city on the Red Sea for foreign tourists as a case study. The daily and mean monthly data of temperature, rainfall, moisture, wind speed, cloud cover and sun duration derived by the regional climate model simulated by the Swedish Meteorological and Hydrological Institute (SMHI - RCA35) for the two climate change scenarios of the Intergovernmental Panel on Climate Change (IPCC) RCP4.5 and RCP8.5 used to achieve this objective. These data used for the future time period of 2021 -2050, based on the application of the Tourism Climatic Index (TCI) and Holiday Climate index (HCI), that are widely used for the adaptation measure of the climatic suitability for tourism, which examines potential changes in climatic attractiveness of destinations, through the statistical analysis of existing and forecasting meteorological parameters. The research methodology on Hurghada shows a major change expectation in tourism season behaviour and that climate change will play a major role in changing the climatic seasonal Hurghada tourism performance.

Introduction:

Tourism is strongly influenced by climate and weather (Hosseini et al., 2015), both of which have a significant impact on the tourism industry, affecting the timing and length of the tourism seasons and the selection of destinations by tourists (Scott et al., 2004) as climatic conditions impact tourism activities, such as sight-seeing (Gomez Martin, 2005). The expected rise in temperature will lead to a shift from the attractive tourism areas of towards the areas with the most suitable temperature.

Target Area:

Hurghada is the administrative capital of the Red Sea Governorate. The city is located on the western shore of the Red Sea on a longitude 48 '33 ° E and latitude 15' 27 ° N. It is bordered from the north by Ras Gharib city, from the south by Safaga, from the east by the coast of the Red Sea and from the west by the mountains of the Red Sea.

3-Dataset:

To investigate the annual variation and projected changes in TCI and HCI scores for Hurghada city, daily and monthly mean climate data were obtained from the Egyptian Meteorological Authority for the historical period (1952 – 2005). The future climate conditions are projected by the regional climate model developed by the Swedish Meteorological and Hydrological Institute

(SMHI -RCA35) (Samuelsson et al., 2011), with grid size 0.5○ × 0.5○. All datasets were used to calculate TCI and HCI for the different three periods (1952-1975), (1976-2005), and the near future period (2021-2050).

4-Tourism Climate Index (TCI):

TCI (Mieczkowski., 1985) contains seven variables based on mean monthly data (maximum daily temperature, mean daily temperature, minimum daily relative humidity, mean daily relative humidity, total precipitation, total hours of sunshine, and average wind speed). These climate variables were grouped into five sub-indices (three of which are separate and two in a bioclimatic composition). Mieczkowski (1985) then weighted the seven variables according to their relative effect on tourist comfort.

The TCI is calculated as follows:

TCI = 2*(4CID + CIA + 2R + 2S + W)

Due to the limitation of TCI where the weightings of TCI based on limited available literature and expert's opinion, also, the weighting of the physical facet is too low about 30% in total. While HCI based on tourist rating of relative importance of each variable and the weighting of the physical facet is 40%. In comparing to HCI, TCI has low temporal resolution which depends on mean monthly data while HCI has higher temporal resolution which used daily weather data.

5-Holiday Climate Index (HCI):

The Holiday Climate Index (HCI) was created with the purpose of overcoming all identified deficiencies and limitations of the TCI. The HCI uses five climatic variables linked to the three facets essential to tourism: thermal comfort (TC), aesthetic (A), and physical (P) facet. The five climatic variables used for the HCI input are maximum air temperature and relative humidity (TC), cloud cover (A), precipitation and wind (P) [12]. The HCI score is calculated according to the following formula:

HCI = 4·T + 2·A + 3·Rd + 1·W

6- Results and Discussion:

The nature of the climate in the city of Hurghada allows tourists to visit and enjoy leisure activities throughout the year as the climate is moderate in most months of the year. The best times to visit the city of Hurghada are the spring and autumn seasons when the peak tourist period is. This reveals that the seasons of spring (March, April and May) and autumn (September, October and November) have a high priority for the comfortable climate of tourism followed by the winter season than the summer season. While climate change and temperature increase have changed the climatic seasons of tourism as demonstrated by the application of both TCI and HCI indices for the historical periods (1952-1975) and (1976-2005) and the near future period (2021-2050) under climate change scenarios RCP4.5 and RCP8.5.

Figure 2 and Tables 1-2, explain the TCI and HCI results and their categories characteristic of each month.

Comparison of the values and categories of the Tourism Climate Index and Holiday Climate Index (Fig. 2, Table 1,2) show that the inter-annual variation of both indices is similar.

According to TCI calculations, months March, April and November still the ideal moths to visit Hurghada under the current and near future situations. These months also still favourable to visit until their rating will be excellent corresponding to HCI statistics.

Corresponding to TCI and HCI categories and values, winter season (December, January and February) will be also the ideal months to attract tourists to visit Hurghada under RCP4.5 and RCP8.5 scenarios.

As presented in the Table 2, for the summer season, the climatic suitability for June, July and August were reduced from the very good category at the historical period (TCI: 70) to the acceptable and margin categories under RCP4.5 and RCP8.5, while this season will be good at the near future period (HCI nearly about 60).

In general, HCI more adequately determines the bioclimatic state of the environment for the development of various types of tourism than TCI.

According to both TCI and HCI, the bioclimatic conditions in Hurghada are favourable for resort and tourist purposes all year round with speak in winter and spring seasons.

Keywords: climate change, Holiday Climate Index, regional climate model, Hurghada, Egypt

Impacts of high temperatures on the Turquoise Coast

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Background

Today, we have started to feel the direct or indirect effects of climate change in every sector and the primary threat of this situation is the life and health of living things. In this context, it is possible to accurately determine the threat of climate change on life and human health, not only by evaluating the increase in average temperatures or the change in average precipitation, but by taking into account the changes in extreme events. The effects of the changes made by climate change in the frequency, intensity, impact area and duration of extreme climate events constitute the basis of physical and economic losses in several sectors. Could the risks emerged by the changes in extreme climate events due to climate change pose a health threat to people in the future when they only try to relax by relieving all the tiredness of the year in their summer vacations?

Climate change also affects human comfort in many sectors due to heatwaves and humidity extremes. Insufficient thermal comfort conditions for humans can affect the quality of life. Coastal tourism is the largest market segment of global tourism and is highly dependent on the thermal climate of a tourism destination. According to Rutty and Scott (2015), studies on the evaluations of outdoor bioclimatic comfort conducted to date have focused specifically on local residents in open urban areas. However, this has made it unclear whether outdoor comfort is perceived differently in non-urban environments or by tourists who have different weather expectations and activity patterns. A study by Lise and Tol (2002) states that changes in the climate may result in changes in tourism demands. The study of Gössling et al. (2012) also supports this statement. Furthermore, stating that the tourist climate comfort has already deteriorated in coastal countries and on the coasts of Turkey, Demiroğlu et al. (2017) indicate that it has worsened with warmer hinterlands and nights in the first half of the 21st century.

Fischer and Schär (2010) analyzed a series of high-resolution regional climate simulations, stating that summer heatwaves in Europe will become more frequent and severe this century, consistent with the trend observed in the past decades. They projected that the frequency of heatwave days would increase considerably for the Iberian Peninsula, and the Mediterranean Basin. It has been stated that heatwaves may seriously affect the health of people living in low river basins in Southern Europe and densely populated city centers on the Mediterranean coast.

