Facts4Tourism

Dossier for the communication of tourism-relevant research results for the German Alpine region

CIPRA Deutschland e.V.

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We would like to express our sincere thanks to our project advisory board and the pilot regions for their valuable cooperation and support in the implementation of the Facts4Tourism project.

We would also like to extend our gratitude to the funding bodies, the Federal Environment Agency and the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection, without whom this publication would not have been possible.

Note on gender-equitable language

Studies show that the use of the generic masculine, which is commonly used in the German language, primarily creates male images in the mind when reading. Thus, the use of the generic masculine does not represent the world as diverse as it is. The German version of this publication therefore uses neutralisations (replacing the masculine form with gender-neutral forms or with nouns) and feminisations (mentioning both genders or adding the feminine form by abbreviation). Between the masculine form and the feminine ending, we also use the gender sign * (asterisk) as a placeholder for all those who assign themselves to neither the feminine nor the masculine gender.

This abridged English version also takes care to use gender-sensitive language where necessary.

Availability

The dossier is available digitally and free of charge via our website (www.cipra.de/publikationen).
Print copies (German) can be ordered for a shipping fee, as far as available.

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Feedback:

We would be pleased to know in which context this dossier was used.
To do so, scan this QR code or go to www.is.gd/F4T_Feedback.

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Preface

In two years of work, in cooperation with the Department of Geography of the Ludwig Maximilians University Munich, the project „Facts4Tourism“ was processed, which was thankfully funded by the Federal Ministry for the Environment. The contents are not only the result of scientific research, but also the result of meetings with tourism practitioners in the different places.

Tourism is, especially in the Alps, the recreational area of Europe, the most important economic sector that has brought prosperity also to peripheral and more remote areas of the Alps and that needs to be further developed in a nature- and environment-friendly way. In sensitive landscapes, those responsible for tourism have a special obligation.

The present work enriches the discussion with problems and facts on the further orientation of tourism in a time of change. At present, many things are in flux and changing the fundamentals of tourism. The consequences of the pandemic, the climate crisis, a biodiversity crisis and the unfortunate Ukraine war are challenges that need to be addressed. This publication will make the decisions easier.

I am delighted that the Facts4Tourism publication joins and expands CIPRA Deutschland's existing publications!

My thanks go to all those involved in the project and to the actors in the tourism communities for their commitment and for making it such a success. I would also like to express my sincere thanks to the Department of Geography at the Ludwig-Maximilians-Universität in Munich for the excellent cooperation that made it possible to implement this project successfully. The cooperation with the university has not only provided valuable insights, but has also made it clear once again how important the exchange between science and practice is in order to effectively address complex environmental issues.

Axel Doering
President
CIPRA Deutschland

Garmisch-Partenkirchen, the 24th of April 2023

Preface

The exchange of knowledge and experience, but also of opinions and attitudes between science and practice is of great importance, especially in times of media diversity. This process is made more difficult by the sheer flood of information, some of which is objective and serious, but some of which is subjective and emotional - even including (deliberately) spread fake information.

This also applies in general to the exchange between tourism science on the one hand and the tourism industry and tourism policy on the other. In particular, the topics of environmental protection and sustainability, climate change and environmental impacts are examples of this. In this respect, CIPRA Deutschland's two-year Facts4Tourism project plays a very important role in communicating tourism-relevant research results in the German Alpine region. Not least thanks to the cooperation with the Department of Geography as the scientific project partner, it was possible to discuss important tourism developments and their environmental impacts in three regions in the years 2021 to 2023 and to reflect them in the state of scientific knowledge. The facts prepared in this way were further developed into recommendations for action.

One of the results of the project is a brochure that presents the state of scientific knowledge in a comprehensible language for a wide range of addressees (e.g. tourism service providers, actors in tourism policy or interested members of our society). In this way, the brochure can serve as a handbook to support the development of constructive solutions to a wide range of tourism-related issues.

From the point of view of the representative of the scientific actor involved, the Department of Geography at the Ludwig Maximilian University Munich, I am delighted with the cooperation with CIPRA and with the present result. For me, this is a very successful example of cooperation between science, a supranational NGO and the project partners involved. I would therefore like to thank all those involved in this project for their openness and willingness to cooperate, especially those responsible for the operational implementation of the project, namely Henriette Adolf, Uwe Roth and PD Dr Philipp Namberger.

Prof. Dr. Jürgen Schmude
Professor in retirement
Department for Geography, LMU Munich

Munich, the 22nd of April 2023

Introduction

CIPRA Deutschland

CIPRA Deutschland is a **non-profit umbrella organisation** for associations and organisations working for the protection and sustainable development of the Alps: CIPRA's work focuses on life in the Alps - for people, animals and plants. Through its member organisations, CIPRA represents aroand 1.5 million individual members.

The member associations of CIPRA Deutschland are (as of March 2023):

- Bergwacht Bayern im Bayerischen Roten Kreuz
- Bergwaldprojekt e.V.
- BUND Naturschutz in Bayern e.V. and Jugendorganisation BUND Naturschutz
- Deutscher Alpenverein e.V. and Jugend des Deutschen Alpenvereins
- Gesellschaft für ökologische Forschung e.V.
- Landesbund für Vogel- and Naturschutz in Bayern e.V. and Naturschutzjugend im Landesbund für Vogel- and Naturschutz
- Mountain Wilderness Deutschland e.V.
- NaturFreunde Deutschland e.V. and NaturFreundejugend
- Ökologischer Jagdverband e.V.
- Schutzgemeinschaft Tegernseer Tal e.V.
- Verband Deutscher Berg- und Skiführer e.V.
- Verein zum Schutz der Bergwelt e.V.

Chair of Economic Geography and Tourism Research in the Department of Geography at Ludwig Maximilians University Munich (LMU)

The Chair of Economic Geography and Tourism Research is part of the Department of Geography at Ludwig Maximilians University Munich. In addition to teaching, it conducts scientific research, advises and works on projects with companies, politics and public administration. The core competencies of the chair are in the fields of tourism geography and economic geography. In tourism geography, the spatial dimension of the tourism economy is studied and practicable recommendations for action are derived. In economic geography, the researchers at the chair investigate how companies and governments react to sustainability goals and policies and how this affects economic areas. Qualitative and quantitative methods are used to explore opportunities, barriers and reactions of actors in different sectors and scales, also in transdisciplinary projects. While most of the research focuses on Munich, Bavaria and Germany, work is also being done worldwide, for example in France, the Caribbean, Israel, New Zealand, Poland and the USA.

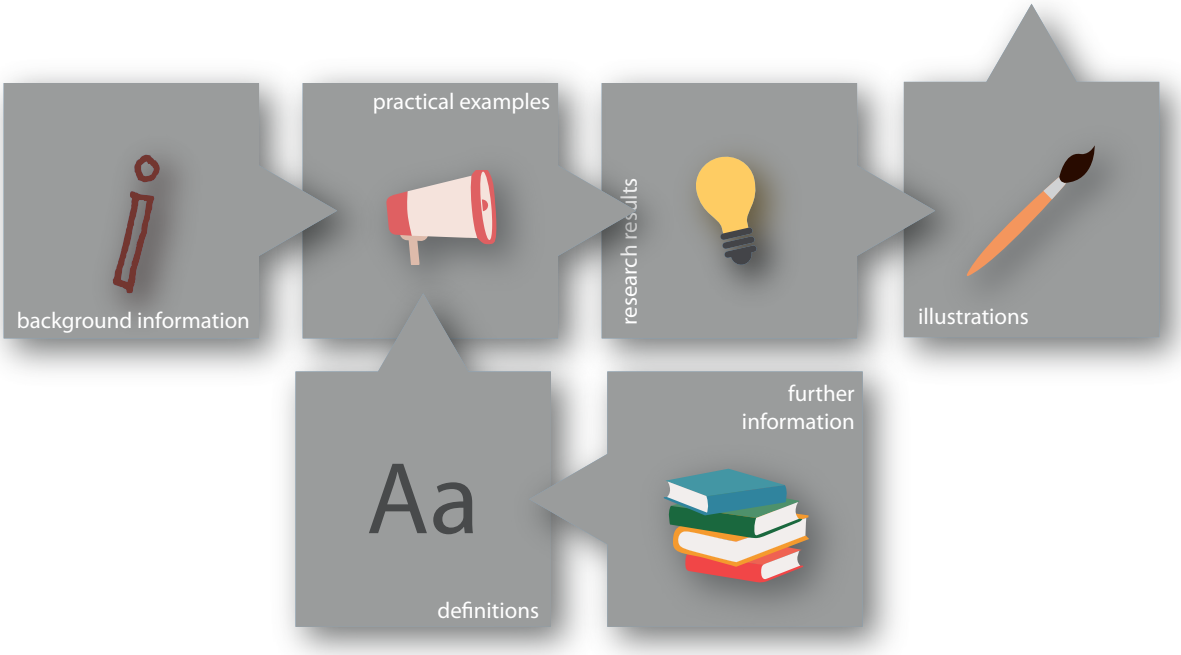
Project Facts4Tourism

CIPRA Deutschland's two-year Facts4Tourism project to communicate tourism-relevant research findings in the German Alpine region took place from 2021 to 2023. In three regions, tourism developments perceived as relevant and their environmental impacts were discussed, prepared on the current state of the relevant research and corresponding recommendations for action were given. A dossier is to make the state of the art in tourism science accessible to all stakeholders and thus contribute to constructive solutions.

The Facts4Tourism project was carried out by the Alpine Protection Commission CIPRA Deutschland in cooperation with the Chair of Economic Geography and Tourism Research at the Ludwig Maximilian University Munich (LMU). The market town of Bad Hindelang, the market town of Garmisch-Partenkirchen and the mountaineering villages of Kreuth and Steinberg am Rofan (AT) were involved as partner destinations in the project. During several workshops and two conferences, there was a lively exchange among stakeholders from the German Alpine region and with actors from the coastal areas of northern Germany. In addition, the project was accompanied by a project advisory board, which discussed important milestones and the progress of the project as well as contributing ideas and suggestions in order to ensure a critical view „from the outside".

Methodology and structure of the dossier

The Facts4Tourism dossier is based on a modular principle. Each chapter contains background information and definitions of terms, illustrations, research results, practical examples and, at the end of each chapter, further information. The chapters and the research results do not build on each other, but can be read separately. In this way, readers can always read content that is of interest to them and skip others.