Jarratt and Davies (2020) point out that climate change impacts on the coast, such as storm surges and rising sea levels, are an inevitability and, in some regions, they are already damaging coastal tourism economies. For instance, studies on the effects of climate change have indicated that the increase in temperature may become a major threat to Mediterranean tourism and to economies of Mediterranean countries fueled by tourism revenues in the future. Moreover, this will be due

not only to the climate conditions at the destination, but also to the climate changes in some major tourist originating and receiving countries and regions (Perry, 2005, 2006).

Methodology

In the study, it will be examined whether the advantage provided by the Mediterranean climate in the Aegean and Mediterranean coasts, which are the most essential tourism centers of Turkey in summer, will turn into a disadvantage in the future. Three different extreme temperature indices will be utilized for this purpose: hot summer days, tropical nights, and apparent temperature. Hot summer days are defined as the number of days with maximum temperature above 35 ℃, tropical nights as the number of days with minimum temperature above 20 ℃ and apparent temperature as the temperature which considers the effect of both temperature and relative humidity. In the calculation of these indices, high resolution (10-km horizontal resolution) maximum temperature, minimum temperature, mean temperature, and relative humidity data obtained using the regional climate model RegCM4.4 will be used. The indices to be calculated using these climate variables will be compared to the past period of 1971-2000 under two different scenarios for the two future periods (2021-2050 and 2071-2100): optimistic (RCP4.5) and pessimistic (RCP8.5). In other words, the changes in temperature extremes will be examined in the context of the Aegean and Mediterranean coastal destinations of Turkey in the light of two different scenarios for the next three decades and for the end of the last century.

Expected Results

Turkey is one of the countries in the Mediterranean Basin, which is one of the regions where climate change may affect the most, and it is expected that the temperatures in Turkey, in particular in the Aegean and Mediterranean coastal areas where the Mediterranean climate dominates, may be higher in warm months. It is inevitable to expect an increase not only in average temperatures but also in the number of hot summer days, the number of tropical nights and apparent temperatures with the increase in maximum and minimum temperatures. These increases are expected to reach their highest levels in the worst-case scenario by the end of the century. The climatic changes mentioned briefly above are expected to be particularly prevail in coastal tourism and these changes may also result in changes in destination preferences and seasonal shifts.

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Keywords: climate change, summer tourism, Turquoise Coast, temperature extremes

Monitoring the relationship between the size of urban canyon and thermal comfort conditions in the city of Erzurum

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Background

Cities are the sources of the world's economic prosperity, innovative ideas and bases for the businesses and service exports providing employment. Based on this short list of advantages, people tend to make a living in cities. Population living in urban areas is 55.3% of all the world's population in 2018 and it was only 33.6% in 1960 and this rate is expected to be 66% in 2030 (World Bank 2020; UNDESA 2019). Urbanized surfaces account for only 2 to 3 % of the Earth's land surface (Liu et al. 2014; Arnqvist et al. 2016), but, cities use two-thirds of the energy all over the world and are responsible for 70% of the global CO_2 emissions (C40 Cities 2020). Depending on the density of anthropogenic activities, cities are known to have exhibited different climatic characteristics compared to their surroundings, which are cooler, windier, and more humid.

Cities are also home to a great number of tourism and recreational activities, bringing considerable amount of revenue, expenditure for local city dwellers and other social and cultural benefits. In order to make visitors satisfied with their trip in a destination city, every type of urban characteristics should be taken into account. By improving the living conditions in a city, a local government serves not only for the citizens but also increases the satisfaction of visitors and cause them to come again or recommend the city. In this respect, meteorological and climatic conditions in a city are very important elements for tourist satisfaction.

Cities cover larger surface areas since one – dimensional natural areas are converted into 3 – D buildings and other structures. Cities are also characterized vertically extended facades which limit human's vertical visibility (sky view factor). Urban areas have altered surface characteristics by replacing natural surface materials with artificial and heat absorbing ones by retaining shortwave (solar) radiation. Such surfaces also do not permit longwave radiation to reflect through the sky by cooling the surface. Depending on the wind breaking effect of tall buildings cities are windless and block transport of heat by advection. Urban environment shelters use more conductive materials and surfaces, therefore it gets warmer faster and stores heat at a larger rate. Since the cities have larger impervious areas, they lose their rain water quicker thus causing a generally dryer atmosphere. In addition, due to the decreased amount of vegetated surfaces, moisture sources are also limited. In addition to these extra heating factors, new energy supplies from anthropogenic activities also heat the urban environment. Domestic heating, traffic combustion, and electrical devices produce extra heat and pollute air thus blocking long wave radiation. Among these unfavourable characteristics of urban environment, 3 – D geometry of buildings or in other words - canyon geometry, is an effective factor for urban environment to show altered climatic characteristics involving the issues all together. The factors mentioned above are also the

causes of urban heat island (UHI) phenomenon, which is the combined effect of all negative urban surface characteristics.

As the human population increases in the cities, vertical urban development is accelerated and the distance between the vertical structures also decreases. With increasing density of tall and linear buildings in a given area, effect of urban canyon also increases. Crowded city parts with multi-story buildings in a close distance are known as urban canyons and such urban zones impact cities negatively in physical and ecological ways. Urban canyons have several economic, ecological, and physical disadvantages for urban dwellers since they increase energy consumption both for cooling and heating, do not allow green infrastructure and cause windless and dirty air. Therefore, in such area's livability and human thermal comfort conditions are very poor. Urban areas showing the characteristics of urban canyon should immediately be transformed or their effects should be mitigated using some measures.

The aim of this study is to monitor the size and densification of urban canyon areas over the last 40 years and their effects on thermal comfort conditions to give suggestions to local decision makers to make people feel comfortable / satisfied with the air conditions to increase tourist satisfaction outdoor.

Material and Method

The study was conducted in the city of Erzurum in Northeast Anatolia Region of Turkey. In the scope of the study size of the urban canyon was monitored using remote – sensing data through ArcGIS software package and thermal comfort calculation was performed using Physiological Equivalent Temperature (PET) index and RayMan software using the meteorological data obtained from the official meteorology station in the city centre.

Results

As the result of the study, effect of enlarging and intensifying urban canyon areas was seen to be clear on human thermal comfort values. In order to reduce this unfavourable effect, a range of measures was proposed to mitigate or remove the urban canyon effect.

Keywords: urban canyon, landscape architecture, Erzurum, thermal, climate change

Future of tourism in changing (bio)climatic conditions in East Anatolia, Turkey

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Background

Tourism and outdoor recreational activities offer a number of socioeconomic and cultural benefits to society and contribute to its physical and psychological wellbeing. Due to the vital importance of these human activities, primarily the governments, i.e. policy- and decision-makers struggle to increase these benefits in favour of the destination under their responsibility. Among the most important components to increase the benefits of tourism and recreational activities to a destination is the satisfaction of visitors/clients which depends on many factors including the effects of (bio)climatological elements. Bioclimatic information takes place in the main constituents of tourism – climate indices as it represents the combined effect of all.

Turkey has adopted policies to boost tourist number and revenue for the last 3 – 4 decades and achieved some threshold targets even while relying on mass tourism and confined target markets. The country also sets new targets to maintain its position in the world tourism industry but this time plans to take the advantages of alternative tourism types with higher rate of profit. In this respect, the areas which are not seen, known, and touched much, like East Anatolia Region, possessing high tourism and recreational potential for the service of socio-economic development of local people. The region covers potentials especially for winter and nature – adventure tourism and country's extreme weather events and values are reported from the region. New tourism infrastructure investments have been made from the central government budget to develop existing tourism potentials based mainly on the suitability of (bio)climatic characteristics. However, both individual climatic elements and their combined effects (bioclimatic comfort values) have begun and are expected to show different trends.

In the determination of the suitability of a location for tourism and recreational activities several tourism–climate indices were developed and used for some parts of the world. Bioclimatic information is considered by some of these indices. Such a situation indicates that bioclimatic information is important for the sectoral development together with other social and physical factors as well as individual meteorological parameters. In addition, the index values representing bioclimatic comfort conditions are also important since they include the combined effects of all effective climatic elements.

Based on the brief information given above the aim of this study is to mention about the importance of bioclimatic information for tourism sector, especially considering it as potential for some tourism types and track the changes in bioclimatic comfort conditions over years to show if there would be a negative impact for the future of tourism sector in East Anatolia Region of Turkey.

Method

In the scope of the study, meteorological data is obtained from 44 meteorological stations located in 14 provinces in the region. Hourly values of temperature, relative humidity, cloudiness, and wind velocity are taken to calculate bioclimatic comfort values. Physiological Equivalent Temperature (PET) index is used as the calculation index for bioclimatic comfort values, which considers not only the effect of climatic parameters on human body but also the personal characteristics like workload, cloth insulation etc. Radiation model software, Rayman is also used to calculate the effect of solar radiation on the bioclimatic comfort values. After the calculation of the PET values, they are categorised in thermal stress levels to determine the differences in the frequency of these intervals over years.

This study compares (bio)climatic comfort conditions obtained by calculating PET values in two periods; 1975 – 2009 and 2010 – 2020 to see the differences in the bioclimatic comfort conditions between the periods to show if the changes impact tourism and recreation activities by utilising the spatial distribution of PET ranges through Geographical Information System.

Expected results

This study is important to follow the trend in bioclimatic comfort conditions to see if there would be a significant impact on tourism activities by being exposed to higher or more frequent thermal stress, especially in summer months. Even though the region has the potential for especially winter tourism activities, in summer months it provides better environmental opportunities than some parts of the country for leisure and excursive activities with suitable bioclimatic comfort conditions. This study is expected to show the long-term trend in bioclimatic comfort values to determine if there is a significant change. In addition, the differences are also taken into consideration to both temporal and spatial aspects. The study shows the spatial and temporal distribution of PET values in two different periods. This will be the first study to compare the distribution of bioclimatic comfort conditions to see the difference in the values and areas of comfort ranges. East Anatolia Region of Turkey has recently begun to attract tourism investment, even if they are heavily public investments. The area is untouched but provides great amount of tourism attractions in cultural, nature – adventure – water sports and agro – rural tourism types, as well as winter tourism. Result of this study is thought to be important for the projected investment on summer tourism activities.

Keywords: tourism, climate, bioclimate, East Anatolia, Turkey, climate change

SkiKlima 2.0: An updated and upgraded geobibliography of ski tourism and climate change research

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Background

The tourism system and the anthropogenic climate change phenomenon show strong interrelationships whereby one impacts the other. On the one hand, tourism's, and especially that of the travel sector's, carbon footprints contribute to warming, while on the other hand, changing climates affect the workings of many different tourism types. In response, these tourism sectors are challenged to adapt to climate change while also may engage in mitigation efforts to reduce their greenhouse gas emissions and minimize their pressure on, or even enhance, carbon sinks. Moreover, unintended consequences may arise from maladaptation or malmitigation (Aall et al., 2016) and climate change induced "last chance tourism" may combine with the actual impacts of climate change to amplify the pressure on destination ecosystems and carrying capacities (Demiroglu & Hall, 2020).

Among the types of tourism, ski tourism had been regarded as the most immediately and the severely affected tourism type. Consequently, it has also been the most studied topic in tourism and climate change literature (Scott et al., 2012; Fang et al., 2018). An early account of publications (Demiroglu et al., 2013) yielded around 300 scholarly studies on the topic, including proceeding papers, chapters, books, and reports besides peer-reviewed articles, stemming from 1938 to 2013. A more recent account by Steiger et al. (2019), determined 119 publications dating from 1986 to 2017. Both reviews indicate a spatial concentration of the literature on few Alpine countries and North America, despite ski tourism being offered by almost 80 countries, and many others acting as demand origins. Further thematic and methodological gaps are also mentioned for future research agendas.

Method

This study aims for technical and content-wise advancement of the underlying tool of the Demiroglu et al. (2013) review, namely; SkiKlima (Demiroglu, 2011). SkiKlima is a "geobibliography" that visualizes publications on the topic of climate change and ski tourism on a web-based interactive map, according to their spatial scopes of interest. This novel method has been recently improved for the case of polar tourism and climate change research (Demiroglu & Hall, 2020), where a census of publications has been not only pinned according to case study areas but also symbolized and layered in terms of sub-themes (impacts, adaptation, emissions, mitigation, rebound effects, combined effects) and various polar tourism sectors (bear safari, Christmas tourism, cruise tourism, overflight tourism etc.) in question.

Expected Results

Upon completion of the research, the inventory of studies on climate change and ski tourism will be updated to the fullest, helping understand the spatiotemporal coverage of destinations and reveal research gaps on certain themes, methods, and perspectives. For this purpose, however, optimally inclusive search strings and mutually agreed categorizations will need to be discussed.

On the technical side, various aspects are still to be decided. The two geobibliographies at hand (Demiroglu, 2011; Demiroglu & Hall, 2020) have so far utilized the Google My Maps service, which has limited features. Therefore, the use of more sophisticated platforms, such as ArcGIS Online and its non-commercial counterparts, are discussed in terms of their potential for a better user experience and analytical skills, not least for deriving author/keyword/citation based bibliometrics. Other questions also remain for how future updates should take place, preferably in an automated and/or collaborative fashion. A final discussion point is about the need and the feasibility of launching a master geobibliography that could extend over the entire corpus of interest to the CCTR community.

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Keywords: climate change, ski, tourism, geobibliography, bibliometrics, SkiKlima

Determination of the effects of climate change on winter tourism in East Anatolia Region of Turkey through a tourism – climate index, the samples of Palandöken and Konaklı Winter Tourism Centres in Erzurum

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Introduction

Climate is the long–term means / behaviours of daily weather patterns or air conditions. According to World Meteorological Organisation (WMO 1999), the length of the period enough to understand the behaviour of atmospheric parameters at a given place is 30 years. Climatic characteristics are known to have affected and shaped all the human activities and behaviours together with physical properties throughout human history. Well known examples of the climatic impact on humans are on public health, urbanisation, and agriculture, which all depend especially on atmospheric conditions. Therefore, humans have survived their lives not in conflict but convenience with climatic conditions since their first existence on the earth by developing adaptation to atmospheric environment until the Industrial Revolution nearly 200 years before.

In IPCC (2018) Summary for Policy Makers Report, human activities are reported to be responsible for nearly 1.0°C temperature increase all over the world (between 0.8°C and 1.2°C) compared to that in pre-industrial period and in case present situation continues this increase is estimated to reach 1.5°C between 2030 and 2052. Depending on the change in temperature all other atmospheric parameters will also show different behaviours causing extensive climate change. Impact of climate change is now affecting human activities more violently and deeply than before by causing large–scale economic and social losses.