Components of the Facts4Tourism dossier.
Source: own illustration

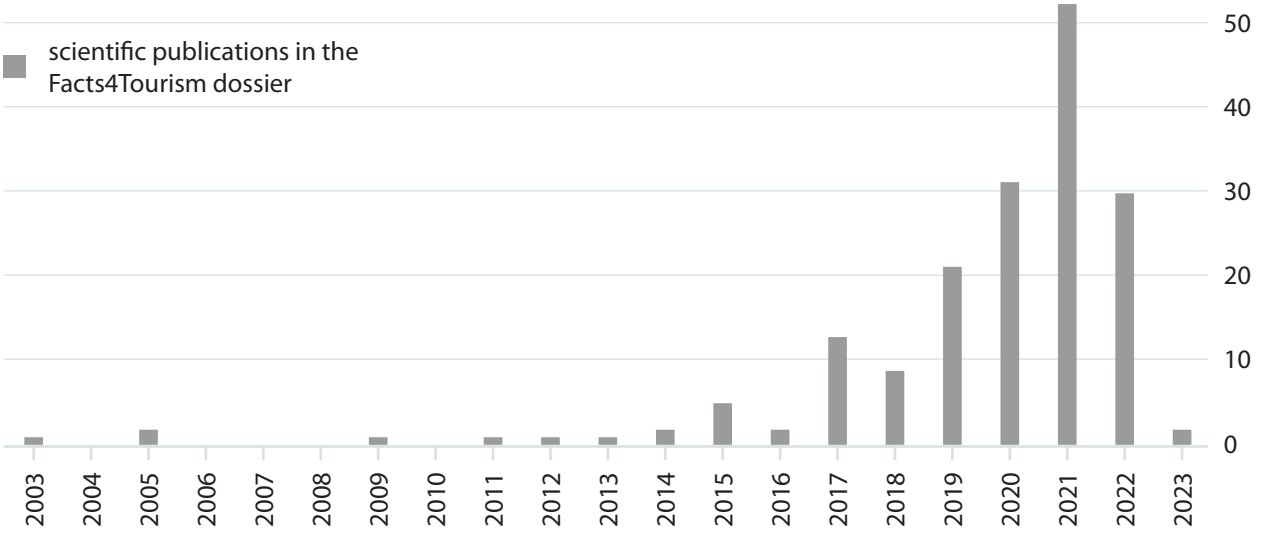
In order to refer to related interesting other passages of the dossier in the text, „cf. chapter heading" is used to refer to the respective chapters in the corresponding chapter colour.

Each section marked with the „light bulb" symbol represents a **scientific publication** (paper). While the full German version of the dossier presents relevant research results and findings of the respective paper, the short English version provides information on the title, the authors, the year of publication of the paper and the research methods used in the paper as well as a link to the English abstract. Scientific publications were only included in the dossier if they had been published in a scientific journal or similar and had gone through the peer review process. *(cf. Science Communication)* To ensure that the dossier contains research results that are as recent as possible, mainly papers from the last three years (2019-2022) were used. If topics in older publications were particularly relevant to the Alpine Space and/or research was conducted in the Alpine Space itself, exceptions were also made to the last rule.

The following were edited for this dossier:

175 scientific publications

107 Reference books, articles, reports, texts and maps



Number and year of publication of scientific publications.
Source: own illustration

In sections marked with a megaphone, individual **projects** and **best practice examples** that fit the respective chapter or topic section are presented.

Info box

Info boxes provide additional information on a specific topic or text. Here you will find definitions of technical terms, short explanations of contexts, background information or other interesting facts.

Science communication

Science communication

Science is defined as an activity that produces knowledge in a specific field that is well-founded, orderly and considered certain.[1] Methodologically, in science, starting from a concrete question, an **idea** is first developed, which is then expanded into a **hypothesis** (statement or assumption that is free of contradictions, but initially unproven).[2] This hypothesis is then **verified** or **refuted** with the help of experiments, studies or methods of induction and deduction. This is how scientific knowledge is gained.[3]

Research methods

To examine research questions, a choice can be made between a quantitative and a qualitative approach. In qualitative research, individual cases are examined in detail and evaluated interpretatively. Often interviews or observations are conducted for this purpose (also called case study). In quantitative research, as many results as possible are collected and statistically evaluated. Typical methods are, for example, surveys or experiments.

In addition to these two approaches, scientific questions can also be researched with a literature analysis (secondary research). Here, existing literature relevant to the research question (scientific publications such as papers or books) is collected and analysed on the basis of the research question. In this way, theories or problems can be compared, newly emerged phenomena can be examined retrospectively and research gaps can be identified.

Furthermore, research can be conducted inductively or deductively: In inductive research, theories are derived from one's own research, whereas in the deductive approach, already existing theories are tested.[4]

Scientific work is not an end in itself. In order to be able to use the obtained findings beneficially, they have to be disseminated, hence communicated, both within and outside the scientific community. **Internal science communication** describes the professional exchange among scientists, for example through lectures or publications in scientific journals. **External science communication** is the communication with a target group about aspects of the research process. External science communication begins when scientific findings are published as a book, journal article, conference lecture or, nowadays, on the Internet – a scientific publication or specialist publication. Scientific articles published in professional journals are also called (research) **papers**.[3,5]

The structure of a paper is always similar: After a title page with introduction and abstract (compact summary), the methods section follows, which provides information about the methods used and information about the respective conditions of the studies. In the results section, the observations and analysis results are presented soberly and objectively; only in the discussion section are the results discussed, interpreted and evaluated in the context of previously published literature and the current state of knowledge. At the end of the paper, there is a conclusion, including an outlook on questions that have arisen as a result of the article, and a bibliography.

Before publication: the peer review process

Scientific publications such as papers (articles in scientific journals) are subject to the peer review process. In the peer review process, publications are read by other scientists from the same field (reviewers) and checked for errors and weaknesses in content, which then have to be revised by the author. This validates (checks the value and validity of) the scientific work and ensures the quality of published research. This method has been used for over 350 years.

Scientific texts are reviewed in two different procedures to ensure the independence and objectivity of the review process. In the single-blind process, only the author does not know who is reviewing the publication. In the double-blind process, the peer review process is completely anonymous – neither authors know who is reviewing the publication, nor do the reviewers know whose text they are reading. [6]

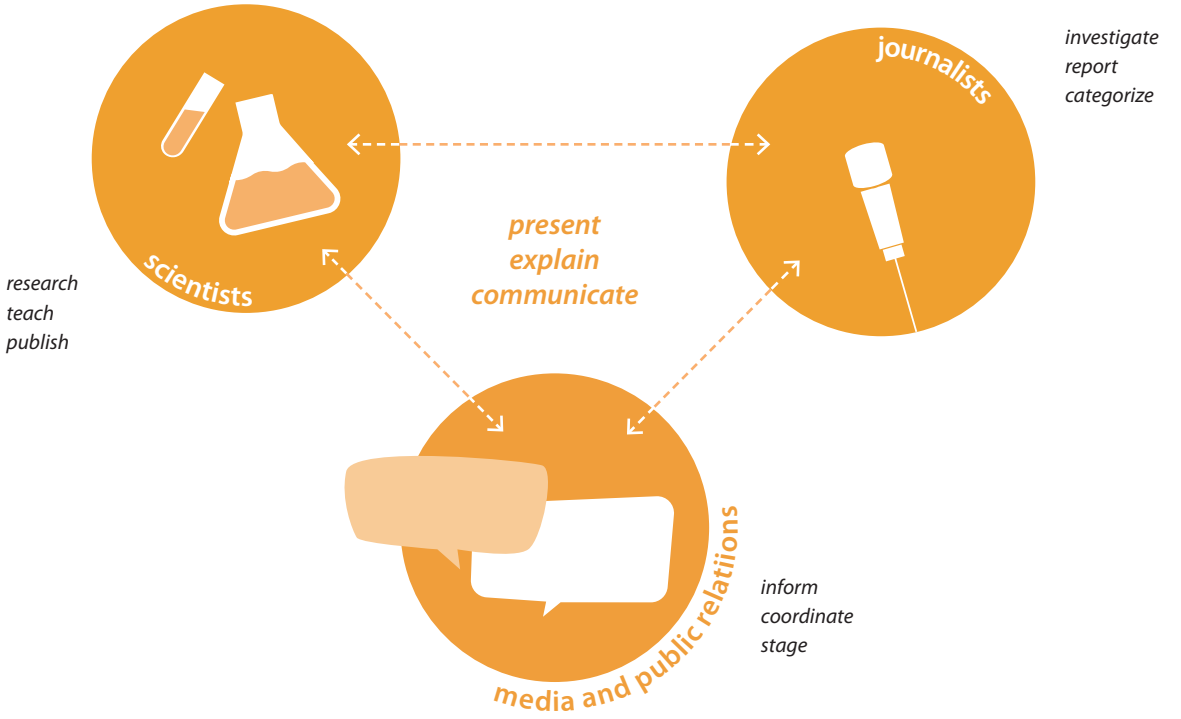
Scientific publications in journals such as papers are usually written in a highly formalised and standardised style and are published in English. As a result, reading and understanding a scientific article can be very challenging and is usually also very time-consuming. Therefore, the communication of science to the public takes place in a so-called popular science way.[7]

After the publication of a scientific publication, an **objective, transparent** and **public** discussion about the contents, such as results, methods, interpretation, classification of findings, can take place. External science communication can take place in various formats of mediation, dialogue or participation. Thus, popular science communication ranges from a lecture for a lay audience to short messages in social media.[3,5]

internal science communication	external science communication	
	from science	about science
Professional exchange among scientists • publications • lectures • seminars • open science • open access • open data • ...	**Scientists with the public and the media** • social media, blogs • Children's University • Science Slam • participation formats	**Journalists** • TV, podcasts, radio • newspapers, magazines • internet, social media
	Communicators with the media and the public • press releases • corporate Publishing • parliamentary evenings	**Politicians** **Lawyers** **NGOs** **Influencers** ...

Internal and external science communication with selected examples.
Source: Bundesministerium für Bildung und Forschung (2021)

Among all the stakeholders in external science communication, the professional groups of scientists, media and public relations workers and science journalists stand out. They communicate scientific knowledge in a **public setting** (in contrast to teachers, who pass on educational content in an institutional setting) and have to explain scientific content to non-specialists. This includes the presentation of **contexts, goals, methods** and **results.**[8]



Stakeholders in science communication.
Source: Own illustration based on Könneker, Carsten (2017)

Due to **digitalisation**, both external and internal science communication are currently undergoing a transformation. Via digital information channels, the general public can be addressed directly by scientific actors (for example via scientific blogs), report on science themselves (citizen journalism) or be involved in the research process (citizen science). Digitalisation thus opens up many new opportunities and scope for action for science communication (especially through social media platforms) - but it also harbours risks.[7,9]

Although information is quickly and widely available to many people in the age of the internet, the wide array of information raises **problems in evaluating** content.[10] Furthermore, it is in principle possible for anyone and everyone to move around on the internet not only as a recipient, but also as a sender of information, without any big financial or time effort.[11] In terms of their importance as a source of information, social media are now ahead of newspapers – and the trend is still rising. Journalists, researchers, laypersons and many other stakeholders are active in social media in different roles and with different interests. However, in social media, sorted by an algorithm, only individually interesting and requested information is displayed for the respective user.