Among human activities tourism and leisure are more recently introduced and developed ones in its present form compared to agriculture, trade, or industry. However, tourism is among the fastest growing economic sectors since its inceptions, except for the periods of global crises caused by economic recessions, terrorism, wars, and pandemics as it is in today. For instance, according to United Nations World Tourism Organisation (UNWTO 2020), the number of international tourists worldwide continued to grow exceptionally in 2017, 2018 and 2019 at a considerably high rate by +7; 6; and 4%, respectively, and tourist numbers reached 1.5 billion in 2019 globally. Based on trends mentioned above, UNWTO forecasted at the beginning of 2020 a growth by 3% to 4% in international tourist arrivals worldwide, however in pandemic period this happened as a loss by 70%. In spite of all negative impacts and fragilities on the sector, World Travel & Tourism Council's (WTTC) latest annual research in conjunction with Oxford Economics, revealed that tourism sector's growth rate has been larger than global economic growth for nine years. In addition, in global economy tourism is responsible for one fourth of new employment and one tenth of whole employment in the world, 10.3% of global GDP, 6.8% of total world exports, 28.3% of global services exports and 4.3% of total investment.

In order to evaluate a location's suitability for tourism activities daily weather conditions as well as climate are accepted to be considerably effective in addition to the potentials resulting from geographical characteristics including topography, location on the earth, flora, and fauna. From a reverse point of view, climate and weather conditions can also play confining and outlining role over the potentials serving for tourism (Rudel et al. 2007) thus determining the tourism types at a destination (e.g. winter, summer, nature – adventure etc.). Tourism is among the sectors highly sensitive to climate and the changes in climatic elements.

Among tourism types, winter tourism has reached such an important economic size that total revenue went beyond $9 billion USD in many winter tourism countries (Walters ve Ruhanen, 2015). This tourism type relies heavily on weather and climate conditions. However, today majority of the winter tourism centres face the climate change threats. The aim of this study is to evaluate the future climate characteristics of two winter tourism centres in Erzurum to suggest sectoral solution proposals for the problems to be witnessed to develop and sustain the sector.

Method

In order to evaluate the present and future climate characteristics of the winter tourism centres, Climate-Tourism-Information-Schemes (CTIS) of Matzarakis (2007), concentration scenarios (RCP4.5 and RCP8.5) and global climate change models (HadGEM, MPI and GFDL), which are officially preferred by Turkish State Meteorological Services, were adopted to use.

Results

As the result of the study, it was seen that climate change will impact the values (categories) of tourism climate index and in order to maintain favourable conditions for index values new measures should be offered for the decision makers.

It was also suggested that since the studies in literature use different methods, scenarios, criteria, parameters, time intervals and geographic conditions (like elevation), it is sometimes difficult to compare the results of such studies even though common finding is on the decrease of snow cover and the number snow–covered days depending on climate change. For the East Anatolia Region, which harbours greater potentials for winter tourism compared to the rest of the country, new awareness efforts should be realized by the authorities in order to sustain this potential by including local people in the sectoral adaptation and mitigation attempts.

Keywords: Palandöken and Konaklı Ski Center, Climate change, Erzurum, East Anatolia, CTIS

Climate risk to Canada's western ski tourism market

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Global climate change represents a grand challenge for society, and the risk for Canada's ski tourism economy is no exception. Climate change represents a significant risk to the profitability and sustainability of ski tourism across Canada with far-reaching consequences for sport, employment, culture, real estate, and community economic development in Canada's tourism-dependent rural and mountain communities (Scott et al. 2017). The UN Intergovernmental Panel on Climate Change (IPCC 2018) concludes that human-induced global warming is unequivocal, has already had widespread impact on human and natural systems, and will require drastic emission reductions to avoid dangerous levels of future climate change. Currently, Canada is neither prepared to adapt to climate change, nor on track to meet its emission reduction commitments (ECCC 2017, 2018, 2019). The Commissioner of the Environment and Sustainable Development (Saher 2018) emphasized the imperative for new knowledge to prepare for the risks and opportunities of a changing climate and decarbonizing economy. Despite global and national importance, the tourism sector (2.1% and 10.2% of Canadian and Global GDP, respectively, and 3.9% and 9.6% of employment - StatsCan 2019, WTTC 2017) remains a priority knowledge gap identified by the IPCC (2014) and several national climate change science assessments, with ski tourism highlighted as one of the most impacted markets (Scott et al 2016).

Growing evidence demonstrates that the multi-billion-dollar ski industry is in the early stages of a climate-induced transition, representing a significant risk to the profitability and sustainability of ski tourism world-wide because of reduced and more variable natural snow, and increased snowmaking requirements and costs (Steiger et al. 2017). Mountains are an integral part of Canada's international tourism brand, and alpine environments are already witnessing the early impacts of a changing climate, including reduced and more variable natural snow and increased snowmaking costs (Steiger et al 2017), however, this research fails to include the indirect impacts of climate change on western Canada ski tourism regions, and the intra-regional competition and shifting tourism patterns across North America. These impacts will alter the competitiveness of ski destinations across every regional market, with far-reaching consequences for sport, employment, culture, real estate, and community economic development in Canada's tourism-dependent rural and mountain communities (Scott et al. 2017). In particular, as natural resource-based industries in Canada's mountain regions continue to decline, communities are increasingly turning to tourism for economic development. Mountain resorts are a key development strategy for rural and remote communities in AB and BC (2012), with expansion of the $1.4 billion ski tourism market a central pillar (BC 2015).

Despite the need and urgency, in Canada, understanding of physical climate risk is limited to Ontario and Québec (Scott et al. 2017) and no analysis has been done on carbon risks, national competitiveness, or sustainability transition opportunities, which hinders a strategic climate

response (Scott et al. 2019). Using a world leading ski operations climate risk model (SkiSim2.0 – Scott et al 2019), this research analyzes the industry specific climate risks and impacts on ski resorts in British Columbia and Alberta Canada for the first time. By using the SkiSim2.0 model, which has been used extensively in studies globally and in Ontario and Quebec Canada to assess the impact of regional climate scenarios under a range of emission futures (e.g. Paris Agreement goals to BAU) on ski season length and other ski operation performance metrics, this research analyzes the impacts and risks of projected climate change across the Rocky and Coastal mountain range (BC and AB) ski resorts for the first time. By running common ensemble climate scenarios across Canada and the US, this research will provide continental scale analysis, compare regional climate risks and domestic/international competitiveness including local real estate, employment, and community development across all of North America's regional ski tourism markets, and inform discussions on comparative regional climate risks and related competitiveness.

Preliminary results demonstrate season length losses across British Columbia and Alberta ski areas with increases required from snowmaking capacity to maintain viable operations. The losses in the BC and Alberta provinces thus far appear to be less significant compared to season length losses in eastern Canada (Quebec and Ontario) and the midwestern and north eastern United States. Within western Canada early results demonstrate potential sub-regional trends with coastal and southern ski areas more vulnerable to climate induced losses compared with ski areas located in the interior BC region and Rocky Mountains. As the climate model continues to produce results across the study area, more conclusive patterns are predicted to emerge including provincial and sub-provincial regional averages, which will then be conclusively compared with existing results from ski resorts in Eastern Canada and the United States of America.

How ski tourism responds to climate change is critical (Scott, 2011) and viable strategies to be part of the decarbonized economy are essential to future development of the visitor economy (Gossling & Scott, 2018; Scott et al. 2016). If tourism is to thrive in a warmer and decarbonized world, the scientific community and industry (UNWTO 2017, WTTC 2015) emphasize a need for transformative change in terms of climate adaptation and mitigation. Proactively climate responses may create opportunities for ski tourism operators (Knowles 2019), and as global financial markets increasingly require climate and carbon risk disclosure (EBRD 2018), ski areas, mountain communities and winter-tourism-based economies across Canada urgently need foresight on regional climate competitiveness, appropriate climate adaptations and carbon emission reduction strategies. The results from this research will help provide some answers to the uncertainty surrounding climate change by predicting regional to continental visitor economy trends, providing insight into managerial strategies to improve resiliency to climate change for example the future demand and availability of snowmaking as well as highlighting climate change mitigation options

Keywords: climate change, ski tourism, adaptation, risk, climate modelling

Snowmaking in a warmer climate: an in-depth analysis of future water demands for the ski resort Andermatt-Sedrun-Disentis in the 21st century

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Background

Winter tourism is currently one of the main income sources in many mountain regions. However, climate change is particularly fast in the Alps and rising temperatures threaten the snow reliability of many ski resorts. The main adaptation strategy to lacking natural snow is snowmaking and in Switzerland, more than half of the ski slopes are equipped for snowmaking. Yet, the production of technical snow is mostly efficient at low temperatures and low air humidity, and it may become infeasible in a warmer climate. The increased water consumption for snowmaking will challenge the ski resorts and it will compete with the water uses in other sectors, such as hydropower production or the hotel industry. For considering future snowmaking investments, the water use of all stakeholders should be accounted for at the catchment level.

Methods

In an in-depth analysis, we evaluated the future snow reliability of the resort Andermatt-Sedrun-Disentis in the Swiss central Alps. This high-elevation resort between 1444 and 2961m asl has recently been expanded and now comprises 270 ha of skiing slopes, 175 ha of which are equipped for snowmaking. The resort comprises the three regions Gemsstock, Nätschen/Oberalp and Sedrun. Modern snowmaking infrastructure has been installed in Nätschen/Oberalp and Gemsstock, whereas the facilities in the region Sedrun of the 1990s were not replaced.

We projected the snow reliability of the resort throughout the 21st century, based on the 2018 Climate Change Scenarios for Switzerland (CH2018), with three greenhouse gas emission scenarios (RCP2.6: emission stop, RCP4.5: reduction of emissions, and RCP8.5: unabated emissions). We used the degree-day model SkiSim2.0 to simulate the future snowpack in the resort, using daily air temperature and precipitation as input variables. The three regions of the resort were analysed separately, in elevational bands of 100m. A resort is regarded as snow reliable when the snowpack allows a continuous 100-day skiing season in seven out of ten winters and skiing is possible during the Christmas holidays. An additional module of the model allowed us to account for the snowmaking of the operators with the existing facilities. Thereby, we estimated the increase in water consumption required to maintain a high snow reliability throughout the 21st century compared to the reference period 1981 to 2011.

Results

Owing to the modern snowmaking facilities, a continuous skiing season of 100 days in the resort Andermatt-Sedrun-Disentis will still be possible by the end of the 21st century under all three emission scenarios. But under unabated emissions (RCP8.5), four out of ten skiing seasons will be shortened to less than 100 days in the region Sedrun at elevations below 1900m asl.

Particularly, over the high-profit Christmas holidays, the natural snow by the end of the century will only sustain skiing in the predominantly north-facing region of Gemsstock. But with snowmaking, the resort will be operational, even with unabated emissions (RCP8.5). Due to multiple high-elevation access points of the resort it is possible to ski the upper areas of the resort (above 1800-2000 m asl), even when the lower areas will not sustain skiing anymore. However, the region of Sedrun will have to remain closed over the holidays every second winter despite of snowmaking. Overall, the snow reliability of the resort can be stated as high throughout the whole 21st century. This comes at the cost of an increased water consumption for snowmaking. For the whole resort, the rise in the water consumption compared to the reference period (1981-2011) is moderate under the assumption of a sudden stop or a reduction of greenhouse gas emissions, with 4% and 16% increase by the end of the 21st century, respectively. With unabated greenhouse gas emissions, the total consumption will rise by 79%. About one fourth of the ski resorts area lies below 1800-2000 m asl, and the additional water will mainly be used for snowmaking at these lower elevations, where the water consumption may even triple by the end of the century.

The high-elevation resort of Andermatt-Sedrun-Disentis may profit from its high snow reliability in the short-term, when smaller ski resorts at lower elevations cannot be operational anymore. On the other hand, the considerable increase in the water consumption will cause additional costs for the resort. Moreover, with unabated greenhouse gas emissions (RCP8.5), today's water sources that comprise a reservoir lake and multiple rivers will not suffice for snowmaking anymore. Thus, new water sources will have to be exploited, including the construction of a new reservoir lake. Increasing demands for water in the region arise not only from the skiing resort, but also from the growing hotel industry with swimming pools, spas, and golf resorts, as well as the hydropower production. While shortages in water are not expected from an overall water deficit, competition among stakeholders and unsustainable water management strategies may provoke shortages in the future. It is therefore crucial to develop local water management strategies that consider the future water consumption of all stakeholders.

Keywords: climate change, snow reliability, snowmaking, Swiss Alps, water consumption, winter tourism

On the effectiveness of snowmaking in reducing snow scarcity in French Alps ski resorts from 1980 to 2018

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Ski tourism has for long been identified to be particularly vulnerable to climate change impacts (Martin et al., 1994, Beniston et al., 1995, Abegg et al., 2007). In order to reduce the impact of natural snow cover variability and snow cover reduction due to climate change, snowmaking has emerged and is nowadays routinely used in almost all ski resorts in developed countries (Steiger et al., 2019).

Background

Recent progress has been made in the literature to better account for snowmaking in future projections of snow reliability in ski resorts in Europe (Austria: e.g. Marke et al., 2015 ; France: e.g. Spandre et al., 2019 ; Norway: e.g. Scott et al., 2020a) and North America (Scott et al. 2020b). However, while several studies have documented strong reductions in snow cover amount, depth and duration in many mountain regions of the world over the past decades (Mote et al., 2018, Klein et al., 2016, Marty et al., 2017, Matiu et al., 2020, Hock et al., in press), explicit assessments of the impact of climate change on ski resorts operations, based on past observations, have remained limited (Beaudin and Huang, 2014, Hamilton et al., 2003). The efficiency of snowmaking based on past observations has seldom been assessed quantitatively: this also requires in-depth analysis of ski resorts operating conditions for past seasons, in a way which allows disentangling the contribution of snowmaking to actual snow conditions. Previous studies in the French Alps have led to the development of a sophisticated modelling system that simulates snow conditions in ski resorts, taking explicitly into account grooming and snowmaking (Spandre, 2016, Spandre et al., 2019). However, in past studies, the time evolution of the fractional coverage of snowmaking was applied uniformly to all ski resorts, in the absence of resort-level data describing the past evolution of snowmaking fractional coverage in ski resorts. A proper assessment of the impact of the interannual variability and long-term climate change on ski resorts operating conditions requires not only to take into account observed variability of meteorological conditions driving the variations of snow conditions in ski resorts, but also the time evolution of their individual snowmaking capacity. In this study, we quantitatively assessed the impact of climate change on the operating conditions of ski resorts, with and without snowmaking, taking into account the variability in snowmaking development dynamics across ski resorts.