This can lead to informal isolation, and **self-reinforcing information networks** can be formed (also: filter bubble, bubble, echo chamber), in which users see their own opinions confirmed again and again. In addition to interest-driven information, false information can also be (unintentionally or intentionally) spread quickly on the internet and in social media; scientific publications can be discredited or defamed. However, there are also positive effects, as the uncovering of numerous plagiarisms shows.[12,13]

Verifying reputable sources

In order to test content and publications for their reliability, the following questions can be checked:

1. Who is the author or editor? Documents without authorship are usually not reliable sources.
2. Is it a credible journalistic or scientific source? Do they have the necessary knowledge about the subject?
3. In which context was the document published?
4. Is the text written objectively, i.e. neutrally and without bias?
5. Can the information be found in several reputable media?
6. Are there source references and can they be verified?
7. Does the title match the text? Is the text free of contradictions?
8. Are other trusted sources spreading the same message? Do the facts match?
9. Can it be proven that photos of the publication have already been published at an earlier time and in a different context (reverse image search)?[14]

Disinformation

False news or misinformation has been around for a long time. Satirically sharpened or clearly recognisable as satire, they are generally not dangerous. Even sensational headlines (clickbaiting) are not necessarily intended to deceive. The situation is different with fake news and disinformation, where misleading or false information is deliberately spread in order to deceive or influence people.

It is often not easy to recognise disinformation as such: content can be purely fictional or exaggerated, and essential information can be omitted so that a false impression is created. If, in addition, figures or quotes are taken out of context, minority opinions are presented as the majority or the range of articles or posts are artificially manipulated, then reality is being deliberately distorted. Not only texts, but also pictures and videos can be easily manipulated nowadays by copying faces with appropriate software or reworking voices (deep fakes). Disinformation campaigns are sometimes used deliberately to spread conspiracy theories, exacerbate existing conflicts and debates, undermine trust in state institutions or divide societies.[14]

In many political systems, **access to information** and also to literature was and is limited, controlled or selective (sometimes also as an active instrument of suppression), since free access to books, literature and information is a fundamental part of **democratic freedom** and ideological, religious, political and scientific openness. In Germany, free and unrestricted access to scientific knowledge and publications is from a formal point of view provided by (scientific) libraries and information centres. In practice, however, there are high **barriers** for the general public in the form of paywalls, spatial barriers or comprehension barriers, or there is a lack of inclusive implementation.[3,15]

Simple language

Simple language does not follow the usual rules of scientific publications, but is oriented towards the reader. While internal terminology facilitates the discourse of experts, the mixture of technical terms, foreign words, nominalisations, neologisms, convoluted sentences and numerous adjectives that is common in scientific texts is not easy reading for readers from outside the discipline.

Simple language is not standardised, but is adapted to the respective target group for which the text is intended. Depending on the target group, education, language knowledge and literacy, subject knowledge as well as orientation towards practice or theory differ.

Simple language is correct language without linguistic aberrations or embellishments and can - but does not have to - affect the use of colour and typography. Simple language can also be understandable German at a high stylistic level, because the level is determined by the reading competence of those for whom the text is written. Simple language may result in longer texts or may involve a loss of information. Complex topics from science and technology can also be expressed in simple language, but at the political and legal level this is not always possible due to technical imperatives.

Simple language is often equated with Easy language. However, there are major differences between the two concepts, as in contrast to Simple Language, Easy Language is intended to support readers whose cognitive comprehension ability differs significantly from assumed average readers (e.g. due to neuronal impairments).[15]

The open access movement

Scientists conduct research (in essence by means of public funding) and generate findings that are then sold back to public institutions such as libraries and universities at high prices in the private sector of journals. The open access movement demands access to (digital) scientific information independent of the financial power of institutions such as libraries, universities and states, and ultimately of readers. It sees scientific research, especially if it has been produced by publicly funded scientists, as common property.[3]

So-called shadow libraries make academic articles available on demand, some of which are only available online behind a paywall. The legality of such portals is disputable.

Further information

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Tourism forms

Tourism forms

Tourism is one of the **main sources of income** in the Alps. The main attractions of the Alps for tourism are their **landscapes** and their diverse **natural and cultural heritage.** To protect this heritage, a balanced approach is needed to develop sustainable tourism offers that focus on experiencing and respecting the environment, as well as to promote the use of alternative mobility solutions. In addition, new business models for year-round tourism are needed.[1,2]

The **Tourism Protocol** of the Alpine Convention aims at reconciling economic interests with existing ecological needs, thus ensuring sustainable development in the Alpine Space.[3] In Bavaria, the Alpine Plan additionally regulates transport development in the Bavarian Alps.[4]

Tourism in the Alpine Convention

The Alpine Convention is an international agreement for the protection of the Alps and was signed by all Alpine states (Germany, Austria, Switzerland, France, Italy, Slovenia, Monaco and Liechtenstein) as well as the EU. It contains guiding principles for sustainable living in the Alps and is the legal basis for the protection of sensitive alpine ecosystems, regional cultural identities and the heritage of traditions in the Alps. To date, legally binding implementation protocols have been adopted for eight thematic areas. These have been signed and ratified by almost all states. The Tourism Protocol of the Alpine Convention was concluded between the Alpine states and the European Union as an international treaty and has been applicable law in Germany since 2002. Its aim is to harmonise the economic interests associated with tourism with the existing ecological requirements and thus to ensure sustainable development in the Alpine region. For this purpose, the following obligatory information on orderly development is laid down in the protocol: Offers, orientation of tourism development, promotion of quality, management of visitor flows, natural development boundaries, quiet zones, accommodation policy, lifts, traffic and transport of tourists, special development techniques such as ski slopes and snow-making facilities, sporting activities, airdrops, development of economically weak areas, staggered holidays, incentives for innovation, cooperation between the tourism industry, agriculture, forestry and crafts, research, education and information.[3]

The Alpine Plan

In the 1960s, in the course of the winter tourism expansion phase in the Bavarian Alpine region, it became clear that an overall spatial concept was necessary in order to simultaneously protect open spaces and terrain chambers from overdevelopment for tourism. This was achieved by drawing up the Alpine Plan, which was incorporated into the Bavarian State Development Programme (LEP) as a sub-plan („Recreational Landscape Alps") and has remained in force ever since.

The Alpine Plan regulates transport development and divides the Bavarian Alpine region into three areas:

Zone A, in which transport projects such as cable cars or roads are fundamentally unobjectionable from a regional planning perspective,

Zone B, in which transport projects are only unobjectionable if this has been examined on a case-by-case basis with regard to Land planning requirements, and

Zone C, in which, apart from so-called land cultural measures (alpine pasture and forest roads), transport projects are not permissible in terms of land planning..

For 50 years, the Alpine Plan has protected large parts of the Bavarian Alps from overdevelopment for tourism; prominent examples are once planned developments at Riedberger Horn, Koblat, Alpspitze, Rotwand, Geigelstein, Sonntagshorn, Hochgern and Watzmann.[4,5]

Development

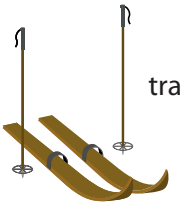
For over 200 years, the Alps have been socially and economically shaped by tourism. Today they are considered the **cradle of tourism.** Over time, Alpine tourism has undergone a series of profound changes in motivation, social structure, choice of means of transport, spatial effectiveness and economic effects.[6] According to Bätzing,[7] tourism in the Alps can be divided into six phases, to which two more have been added here in view of current world events:

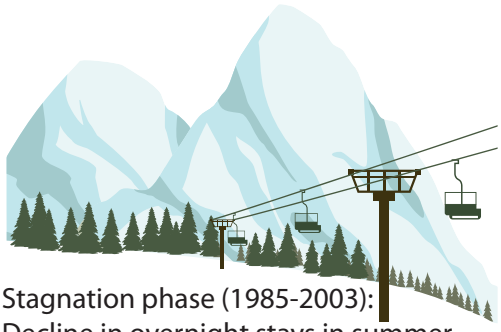
Belle Époque (1880–1914): Low numbers of guests (mainly upper class) with long stays in combination with high local concentrations leads to very high tourism intensity (cf. 1970s to 1980s). Pure summer tourism.

Discovery period (1765-1880): Little tourism with a rather adventurous character, hardly any tourist infrastructure.

Interwar period (1918-1939): Slow recovery of tourism after the First World War with changed structure; middle class now main tourist group. Increasing popularity of winter tourism from the 1920s onwards, construction of first ski lifts and cable cars (symbols of progress).

Alpine gold rush period (1955-1985): Mass tourism enters the Alpine region. Permanently high growth rates of summer and winter tourism (hope for boundless growth and corresponding investments). Traditional character of summer tourism, modern traits in winter tourism (active body experience).





Stagnation phase (1985-2003): Decline in overnight stays in summer tourism; concentration on active sports offers; stagnation of winter tourism despite worldwide tourism growth; loss of importance of the Alps in tourism due to globalisation, liberalisation, opening of borders and cheap travel; first political pressure for ecological reasons; crowding out of small providers by competition; spatial concentration of tourism.

New developments and slight growth (2003-2019): Financing of large-scale projects no longer possible after slight growth; realisation of regionally significant projects in Alpine winter tourism (ski area mergers); focus of summer tourism on active sports with modernised and technical elements; acceleration of spatial concentration of tourism; concentration of tourism on about 300 tourism centres in the Alps.