Method

To address our research issue, a complete snowmaking coverage dataset over the period encompassed is necessary. We analysed snowmaking investments figures by 101 ski resorts in the French Alps from 1997 to 2018 and developed an original method to infer the time evolution of the snowmaking coverage for each ski resort. We developed two empirical models: a linear and

an asymptotic exponential model. Both provide an estimate of the surface covered with snowmaking determined by related investments and an initial value of 7% in 1996. The surface area of the ski resorts implemented in the exponential modeling was estimated from gravitational envelopes using a ratio of 11% (François et al. 2016). We defined the coefficients of the 2 models based on a sample of 33 ski resorts in which evolution of snowmaking fractional coverage had been recorded. We assessed the models with two other samples of 17 and 15 ski resorts. On the basis of the mean coefficients, we computed the evolution of the fractional coverage of snowmaking for the remaining ski resorts of our dataset.

This data was used together with the output of the SAFRAN-Crocus model chain (Durand et al. 2009, Spandre et al. 2016, 2019), making it possible to perform simulations with and without snowmaking for the past decades. We finally obtained a complete dataset of resort-level snow reliability that spans 72 ski resorts, accounting for their intrinsic variations of snowmaking coverage from 1997 to 2018.

Since the size of ski resorts affects snowmaking development (Spandre et al., 2016), we also assessed the influence of ski resort size on the evolution of snow conditions, with and without snowmaking.

For each ski resort, we computed simulated snow conditions: 1) groomed snow cover without snowmaking, 2) with individual snowmaking coverage rates (based on the 2 models used) and 3) with similar snowmaking coverage rates across ski resorts (based on the 2 models, common for all ski resorts) and 4) with a constant snowmaking coverage value reached at the end of the time period (2018) using distinct individual values and using a similar value for all ski resorts. These numerical simulations make possible to compare the state of the snow cover with and without snowmaking, accounting for individual dynamics of snowmaking area coverage, contrasted to results obtained using similar values for all ski resorts (Spandre et al., 2019b).

Results

We find a mean unit cost for snowmaking equipment of 118k€/hectare computed with the coefficient estimated of the linear model and consistent with guidance values found in the literature. Since the linear model assumes a fixed cost for every hectare equipped, we observed a faster growth of the snowmaking coverage rate in our linear model than in the exponential one. The linear model reaches a 34% mean value for snowmaking coverage in 2018 while the exponential model only reaches values of 25%, probably underestimated compared to existing estimates (Spandre et al., 2015). Differences between the models in the calculating of the snowmaking rate only slightly influenced snow reliability index values.

Preliminary analysis of the data indicates that the larger the ski resort is, the higher its snow reliability index. During the time period considered, small ski resorts faced several times snow seasons with snow reliability index below 50% while larger ski resorts have never fallen below a 60% index.

Regarding snowmaking impacts on snow reliability values, snowmaking systems allowed an average increase of 10-11% of the snow reliability compared to the groomed snow cover without snowmaking over the 1997–2018 periods.

Snow reliability gains from snowmaking differ substantially between larger and smaller ski resorts. Small ski resorts had the highest increase of their snow reliability with snowmaking since they encounter more often low snow reliability values than larger ski resorts. Snowmaking often offsets the drops of snow reliability of seasons with marked snow scarcity, but not always (low-snow conditions combined with meteorological conditions unfavourable for snowmaking). The increase of snowmaking coverage over the period studied generates a smoothing of the snow cover variability. This smoothing is even more pronounced in the cases where the interannual variability of the natural snow cover is already small, which is often the case for larger ski resorts.

This work paves the way for the first quantitative assessment of the added-value of snowmaking in reducing the impact of climate change on ski resorts snow cover reliability in the French Alps.

Keywords: snowmaking, ski tourism, French Alps, climate change, snow cover reliability, ski resort

Outdoor guide's perceptions of environmental and climatic change

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Background

As people are increasingly on the search for extraordinary experiences, adventure tourism (i.e. backpacking, climbing, hiking, rafting, scuba diving, skiing, etc.) is experiencing significant growth and providing tourists with life-changing experiences (Gross & Sand, 2020; UNWTO, 2014). Unlike built attraction-based tourism, adventure tourism relies entirely on natural settings, which leaves communities dependent on adventure tourism extremely vulnerable to the slightest environmental and climatic changes. A growing body of evidence suggests that global climate change will influence the future of adventure tourism and outdoor recreation opportunities on a global scale and across Canada, more specifically. Hewer & Gough (2018) predict that climate change is anticipated to present increased risks for cold-weather activities in Canada, while opportunities are anticipated to arise for warm-weather activities. However, this prediction fails to understand the indirect impacts of climate change on adventure tourism, such as the increase of natural hazards, cost of adaptation, and the associated likelihood of accidents. While there has been research done on the impact of climate change on natural environments that adventure tourism relies on and an overview of climate change impacts on outdoor recreation generally (Hewer & Gough, 2018), a very small body of research has specifically focused on guides perspectives or included hard adventure tourism activities, such as mountaineering, rock climbing, back-country skiing, or hiking (Mourey et al., 2020; Salim et al., 2019).

From a guiding perspective, two studies in the Mont Blanc mastiff, France (Mourey et al., 2020; Salim et al., 2019) aimed to define perceptions of mountain guides about climate change and how guides are adapting to associated climatic and environmental changes. Salim et al. (2019) primarily focused on defining difficulties that mountain guides face due to climate change, and more specifically, how guides adapt to climate change related challenges, while Mourey et al. (2020) focused largely on outlining adaptation strategies that mountain guides have adopted to increase the adventure tourism's resilience to climate change. The guiding industry is unique, as guides are trained through an elegant blend of art and science to make decisions based on experience, observation, and intuition (ACMG, n.d.). While quantitative research can define change in natural environments, guides can provide eye-witness experiences to these changes and outline what these mean for the future sustainability of adventure tourism. However, guides perspectives have been historically neglected from tourism literature since much work has taken a more quantitative approach to understanding climate change impacts.

This research will work to narrow key knowledge gaps in the adventure tourism literature by extending guiding perspective studies to a Canadian context through surveying guides registered through the Association of Canadian Mountain Guides (ACMG). This work will identify perceived environmental impacts in adventure tourism destinations across Canada, outline the insights

outdoor recreation guides have developed about climate change over the course of their career, highlight risks and opportunities that climate change poses to the future of the adventure tourism industry, and lastly, determine the state of climate change adaptation in Canada's adventure tourism guiding industry. By targeting these key knowledge gaps, this research will help the adventure tourism industry navigate the uncertain future that lies ahead due to climate change. This includes outlining essential information guides require before adapting to current and future impacts, creating an inventory of perceived climate change impacts in high mountain environments, which are regions that are often inaccessible to scientists on a frequent basis, and outlining the importance of adventure tourism for climate advocacy.