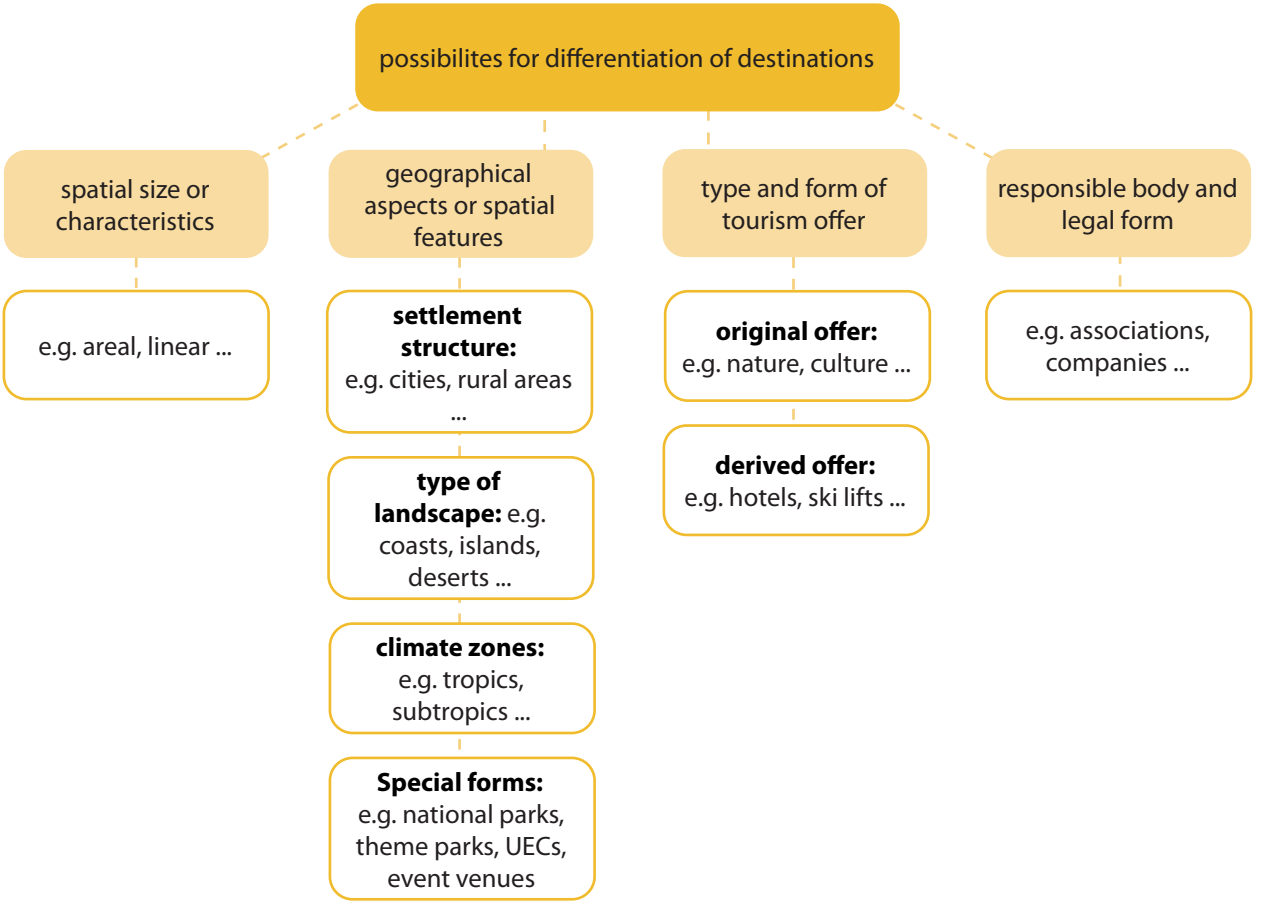
Corona pandemic (from 2020): Lockdown leads to decline in turnover for tourism enterprises; government relief/compensation allows partial compensation of losses; despite increased domestic tourism, decline in turnover and additional costs throughout the pandemic phase.[8] Corona crisis exacerbates existing structural problems in tourism;[9] recovery in areas with high tourism intensity, low population density and short distance to metropolitan areas occurs comparatively quickly (Bavarian) Alps).[10]

Spatial concentration and competition - linear future scenario without taking into account long-term pandemic effects (until 2040): Competition with overcapacities and climate change accelerate spatial concentration in Alpine tourism; forecast for 2040: only about 50 large ski resorts and a good 150 tourism centres; high investment needs make actors in the Alpine region dependent on capital providers outside the Alps; central investment decisions are made outside the Alps, which means that Alpine tourism is economically more determined from outside.[11]

Phases of tourism. Source: Own illustration based on Bätzing (2015), Bätzing (2017), Jäggi (2021), Laesser et al. (2021) and Schmude et al. (2021)

Destinations

The Alps can also be seen as a destination or as a composition of different destinations. A destination is defined as a geographical space (place, region, hamlet) chosen as a travel **destination.** It contains all the facilities necessary for a stay (accommodation, catering, entertainment/activities). It can be a **competitive entity** that provides services to third parties using people and technology for a fee and should be managed as a strategic business unit.[12] The range of tasks of a destination includes the marketing function, the services function, the interest representation function and the mission statement and planning function.[13]



Possibilities for differntiation of destinations.
Source: Own illustration based on Schmude and Namberger (2015), Freyer (2009)

Alpine destination types

Which of the following typical aspects apply to your destination?
Tick each one and **find out your destination type!** *(Solution on p. 182)*

mountains	The destination is surrounded by mountain ranges and heights. They offer a variety of tourist opportunities in the field of winter sports, hiking and climbing, but also other activities related to mountain experiences. ☐	The destination is located in the foothills of higher mountains, for example in a river valley, and has an open cultural landscape and less extreme climate. Example: A lake or river offers opportunities for water sports and other recreational activities. ☐
ressources	The unique local or regional resources (parts of nature or material/non material cultural heritage created by the local population) of the destination are used as elements of the unique selling proposition. ☐	Due to fewer natural resources, the destination needs greater investment to build artificial attractions to capture the Alpine tourism market. ☐
accessibility	The good accessibility of your destination is a competitive advantage and promotes tourism development and investment. There is a high proportion of second homes that are only used for short periods of the year. Tourism is a combination of overnight stays and day visitors from cities. ☐	The destination is rather remote. Tourism has a longer average length of stay. ☐
seasonality	Strong single-season dependence on the winter or summer season leads to additional strain: the labour market is seasonal and of short employment duration as well as high unemployment risk. High infrastructure capacity to meet seasonal peaks in demand. Low efficiency of tourism facilities outside the peak season. ☐	The winter and summer seasons are well balanced, **or** there is year-round tourism without strong seasonal fluctuations. ☐
tourism intensity	The relative contribution of tourism to the total value added of the regional economy is above average. The ratio of overnight stays/beds to the number of inhabitants is above average. Local or regional development policy is one-sidedly oriented towards tourism. ☐	The winter and summer seasons are well balanced, **or** there is year-round tourism without strong seasonal fluctuations. ☐

Destination types.
Source: Own illustration based on Permanent Secretariat of the Alpine Convention (2013)

Description of the destination types

The following seven combinations are recognised as the most important main types of Alpine tourism and represent the core elements of typical Alpine destinations. Most destinations try to become more competitive by covering several of these types.[14]

Type 1: Summer destinations in the Alpine foothills

The destinations are a popular destination for vacationers and residents of nearby major cities in the summer months, for example on the rivers and lakes of the Alpine foothills. Higher mountains and alpine attractions are nearby and are also visited by vacationers in the destination, which leads to a high volume of traffic in the peak season.[14]

Type 2: Health destinations

These places have both on-site medical treatments and activities in the surrounding mountain landscape. Places with a lively cultural life have longer-staying holiday guests. The core product „health regiments" is complemented by wellness offers, predominantly in combination with short holidays.[14]

Type 3: Nature experience destinations

The destinations are located in or in the immediate vicinity of large protected areas and traditional cultural landscapes. Hiking and trekking with overnight stays in huts or guest rooms with breakfast on farms are a growing market; alpine nature serves as a backdrop for various outdoor sports. Entry points to the protected areas attract short-stay tourists from type 1 and 2 destinations and thus lead to very high visitor numbers in the peak summer season.[14]

Type 4: Alpine cities and villages

Villages and towns on the edge of the Alps and in large river basins that offer visitors a high level of variety and many shopping and leisure opportunities. Visitors combine this with excursions to the surrounding nature and sights. The destinations are also attractive for business trips.[14]

Type 5: Year-round destinations in the inner mountain areas

These places are remote and mostly attract overnight guests. Activities of the guests are skiing, sports summer activities or wellness offers. The lift and wellness infrastructure enables year-round and all-weather activities.[14]

Type 6: Ski resorts

For these destinations, the winter season is the most important and often the only basis of the tourism economy. The resorts are located at a high altitude, have accommodation facilities in all price categories close to the lifts and slopes, as well as a corresponding range of entertainment options, and can hold their own in international competition.[14]

Type 7: Year-round tourism in the mountains at the edge of the Alps

These destinations at the edge of the Alps are visited both by day tourists from nearby major cities and by holiday guests staying for longer periods of time. Especially on weekends, the overlapping of overnight stays and day visitors leads to heavy traffic congestion and thus to negative effects such as noise and air pollution.[14]

Strenghts, weaknesses, opportunities and risks of destination types in the Bavarian Alps

For the Bavarian Alps, types 1, 4 and 7 - summer destination in the foothills of the Alps, Alpine towns and villages and year-round tourism in the mountains at the edge of the Alps - are particularly relevant. Therefore, their respective strengths, weaknesses, opportunities and risks are listed below.[14]

Summer destination in the foothills of the Alps

Strenghts

high degree of diversity for holiday guests locally and through the mountains and Alpine towns in the surrounding area

clean lake and river water

diverse cultural landscapes

different types of accommodation

authenticity and attractiveness of local culinary specialities and cultural events

Weaknesses

predominantly highly fragmented small structures with a low level of cooperation

conflicts due to overlapping of day visitors coming from the major cities and holiday guests

high potential for bad weather/thunderstorms in the Northern Alps

lack of all-inclusive offers/low-priced products for families

seasonality on the labour market and in the utilisation of capacities

Opportunities

lakes and rivers as cool alternatives for summer destinations when temperatures are high

little impact of rising energy prices on travel costs

combination of variety of offers in city and mountains suitable for all generations/parts of families

new understanding of winter experiences

Risks

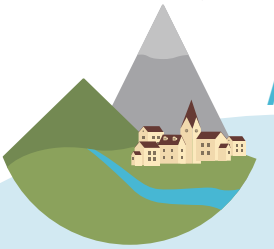
one-sided seasonality

lack of staff in the service sector

too slow to adapt to accessibility in order to benefit from the market growth of older travellers

rising energy prices jeopardise the maintenance of public transport in remote areas

Summer destinations in the foothills of the Alps.
Source: Own illustration based on Permanent Secretariat of the Alpine Convention (2013)



Alpine cities and villages

Strenghts

historic town centres and authentic architecture

diverse tourist attractions in the towns and their surroundings

very good accessibility and mostly public local and regional transport

shops, leisure facilities and services

MICE facilities in connection with larger hotel capacities (meetings, incentives, conventions and events)

Opportunities

removal of barriers and improvement of public transport are already underway

day spas offer recreation and longer offers

benefit from improvement of high-level transport infrastructures

unique shopping experience combining international brands and local/regional/traditional products, food and restaurants

cultural offer based on local and regional heritage creates unique profile and attraction

Weaknesses

„interchangeable“ city centres with international brand shops

outside the historic centres, heavy traffic leads to noise and air pollution

in the summer season heat waves (cities in the Southern Alps)

focus on short trips/holidays, which bring additional traffic

overlap of visitors from the cities with day visitors from destinations in the surrounding area

Risks

unfavourable media portrayal due to extreme weather situations/natural disasters in the Alps

displacement of local and regional trade due to lack of control and regulation of retail, which in turn reduces overall attraction and regional value creation

too slow barrier removal to benefit from market growth of older travellers

Alpine cities and viallges.
Source: Own illustration based on Permanent Secretariat of the Alpine Convention (2013)

Year-round tourism in the mountains at the edge of the Alps

Strenghts

versatile tourism and leisure attractions, combined with infrastructure and services

nature of the mountains as a pure recreational area for city dwellers

efficient use of infrastructure capacities Good accessibility by public transport from the metropolises/ cities

creation of permanent jobs (however, mainly in the low-wage service sector)

availability of different forms of accommodation of varying quality

mountain farming protects the landscape and produces authentic, local foodstuffs

Weaknesses

predominantly highly fragmented small structures with low level of cooperation

tendency towards shorter stays - increasing negative impact of traffic (day visitors and short stays)

on weekends with good weather strong pressure on attraction points and related traffic and transport systems

conflicts due to overlapping of day visitors coming from metropolises and cities and holiday guests (see type 4: Alpine towns and villages)

low innovation and reinvestment rate of micro, small and medium-sized enterprises (SMEs)

lack of clear positioning (unique profile) leads to lower competitiveness vis-à-vis specialists.

Opportunities

same as type 1: Summer destinations in the Pre-Alps

good market opportunities in winter with snow reliability of higher ski areas and with new winter experience products

multi-optionality also in winter as an advantage for multigenerational / family tourism

Risks

second and old homes increase property prices

migration of young people is accelerated

return of highly educated locals is prevented

constriction of the labour market, succession problem

severe threat to most ski resorts due to climate change

Year-round tourism in the mountains at the edge of the Alps
Source: Own illustration based on Permanent Secretariat of the Alpine Convention (2013)

Success factors for nature-based health tourism

Paper: Geography Matters, But … Evolving Success Factors for Nature-Oriented Health Tourism within Selected Alpine Destinations

authors: Jürgen Schmude, Markus Pillmayer, Maximilian Witting, Philipp Corradini
published: 2019
methodology: quantitative (survey) and literature analysis
abstract link

Partnerships between nature conservation and local businesses: Case studies in the Gesäuse National Park and the Steirische Eisenwurzen Nature and Geopark (AT)

Paper: Let's partner up! From resistance to collaboration: A strategy for regional development, or how to create partnerships between nature conservation and local companies – a success story

authors: Marco Schiefer, Eva Maria Vorwagner
published: 2021
methodology: qualitative interviews)
abstract link

Spatial and temporal patterns of outdoor recreation in the Alps

Paper: Revealing spatial and temporal patterns of outdoor recreation in the European Alps and their surroundings

authors: Uta Schirpke, Claude Mensch, Thomas Marsoner, Ulrike Tappeiner
published: 2018
methodology: quantitative (GPS data)
abstract link

Perceived landscape quality and sense of place: case study from Switzerland

Paper: Relating landscape ecological metrics with public survey data on perceived landscape quality and place attachment

authors: Flurina M. Wartmann, C. B. Stride, F. Kienast, M. Hunziker
published: 2021
methodology: quantitative (surveys)
abstract link

The **Mountaineering Villages** initiative consists of communities from the Alpine region that are committed to holistic, nature-friendly and sustainable community and tourism development. As regional development cores in sustainable Alpine tourism, they combine nature conservation, climate protection, mountain sports and sustainable economic development of the region. Thus, the mountaineering villages are not a pure tourism strategy, but rather a sustainable regional development strategy. The initiative's goals include strengthening nature-friendly tourism, preserving alpine nature, landscape and tradition, improving climate-friendly mobility and strengthening local and regional value creation.

project name: Bergsteigerdörfer
project duration: since 2008
project partners/implementation: Österreichischer Alpenverein, Deutscher Alpenverein, Schweizer Alpen-Club, Alpenverein Südtirol, Club Alpino Italiano, Planinska zveva slovenije

In addition to the image and structural problems that the tourism industry has from the guest perspective *(cf. Segments)*, it suffers from the same problems internally. As the labour market is now an **employee market** and companies compete for the best skilled workers, it is relevant to be attractive as an employer - especially for young people on the labour market. **Generation Z** (birth cohorts around 1995 to 2010) must be enthused for the industry, because the enjoyment of the job is the greatest motivation for performance in this generation - income and target achievement are secondary. The workplace is chosen on the basis of soft factors such as work culture, work climate and diversity of work. The demands on employers - and this is where Generation Z sees a responsibility - are individuality, meaning and being, self-direction, participation, transparency, salutogenesis and holism. If these requirements are not met, the members of this generation are quick to change jobs. Sustainability in particular will become a pull factor for skilled workers in the future. The tourism industry and individual businesses should advertise these values and incorporate them into their corporate culture - because among young people there is a high willingness for and enjoyment of teamwork.[15]

Changing political, social, technological and economic developments lead to complex challenges for destinations, which requires new approaches to destination management. Innovative possibilities for the development of destinations are offered by concepts from design research **(destination design):** Design can build a bridge between different disciplines and show new solutions.[16]

In the sub-project **Forest-based Health Tourism** of the project **Knowledge Dialogue Northern Black Forest,** different types of design elements were examined in more detail. These include, for example, experimental forest visits, on-site dialogues, design thinking and research-based teaching-learning projects. Based on these elements, further steps were taken, such as the preparation of a medical report on the health effects of the national park region. From this, concrete product ideas were developed in the area of overlap between tourism, forest and health and taken up by the responsible destination management.

project name: Waldbasierter Gesundheitstourismus / Wissensdialog Nordschwarzwald
project duration: 2015–2020
project partners/implementation: Universität Freiburg, Hochschule für Forstwirtschaft Rottenburg, Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg, Öko-Institut e. V., Nationalpark Schwarzwald, Naturpark Schwarzwald Mitte/Nord

Sustainability-oriented innovation through destination design

Paper: Destination design: A heuristic case study approach to sustainability-oriented innovation

authors: Anna Scuttari, Harald Pechlaner, Greta Erschbamer
published: 2021
methodology: qualitative (case study #Dolomitesvives, observations, network analysis)
abstract link

Neue Perspektiven für die Destinationsentwicklung durch Destination Design

Paper: Destination design: New perspectives for tourism destination development

authors: Michael Volgger, Greta Erschbamer, Harald Pechlaner
published: 2021
methodology: literature analysis
abstract link

Segments

In the Alpine Space there is a variety of different landscapes, activities and cultural offers, which are capitalised differently by the many destinations and lead to a wide range of tourism types and forms. **Types of tourism** answer the question of why people travel (e.g. content of the trip, motive for the trip, destination). **Forms of tourism** explain how people travel (e.g. duration of travel, means of travel, time of travel, organisation of travel).[17,18] **Market segments** refer to the supply and demand side submarkets of the tourism industry, which is structured in a non-uniform manner. Through these differentiations, success and failure factors, regional characteristics and current as well as future trends can be derived more accurately.[19] In the Alpine region, these distinctions are of particular importance, as the region is characterised by a variety of different landscapes, activities and cultural offerings.

In **Special Interest Tourism,** vacationers want to pursue a specific hobby, activity or interest. This motivation is crucial in deciding where, when and for how long they want to travel. The particular interest - and not the destination - is decisive for the decision-making process. Also characterising for the holiday choice by interest is the desire for a non-standard holiday.[20]

Selected relevant areas of special interest tourism are:

Selected relevanz areas of special interest tourism.
Source: Own illustration based on Weiler (1992); Douglas et al. (2001); Agarwal et al. (2018); Rittichainuwat (2018) in: Pforr et al. (2021); Aidley et al. (2021) in: Schmude (2021); Permanent Secretariat of the Alpine Convention (2013) and Antonschmidt et al. (2017)

Many forms of special interest tourism have become more **commercialised** and appealing to a wide range of mainstream tourists in recent years.[21] A good example of this is adventure tourism, the range of which has been complemented since the 2010s by „soft" adventure tourism (package offers, group trips or courses with expert guidance - minimisation of self-responsibility and risk through the constant presence of a professional guide with maximum self-experience with physical challenge).[22] The need for the **individual experiences** continues to grow. *(cf. target group)*

Cultural tourism in rural areas

In cultural tourism, the main or secondary motive of the guests is to use cultural offers of a destination. The tourism market segment of cultural tourism can be combined well with other sub-segments such as business tourism, health and wellness tourism or nature tourism.[23] Rural areas offer diverse potentials and attractive starting points for cultural tourism. At the same time, cultural and creative industries can be economic and social drivers for rural areas as an economic and living space. Cultural tourism content provides narratives for many services and is thus not only commercially interesting, but also significantly influences public perception. Cultural tourism offers the opportunity to rethink the distinction between guests and locals; it brings people together and promotes mutual understanding. What is most in demand in rural cultural tourism is regionality, place-based culture, authenticity and substance. However, spatial-functional and personnel challenges must not be disregarded - cultural tourism managers on site and regional political support are usually decisive for success. The development of cultural tourism in rural areas is individual; it must be approached analytically and solution-oriented, but also regionally oriented.[24]

Potential of educational tourism: case study in the French Alps

Paper: Scientific Tourism in the French Alps: A Laboratory for Scientific Mediation and Research

authors: Yannick Vialette, Pascal Mao, Fabien Bourlon
published: 2021
methodology: quantitative (survey) und qualitative (interviews, observations)
abstract link

Night tourism and dark sky tourism in mountain regions: Case study in western Switzerland

Paper: Co-creation of Shared Values in the Aim of Reinvigorating a Mountain Region Through Night Tourism: Case Study in French-speaking Switzerland

authors: Vincent Grèzes, Rafael Matos-Wasem, Sandra Grèzes
published: 2018
methodology: quantitative (survey) und qualitative (workshops)
abstract link

Tourist value and loyalty intentions in dark tourism

Paper: Dark tourism: tourist value and loyalty intentions

authors: Pramod Sharma, Jogendra Kumar Nayak
published: 2019
methodology: quantitative (survey)
abstract link

Star parks in the Alps

The Winklmoos-Alm Star Park in Reit im Winkl, Bavaria, at 1,200 m, was the first star park in the Alps when it was founded in 2018. In addition to it, there are four other internationally recognised star parks in Germany certified by the International Dark-Sky Association (IDA): in the Rhön, in Westhavelland and in the Eifel (as of 2023). IDA star parks are committed to preserving the dark night sky or restoring it through appropriate measures. With the naked eye, up to 6,000 stars can be seen on a clear, moonless night at Winklmoos-Alm.[25]

Dark tourism in the Alps

In the Alps, too, there are a large number of places that could be or are already considered destinations for dark tourism. In the Bavarian Alps, for example, the Kehlsteinhaus (Eagle's Nest) near Berchtesgaden, one of the few undestroyed monuments of the Nazi era, is already internationally known for Dark Tourism..[26]

Development of sustainable mountain bike models: Mountain bike tourism in Austria and the Alpine region

Paper: Mountain bike tourism in Austria and the Alpine region – towards a sustainable model for multi-stakeholder product development

authors: Ulrike Pröbstl-Haider, Dagmar Lund-Durlacher, Hannes Antonschmidt, Claudia Hödl
published: 2017
methodology: qualitative (interviews)
abstract link

Cycling is prohibited throughout Austria on forest paths and also on most alpine paths. However, trail owners can voluntarily open their trails for cycling. The **Mountainbike-Modell 2.0**, jointly developed by the province of Tyrol and interest groups, regulates under which conditions trails can be officially opened, built and marked according to their level of difficulty. The route network now comprises more than 330 km of single trails and 6,400 km of MTB routes. It is freely available online and is regularly updated. The cooperation of all stakeholders helps to find satisfactory solutions for all involved and to avoid potential conflicts.

project name: Mountainbike-Modell 2.0
project duration: since 2014
project partners/implementation: Amt der Tiroler Landesregierung (Abteilungen Forst, Sport, Tourismus), Landesradsportverband, Landwirtschaftskammer Tirol, Österreichischer Alpenverein, Österreichische Bundesforste AG, Tiroler Jägerverband, Tirol Werbung, Vertrider (aktive Mountainbiker), Wirtschaftskammer Tirol (Fachgruppe Seilbahnen)