Methodology

This study involves the use of a structured online survey with open and close-ended questions that will be administered using Qualtrics (an online survey platform). This survey will be disseminated via email to current members through the ACMG email list with pre-approval from the ACMG Partnership Coordinator. Survey data will then be analyzed using the Qualtrics Analytics tool and Excel. Participants included in this study will be exclusively members of the ACMG operating in the outdoor guiding streams. Under the ACMG, there are multiple streams of guiding that members fit into, including outdoor (mountain, alpine, ski, rock, via ferrata, and hiking) and indoor (climbing gym instructor) guides. This study is going to target members in the outdoor guiding streams and exclude the climbing gym instructors based on the sole purpose of gaining perspectives on environmental change in guiding regions. The 25 questions included in the survey are broken down into the following categories: (9) demographic and professional operation questions, (4) physical change questions, (6) climate change perception questions, and (6) climate change adaptation questions. Considering the ACMG currently has 1455 members, expected sample size is between 291 – 363 based on an anticipated response rate between 20 – 25% and achieving a confidence level of 95%.

Expected Results

How outdoor recreation guides perceive and respond to climate change is critical knowledge for the future of the ever-expanding outdoor recreation and adventure tourism industry. Results from this study are expected to provide context to the adventure tourism and broader tourism industry in mountain destinations on climate change vulnerability and adaptation. Expected results of this study include: (1) guides noting significant physical changes in guided regions (i.e. glacial coverage, permafrost coverage, precipitation, temperature, and slope instability) (2) guides noting significant changes in hazards within the guiding environment (i.e. avalanches, rockfall, icefall, forest fires, flooding, and extreme weather events), (3) guiding companies and independent guides noting the adoption of basic adaptation strategies, and (4) guiding companies and independent guides noting key information barriers for adaptation and resilience building. While quantitative studies have contributed significantly to the understanding of complex changes in ecosystems where adventure tourism takes place, few studies have incorporated the industry's perceptive, which is essential for understanding risks and opportunities. By gaining an insight into

the perceptions of outdoor recreation guides when it comes to climatic and environmental change, this research can help the tourism industry at large understand climate risk and create adaptation strategies to ensure the resiliency of the adventure tourism industry.

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Keywords: recreation, tourism, adventure, adaptation, resilience, vulnerability

Can last chance tourism be a vector of improvement for pro-environmental behaviour? An exploratory study on glacier tourism

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Introduction

Environmental changes are currently leading to the emergence of new forms of tourism, in particular with regards to the development of Last Chance Tourism (LCT). LCT is a concept that appeared in the early 2010's; it is defined by Lemelin et al. (2010) as a form of tourism that aims to see natural features before they disappear. LCT involves a paradox well defined by Dawson et al. (2011) in the case of polar bear tourism: the more aware and concerned the visitors are about human impact on climate change, the more likely they are to visit remote areas to see polar bears before they disappear. As a result, research on LCT has largely focused on its negative aspects and whether this type of tourism could be a threat to the areas hosting it. More recently, research has emerged on potential positive impacts that LCT can bring, especially in terms of the pro-environmental behaviour of visitors. Only limited research has been conducted on this subject, including Miller et al. (2020), who has shown via a case study in Alaska that LCT experiences can increase visitors' pro-environmental behaviour intentions. As a result, the aim of our present research is to investigate the potential for LCT and glacier tourism in particular to be a vector of climate change awareness and pro-environmental behaviours. Accordingly, the purpose of this presentation is to summary the research design and the initial results obtained and to discuss the work in progress and its future.

Methods

Glacier tourism in the Alpine Range was chosen to conduct our research (Salim et al., 2021). Three phases were necessary, the last of which being still in progress.

First, we wanted to make sure that glacier tourism sites in the Alps were considered by their visitors as last chance destinations. For this purpose, a quantitative survey built around the Recreation Experience Preference scale (cf.: Manfredo et al., 1996) was implemented at seven glacier sites in France, Switzerland and Austria during summers of 2019 and 2020.

In a second step, Pro-environmental Behaviour Intentions (PeBIs; cf.: Halpenny, 2010) were chosen as indicators to measure the potential benefits of LCT destinations in terms of pro-environmental behaviour. The quantitative survey implemented during the summer 2020 at the largest French glacier (Montenvers-Mer-de-Glace) aimed to understand which factors could influence PeBIs. Landscape perception, emotions, LCT motivations, attachment to place, satisfaction and revisit intention were included as variables to be tested.

In a third phase, the objective was to understand the impact of landscape interpretation elements, in particular the numerous glacier interpretation centres, in the transfer of knowledge from

scientists to the general public as the understanding of the processes linking climate change and glacier retreat. This work is carried out through a qualitative survey based on mobile ethnography.

Preliminary results and discussions

The first phase of our research resulted in 1330 surveys collected from tourists at the seven investigated sites. An exploratory factor analysis highlighted five motivational factors (KMO = .808) related to: (i) environment, (ii) LCT, (iii) learning, (iv) storytelling, and (v) tranquillity. Despite a few differences, LCT is the second most important motivation within the sites. This result suggests that Alpine glaciers are nowadays widely considered as "endangered species" and have become part of a tourism practice assimilated to LCT. Different analyses are still in progress, notably with a view to understanding the different typologies of visitors based on their motivations.

In the second phase, 301 completed questionnaires were collected at Montenvers-Mer-de-Glace. Exploratory factor analyses and correlations show that there are statistical relationships between PeBIs and landscape perception, emotions felt, and motivations for LCT. These results suggest that LCT destinations, and particularly glacier tourism sites, may play a role in increasing awareness on environmental issues. They also suggest that further work is needed on interpretation elements and scientific mediation of the landscape in a way to encourage pro-environmental behaviours.

The third phase provides an opportunity to explore an interpretation issue. 10 semi-structured interviews carried out at the Montenvers-Mer-de-Glace explored how visitors perceive the impact of tourism on the environment and how they see their own actions on the climate. A follow-up survey will be carried out during the summer 2021 around different interpretation centres of Alpine glaciers.

The first results of our research suggest that touristic glaciers can be considered as LCT destinations and that LCT can be a form of tourism that encourages pro-environmental behaviour. These results need nevertheless to be confirmed, in particular through comparative analyses between different sites. In addition, the study on the efficiency of interpretation elements must be continued to help managers to take full advantage of the educational potential of their site.

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Keywords: climate change, glacier tourism, last chance tourism, pro-environnemental behaviour, sustainability, interpretation

News media framing of hurricane events and Caribbean tourism

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Background

The Caribbean is the most tourism intensive region in the world, with a heavy reliance on the sector for contributions to GDP (US$56.4 billion) and employment (2.4 million jobs) (WTTC, 2018). The Caribbean is also highly dependent upon favourable climatic conditions in the coastal zone to attract tourists, hinging their economic viabilities, in part, on visitors' preferred weather conditions (Rutty & Scott 2014). The historic 2017 hurricane season, whereby the Caribbean was hit by six major hurricanes, resulted in a sharp downturn in regional tourist arrivals (-826,100). Despite less than one third of the Caribbean islands being physically impacted, "A public misconception that the entire Caribbean was struck by the storms [was] damaging to the region" (WTTC, 2018, p. 3). The primary goal of this study is to examine how the news media frames hurricane events within the context of Caribbean tourism, including how the Caribbean tourism sector is portrayed during the reporting of hurricane threats.

The news media is cited as one of the key sources of weather data utilized by tourists (Rutty & Andrey 2014; Scott & Lemieux 2010), acting as an intermediary to communicate climatic information to the public (Matyas et al., 2011). However, the media has been found to amplify weather risks, as well as to report incorrect or misleading information (Renn et al., 1992) which can amplify the risk perception of tourists (Kapuściński & Richards, 2016) and negatively impact the ability of destinations to attract tourists (Becken et al., 2010). Through the media practice of agenda setting and framing, the public's attention is steered toward specific facets (i.e., attributes) of a topic or event, which influences how the public understands and perceives the information. Research on risk perception in the context of tourism, although limited, collectively underscores that risk perception directly influences tourist behaviour (Kapuściński & Richards, 2016). Indeed, tourists are sensitive to risk amplifying information, with the literature demonstrating that tourists will cancel vacations or travel to alternate destinations if their vacation destination is reported to pose a risk to their wellbeing or their travel experiences (Rutty & Scott, 2009; Wilson & Becken, 2011). Importantly, the vitality of a destination's tourism industry is inextricably linked to tourists' perception of safety and security because perceptions influence tourism demand (Brown, 2015).

Despite considerable evidence that weather reports can and do influence travel-related decision-making (Brown, 2015; Rutty & Scott, 2009), there has been little to no regional studies that have examined the impacts of weather-related media coverage on Caribbean tourism. Moreover, there is limited research on the impacts of hurricane events on Caribbean tourism arrivals even though the tourism-dependent region is highly vulnerable to weather and climatic conditions. To address this knowledge gap, the presented study will examine news media framing of hurricane risks and Caribbean tourism over a period of 40-years (1979 - 2019). By analyzing the frames, messages, and communication style within the news stories, the results of this shed light on how hurricane

events and Caribbean tourism are represented in the media. The results will highlight significant factors that may shape tourists' risk perceptions, which could potentially have a negative effect on tourism arrivals in the Caribbean region before, during, and after a hurricane event.

Method

Using the LexisNexi database (the world's largest electronic database for public-records related information), news media articles released between 1979-2019 on hurricane and tourism in the Caribbean were collected and analyzed. An advanced search within the news database using the keywords 'hurricane* and 'touris*', and the geography filter of 'Caribbean' was undertaken, resulting in a sample size of 635 articles. Next, a mixed-method content analysis using both quantitative (i.e., word-frequency counts) and qualitative (i.e., interpretative analysis to ascertain the meaning and context of the news information) was completed to assess the media practice of agenda setting and framing, identifying, and defining key article attributes (i.e., themes/variables).

Results

The main objective of this study was to examine how the news media identifies, constructs, and frames hurricane risks within the context of Caribbean tourism. The results underscore that over the last 40-years, the media has amplified hurricane risks in the context of Caribbean tourism, which can negatively affect tourism arrivals and destination image. Specifically, the media often suggests or claims that hurricanes actively targeted tourist zones or tourists while on vacation, negatively impacting key tourism assets (e.g., beach aesthetics), leaving tourists stranded or in unsafe conditions, and disrupting business operations that will impede tourists' comfort and overall travel experience. Moreover, articles often omit critical geographical information, reporting sweeping statements that the region as a whole is (or will be) at risk to a hurricane. The media also tends to use sensationalist headlines when reporting hurricane risks (e.g., British tourists shelter as killer hurricane batters holiday island).

The findings from this research serve to confirm the concerns of the Caribbean Tourism Organization and various Caribbean government officials that are concerned about the media representation of the region as hurricane-ravaged and vulnerable to hurricane strikes (WTTC, 2018). The media analysis presented underscores that through agenda setting and framing practices, the media largely exaggerates hurricane risks to tourism. Given the media's ability to influence and shape public perception, which can amplify the risk perception of readers, the news media's reporting of hurricane events in the region has significant implications for the tourism sector. The presented research provides a deeper understanding of media framing practices and offers destination managers and operators insights that can assist in decision-making on communication and marketing strategies aimed at reducing or minimizing the Caribbean's exposure to misleading media portrayals of hurricane events to limit unnecessary decreases in tourism arrivals.

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Keywords: Caribbean, Tourism, Hurricanes, Media, Risk

The Arctification of northern tourism: A longitudinal geographical analysis of company names in Sweden

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Background

The European north above the Arctic Circle has since long attracted travelers, the selling point being the availability of nature and wilderness. Previously, the region was seen as a place with few visitors mainly focusing on nature experiences, recent development however demonstrates a larger number of tourists that suggest a greater variety of tourism motivations, including mass tourism in places such as the Santa Claus industry in Rovaniemi. New products such as dog sledge tours, northern light watching, snowmobiling, and stays in ice hotels has been introduced to the regional tourism supply. This development is in line with reports of growing tourism in northern areas and the Arctic. At least until the Covid-19 pandemic caused a discontinuation of a long-lasting boom. The process of tourism development also contributes to the understanding of the Arctic as important region for climate change, geopolitical struggle, and new economic opportunities. Many of the tourism companies in the Arctic region utilize company names such as 'Arctic' or other terms related to imaginations of the European far North. Hence, this article aims at illustrating the process of 'arctification', here referring to the use of Arctic terminology to reimage the touristic properties of the region. This has been done by mapping the changing geographies of company names. Through this process, it is possible to assess what places are considered Arctic in the tourism industry.

Method

The data used in this study was extracted from a privately owned and run firm called Retriever Sverige AB. This database is a collection of public financial and business-related information regarding all limited companies, economic associations, sole traders, and trading partnerships in Sweden. The database collects information from private credit institutes and public government authorities, such as The Swedish Companies Registration Office (Bolagsverket), The Swedish Tax Agency (Skatteverket) and Statistics Sweden (Statistiska centralbyrån). The central piece of information for this study is the organizational name used for the company and/or association. The name of the organization is the key indicator used for tracking the arctification process in the region. The justification for this is grounded in the assumption that the companies are the most important actors in the decision of specific products to be offered in the marketplace, but also how these products should be branded, profiled, named and intended to be perceived among potential customers. Further, companies and their market offers are indirectly a response to market demand, hence partially taking into account the demand side.

Results

The results demonstrate an increase of tourism companies with names related to the properties of the arctic environment. Furthermore, the number of companies with arctic related names has increased from zero companies in 1964 to over two hundred companies in 2020. What is particularly interesting about the company names was that 86% of all companies utilize English terminology. This could be seen an indication that the companies aim at marketing themselves towards an international market. In addition, the study shows spatial differences between these arctic named tourism companies, such as diffusion and clusters. The study analyzed the companies' physical location and its relationship to its surroundings. For example, proximity to county capital, municipal center, airports, and other arctic named tourism companies. The result demonstrated that airports and municipal centers were factors that had a high correlation with the location of arctic named tourism companies. The companies that were newly established had a tendency to cluster around municipal centers and other arctic named tourism companies, whereas the results show that older companies were more spatially diffused in comparison. Hence, this study aimed at illustrating the process of arctification in tourism by mapping the changing geographies of company names. Through this, it is possible to assess what places are considered Arctic within the tourism industry. Thus, the article contributes to understanding the role of tourism for re-imaging regions and their relations to networks of stakeholders, in this case the tourism industry and tourists. The study also creates the opportunity for future studies to assess the impact of these arctic named tourism companies on the wider society, as well as the reimage of the region.

Keywords: arctification, arctic, tourism, supply, regional, development

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