In the **NAT:KIT** project, a communication and intervention tool for guiding cyclists, especially mountain bikers, in protected areas is to be developed in the form of a digitally accessible manual. The aim is to enable actors in protected areas to select and implement adequate guidance and management approaches for their local situation with a high probability of success.

project name: NAT:KIT
project duration: 2021–2023
project partners/implementation: Mountainbike Tourismusforum Deutschland e. V., Naturpark Ammergauer Alpen, Geo-Naturpark Bergstraße-Odenwald, Nationalpark Bayerischer Wald

The term **sustainable tourism** does not refer to an independent sector, but stands for the pursuit of sustainable development goals in the tourism industry and thus encompasses the entire range of tourism activities and stakeholders. Therefore, the term **sustainable tourism development** would be more appropriate.[14] Requirements for sustainable tourism development are economic, social, ecological and institutional sustainability.[27] However, consumers are also an important aspect - through their demand behaviour, they influence the success and ongoing adaptation of the offers. The following segments of special interest tourism can be assigned to sustainable tourism development:

Selected relevanz areas of special interest tourism within sustainable tourism development. Source: Own illustration based on Weiler (1992); Douglas et al. (2001); Agarwal et al. (2018); Rittichainuwat (2018) in: Pforr et al. (2021); Aidley et al. (2021) in: Schmude (2021); Permanent Secretariat of the Alpine Convention (2013) and Antonschmidt et al. (2017)

Due to the increased social awareness of human-made climate change, the tourism industry has a (morally shaped) public image problem, as - unlike other industries - there are no convincing concepts for the substantial reduction of greenhouse gases. The challenges of climate change have caused - (and are are causing) new trends towards sustainability that also influence tourism, such as changes in food consumption and appreciation of regional food. However, the biggest emission factor in tourism, mobility (travel to and from destinations, local transport), remains an unsolved problem from a global perspective.[27, 28]

Outdoor adventure tourism, sustainability and well-being

Paper: Active engagement with nature: outdoor adventure tourism, sustainability and well-being

authors: Paul Hanna, Sarah Wijesinghe, Ilias Paliatsos, Carl Walker, Matthew Adams, Albert Kimbu
published: 2019
methodology: qualitative (interviews)
abstract link

Outdoor recreation, nature-based tourism and sustainability

Paper: Outdoor Recreation, Nature-Based Tourism, and Sustainability

authors: Patricia L. Winter, Steven Selin, Lee Cerveny, Kelly Bricker
published: 2019
methodology: Literature analysis
abstract link

The Permanent Secretariat of the Alpine Convention repeatedly organises conferences on sustainable tourism within the framework of projects. These included the tourism conference „Healing Power of the Alps“ in the EU project **HEALPS** (Alpine Health Tourism)

(2021), the online conference **Outdoor Tourismus mit Fernsicht** in cooperation with the International Commission for the Protection of the Alps CIPRA and the network of municipalities „Alliance in the Alps" (2020) as well as the conference **ALMCC2020** („Alpine Landscape Meets Culture"-Conference 2020) in the Alpine Space project CHEERS (INTERREG B).

project name: Konferenzen über nachhaltigen Tourismus
project duration: since 2020
project partners/implementation: Permanent Secretariat of the Alpine Convention with changing project partners

Last-Chance-Tourismus

Last-chance tourism refers to a form of tourism that aims to see or experience an endangered sight before it disappears. Last-chance tourism first developed in the context of polar bear watching, but is also relevant to coral reefs and glacier tourism. The motivations behind it can be divided into four dimensions: Observation, understanding, a sense of urgency and experiencing environmental change (being a witness). On the online platform Tripadvisor, a quarter of visitors to glaciers said in the comments that now was the last chance to see them. However, last-chance tourism is paradoxical in itself: the trips to visit the endangered elements contribute to the threat status of those very objects due to their harmful emissions. Visitors are aware of climate change and its impact on the environment, but this does not prevent them from engaging in last-chance tourism, which in turn contributes to climate change(cognitive dissonance).[29,30,31]

(cf. Prohibitions, Rules, Punishments - Psychology in Environental Protection; cf. Climate Change)

Agricultural or tourism development on alpine pastures? Experiences from the German Alps

Paper: The future of Alpine pastures – Agricultural or tourism development? Experiences from the German Alps

authors: Alice Wanner, Ulrike Pröbstl-Haider, Magdalena Feilhammer
published: 2021
methodology: qualitative (interviews, workshops)
abstract link

Opportunities and challenges in Agrotourism: Case Study from the Ötztal (AT)

Paper: Different Forms of Accommodation in Agritourism: The Role of Decoupled Farmer-Based Accommodation in the Ötztal Valley (Austria)

authors: Rike Stotten, Michaela Maurer, Hannes Herrmann, Markus Schermer
published: 2019
methodology: quantitative (online-survey) und qualitative (focus group)
abstract link

Sustainable agrotourism as a concept for destination development

Paper: Interpreting sustainable agritourism through co-evolution of social organizations

authors: Paola M. A. Paniccia, Silvia Baiocco
published: 2021
methodology: qualitative (20 long-time studies) and contextual (background knowledge and data)
abstract link

Events

Events play an important role in Alpine tourism as they offer a way to stimulate tourism outside the traditional main seasons. Events in tourism can basically be generated both on the basis of **existing attractions** (nature: almond blossom, solar eclipse; customs and tradition: cattle drive, Oktoberfest, etc.) and artificially (cultural events such as exhibitions, concerts, festivals, competitions). In addition, a distinction can be made between **mega-events** (very large events; international or national significance; for example, Olympic Games), **medium-events** (medium-sized events; special regional and occasionally also national significance; for example, art exhibitions) and **micro-events** (smaller events; significance for cities and communities; for example, city festivals). In addition to their sporting and cultural significance, their many economic and image benefits as well as their accompanying effects of events, there are disadvantages especially from an ecological point of view, but also from the point of view of the population. These are considerable, especially in the case of large events, but also depend on the respective sensitivity of the surroundings. [32,33,34,35,36]

positive effects	negative effects
improvement of infrastructure (transport links, sports facilities) in the region	land consumption, often permanent landscape destruction, soil sealing
higher turnover in tourism (event tourism), in retail, hotel and restaurant businesses	landscape pollution (especially rubbish)
increasing tax revenues	greenhouse gas emissions (frequent use of cars to travel to major events)
opportunity for repositioning	damage to flora and fauna (especially through mass events)
	water pollution (as a result of high volumes of waste water and the lack of sewage treatment plants in some cases)
	disturbance to local residents

Positive and negative effects of events. Source: Own illustration based on Collins et al. (2009), Freyer und Groß (2006), Getz (2008), Bogusch (2009), Toniolo et al. (2017)

However, positive effects of events can also lead to negative effects at other locations (relocation, competition, etc.). Due to their public impact, events multiply positive and negative effects with their **radiance** many times over. Although the sponsors of events often point out the importance of ecological and socio-economic aspects in the planning and implementation and promote them as „green" or sustainable, the (environmental) effects of events are difficult to assess quantitatively because they are complex and often extend over longer periods of time. The multitude of different happenings behind the term „event" causes a lack of common and consistent approaches in conducting the environmental assessment of an event. In addition, the voluntary nature and arbitrariness with which environmental protection and sustainability measures depend on the goodwill of the organisers pose a problem.[30,31,32,33,34]

The economic impact of the Winter Olympics in Turin

Paper: All that glitters is not gold. The economic impact of the turin winter olympics

authors: Anna Laura Mancini, Giulio Papini
published: 2021
methodology: quantitative (evaluation of public data)
abstract link

Life cycle assessment to determine the environmental impact of events

Paper: Life Cycle Assessment to support the quantification of the environmental impacts of an event

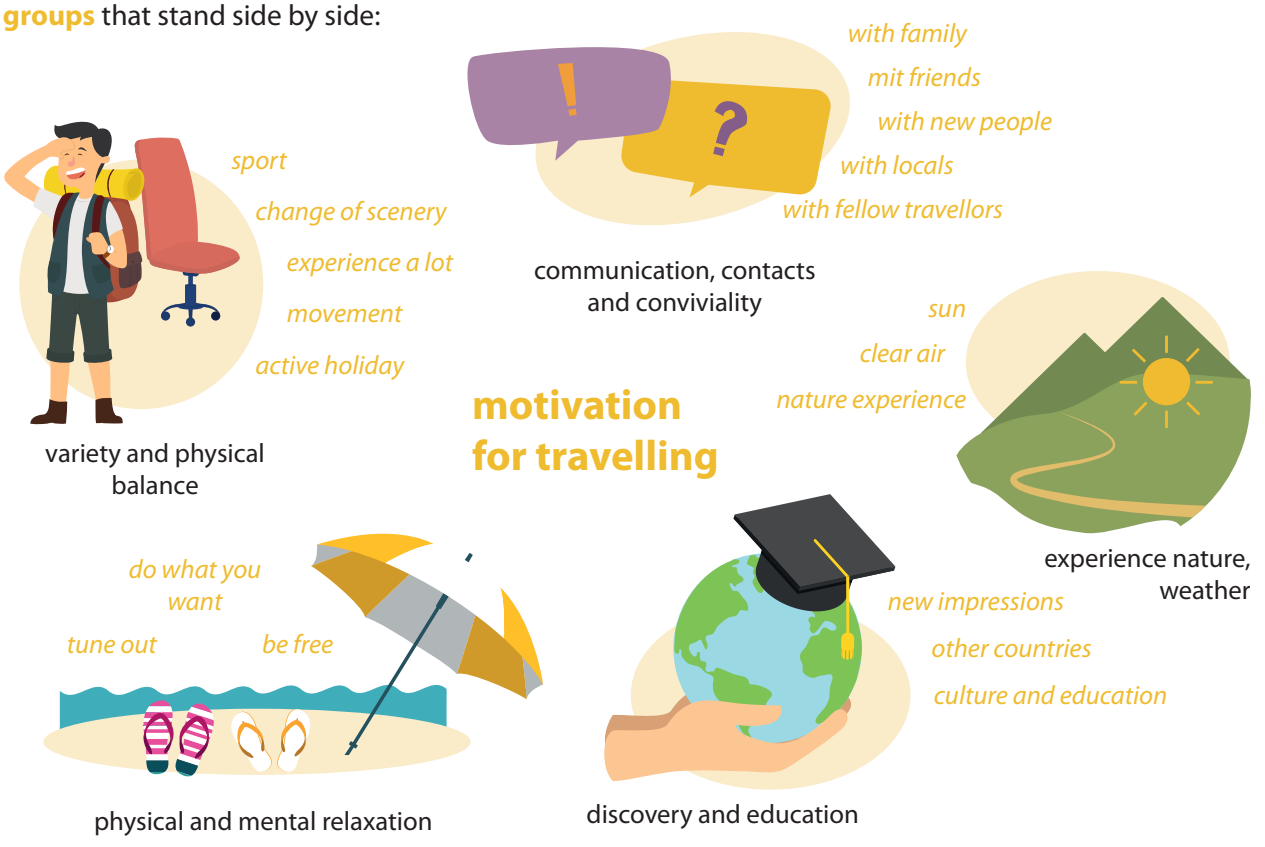
authors: Sara Toniolo, Anna Mazzi, Andrea Fedele, Filippo Aguiari, Antonio Scipioni
published: 2017
methodology: quantitative (life cycle assessment)
abstract link

Target groups

Not only nature and sports enthusiasts are attracted to the Alps. Tourists, the **demand side** of tourism, differ greatly in terms of their needs, wishes and expectations. Accordingly, groups with the same and/or similar **needs** and thus similar reactions to the use of specific marketing instruments can be grouped together.[19] In addition, vacationers can be typologised according to demographics and behaviour/activity.[37]

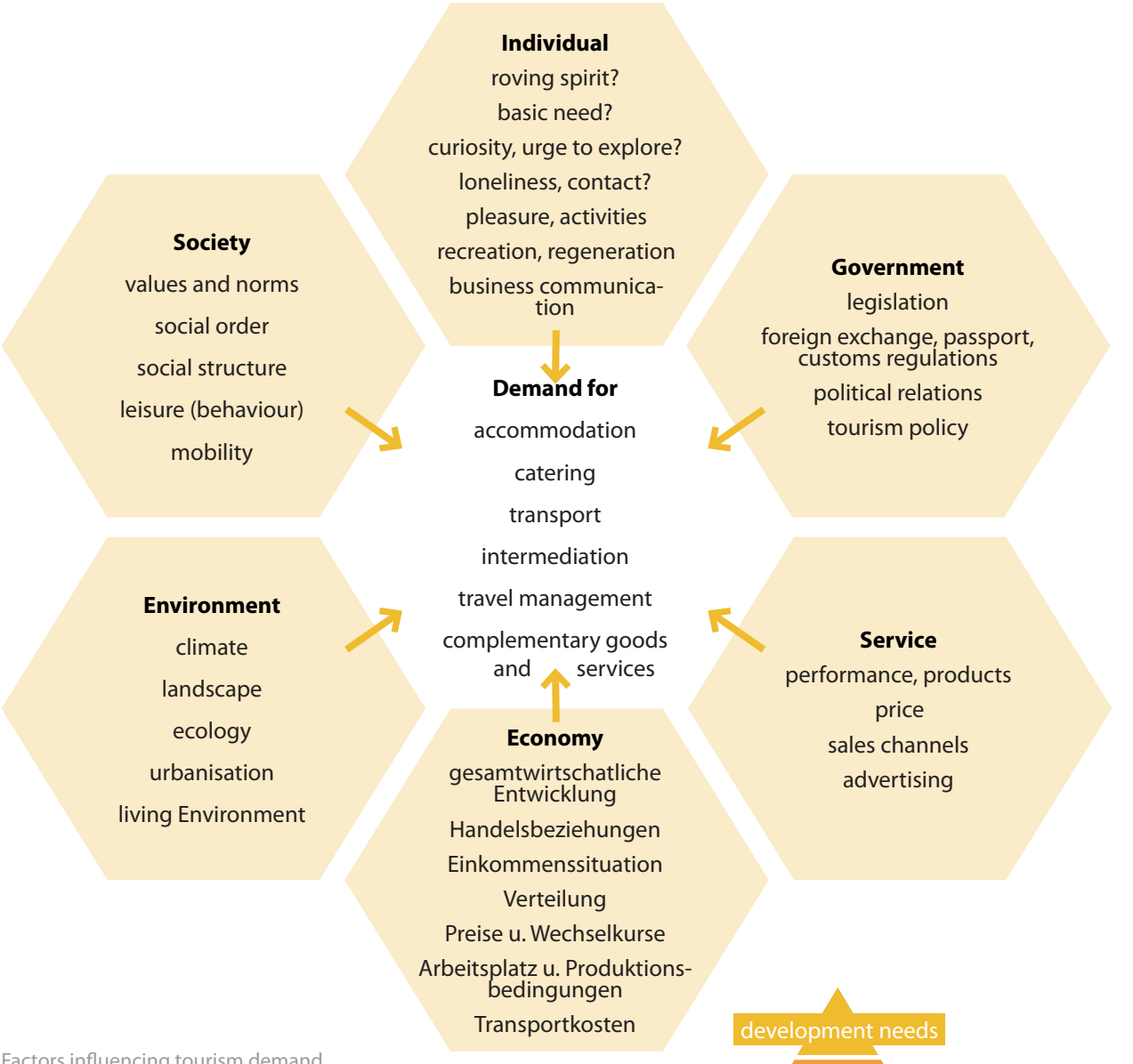
The advantage of this is that with exact knowledge of the supply and demand side, **target group-specific** marketing strategies can be developed. Furthermore, directly addressing target groups in the highly competitive tourism market is a successful approach. However, the groups can only be recorded and differentiated from each other to a limited extent. Also, the current and future (purchasing) behaviour of people can only be understood approximately. Since an increasingly differentiated demand can also be observed on the part of tourists, it is becoming more and more difficult to assign them to specific groups. This results in ever smaller target groups, which lead to **ever smaller market segments.**[19]

In empirically oriented tourism research, a distinction is often made between five travel **motivation groups** that stand side by side:



Motivation for travelling. Source: Own illustration based on Freyer (2015)

Tourism demand is influenced by all areas of social life. A distinction can be made between six **areas of influence:** individual, social, ecological, economic, supplier and state influences. Tourism demand is influenced by all areas of social life. A distinction can be made between six areas of influence: individual, societyl, environment, economy, service and government influences.[35] According to Maslow's hierarchy of needs, today's (holiday) tourism is mainly assigned to the (currently) highest level of this hierarchy: People travel primarily for pleasure and self-realisation; the keyword is **destination me.** Forms of tourism in which the personal experience takes on a new significance are becoming increasingly important..[13,37] *(cf. Destinations)*



Factors influencing tourism demand.
Source: Freyer (2015)

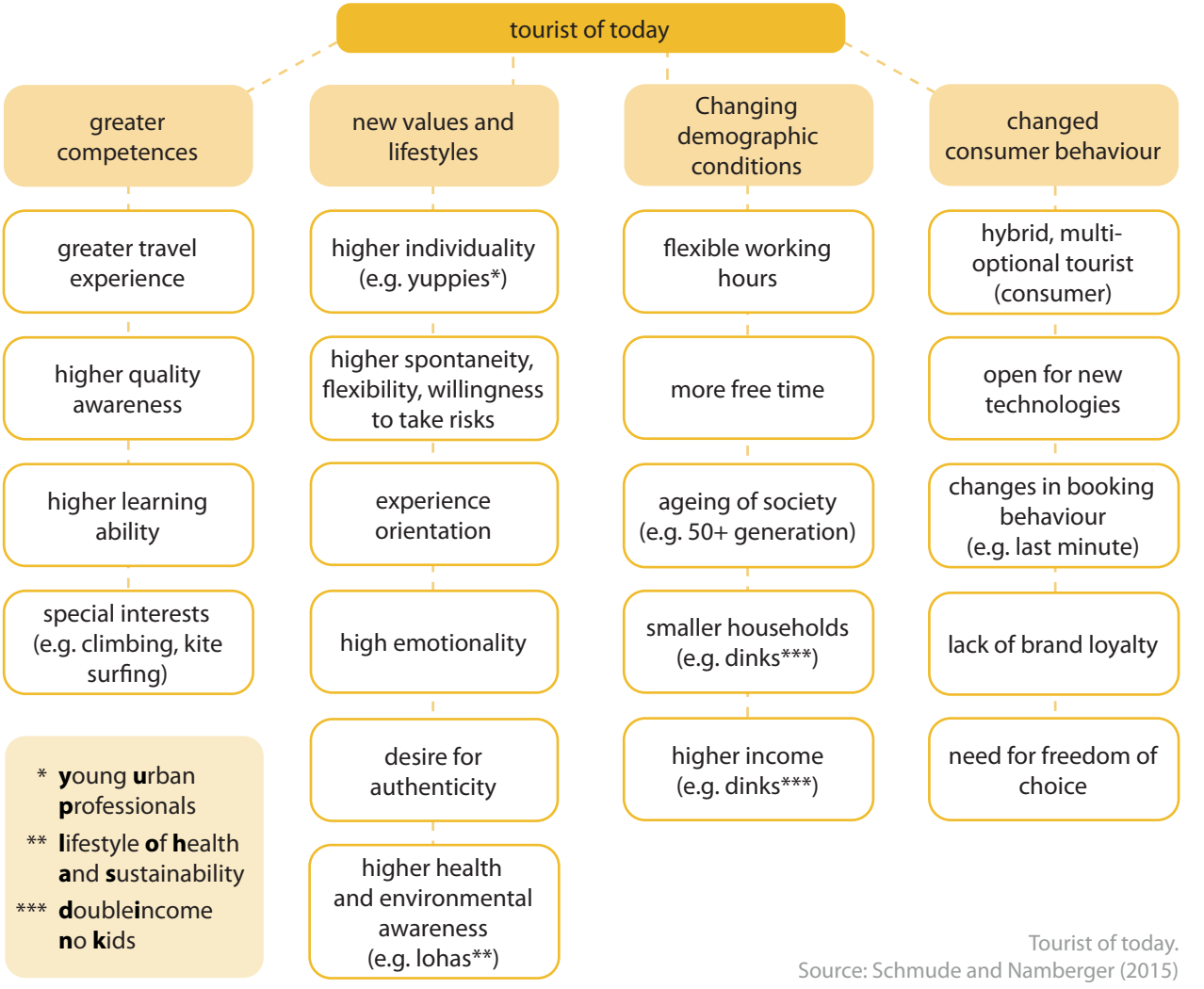
Maslow's hierarchy of needs.
Source: Freyer (2015)

The prevailing **values and norms** within a society determine leisure and travel behaviour. In industrialised countries, there is a high social expectation of leisure behaviour; holiday trips are considered a social necessity and are an integral part of social leisure behaviour.[37]

Towards the end of the 20th century, as a result of the loss of an overall social consensus and the loss of importance of ideologies, a social fragmentation and splintering took place. This is also reflected in the heterogeneity and diversity of different life plans. The individual seeks its own identity and tries to become happy in its own experience: The **society of meaning** („experience 2.0“) is the guiding social value at the beginning of the 21st century. This produces an individualised and **multi-optional** consumer with a flexible and hybrid demand pattern.[13]

It is precisely the change between different tourism offers that is a constituent element of today's tourism demand.[13] The increasing differentiation of travel motives interacts with the increasing differentiation of tourism offers: Both the demand and supply markets are becoming increasingly segmented The increasing differentiation of travel motives interacts with the increasing differentiation of tourism offers: Both the demand and supply markets are becoming increasingly **segmented.**[19,38]

Vacationer typologies, often based on lifestyle types, are used to reduce complexity on the demand side. However, these are not rigid, permanently valid segmentations, but are subject to change over time and must be adapted again and again.[19]



Tourist of today.
Source: Schmude and Namberger (2015)

Due to the **changeable consumption behaviour** of today's tourists, it is often difficult to assess the demand side and their market behaviour. The erratic consumption behaviour of the hybrid and multi-optional tourist shows a significantly **reduced destination** and/or **brand loyalty.** As a result, regular customers and repeat buyers lose importance, and the consumer behaviour of the demand groups of different market segments or within individual market segments differs significantly from each other.[19]

Millennials' preferences and motivation in mountain tourism: case study among students

Paper: Mountain tourism and motivation: millennial students' seasonal preferences

authors: Chiara Giachino, Elisa Truant, Alessandro Bonadonna
published: 2019
methodology: quantitative (survey) und qualitative (interviews in focus groups)
abstract link

Sustainability and mountain tourism from the millennials' perspective

Paper: Sustainability and Mountain Tourism: The Millennial's Perspective

authors: Alessandro Bonadonna, Chiara Giachino, Elisa Truant
published: 2017
methodology: Survey of 2,292 millenials in the Piedmont region
abstract link

Ecosystem services of mountain lakes in the European Alps: preferences, visitor groups and implications for management

Paper: Recreational ecosystem services of mountain lakes in the European Alps: Preferences, visitor groups and management implications

authors: Uta Schirpke, Rocco Scolozzi, Alexander Kiessling, Ulrike Tappeiner
published: 2021
methodology: quantitative (online-survey)
abstract link

Motivation for soft adventure activities: study on hiking tourism

Paper: Soft adventure motivation: an exploratory study of hiking tourism

authors: Bernhard Fabian Bichler, Mike Peters
published: 2021
methodology: quantitative (survey) und qualitative (interviews)
abstract link

Motivation of visitors and effects on marketing in winter tourism in the Alps

Paper: Winter tourism in Germany is much more than skiing! Consumer motives and implications to Alpine destination marketing

authors: Thomas Bausch, Carolin Unseld
published: 2018
methodology: qualitative (panel-based online forum with focus groups)
abstract link

Visitor preferences for landscape conservation in the Alps: differences between regions, conservation programmes and socio-economic groups

Paper: Visitors' preferences for landscape conservation in Alpine environments: Differences across regions, conservation programmes, and socio-economic groups

authors: Michael Getzner
published: 2020
methodology: qualitative (interviews) und quantitative (survey)
abstract link

Motivation of visitors for glacier tourism in the European Alps

Paper: Visitors' motivations to engage in glacier tourism in the European Alps: comparison of six sites in France, Switzerland, and Austria

authors: Emmanuel Salim, Marius Mayer, Philipp Sacher, Ludovic Ravanela
published: 2022
methodology: quantitative (survey, latent class analysis)
abstract link

Weather preferences of summer tourists in mountain landscapes

Paper: Rain, Rain, Go Away, Come Again Another Day. Weather Preferences of Summer Tourists in Mountain Environments

authors: Robert Steiger, Bruno Abegg, Leandra Jänicke
published: 2016
methodology: quantitative (survey)
abstract link

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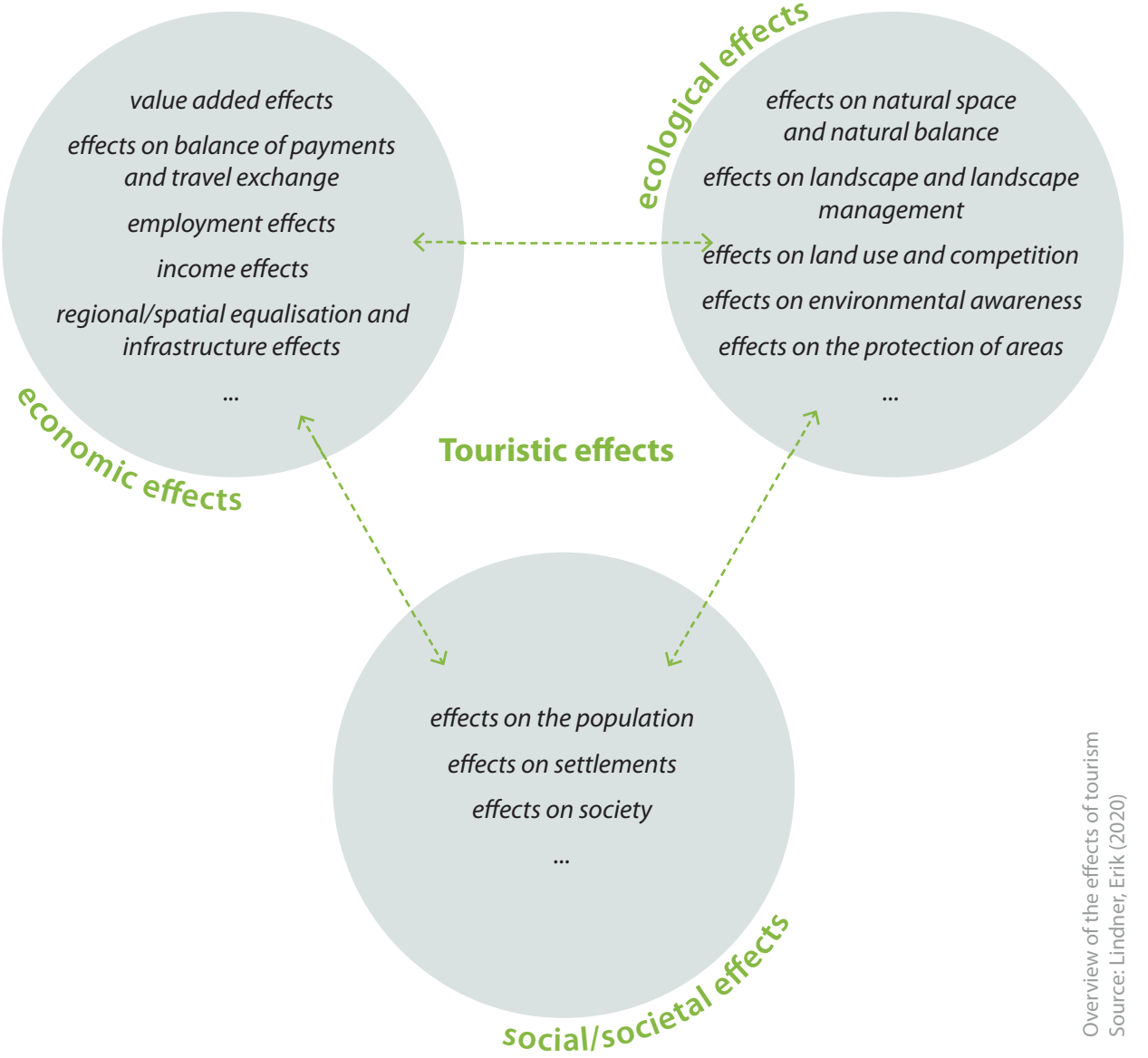
Tourism effects

Tourism effects

Tourism can have different **impacts** on the Alps, both positive and negative. Tourism effects include all impacts of leisure and tourism activities on the **economic, social and environmental situation** at the destination. These effects depend on the specific economic, social and political conditions of the destination. There are **many interactions** between the effects, which are both **positive** and **negative.** As a result, a precise attribution of the impacts created is difficult and not always clear; there are also impacts that are not attributed to tourism at first glance. The economic effects of tourism are mostly assessed positively, the effects on the environment and society in many cases rather negatively.[1]



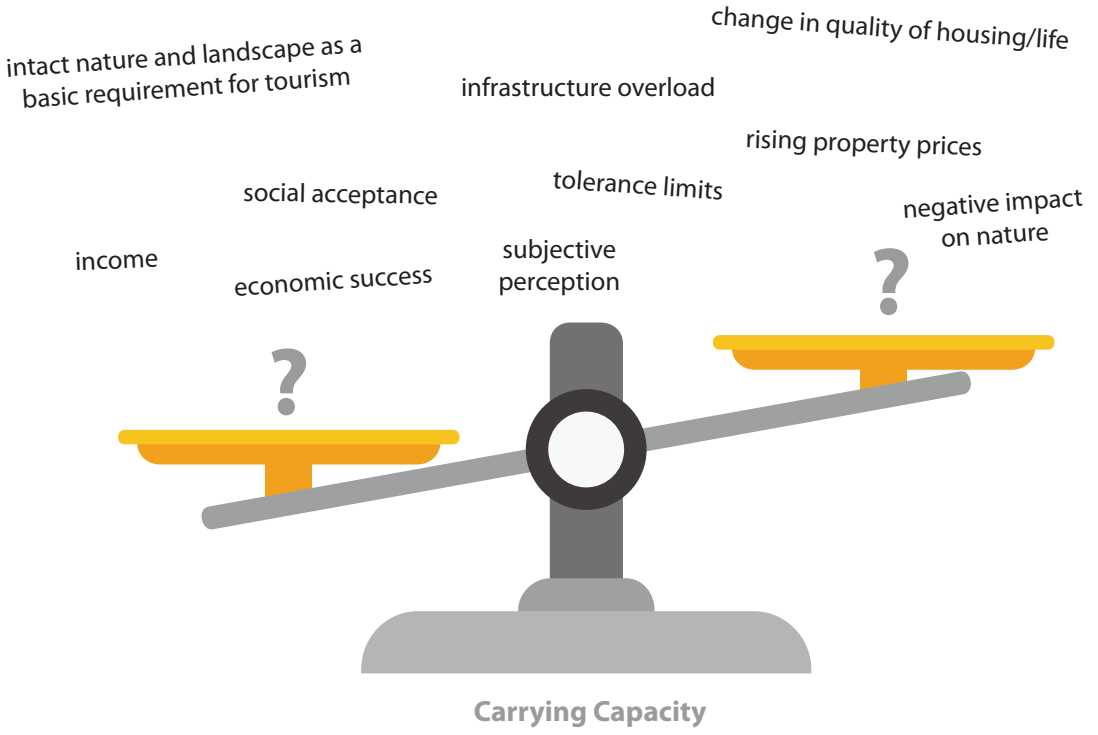
Overview of the effects of tourism
Source: Lindner, Erik (2020)

Influence factor quantity

The Alps are considered a tourist **hotspot** in the middle of Europe. According to the Duden dictionary, a hotspot refers to a place that exerts a special attraction and draws a particularly large number of people, but also to something that harbours a high potential for conflict and/or is of great explosiveness.[2] A tourist hotspot is therefore a place that is heavily and selectively frequented by foreign visitors, i.e. experiences intensive tourist demand, such as the Marienplatz in Munich or the Partnachklamm near Garmisch-Partenkirchen. A tourist hotspot also always harbours conflict potential when the capacities of the destination are exceeded.

Overcrowding ore **crowding** are the terms used to describe when a place exceeds its physical capacity: The sheer number of tourists and thus the absolute overcrowding cause such a high density of visitors that it is difficult or even impossible for residents to get around on their daily routes. The limits of overcrowding are objectively and physically tangible (number of visitors per attraction/area unit), but the accepted density is subjective and also depends on the respective situational expectation (for example, visiting a discotheque versus watching a sunset on the beach).[3]

The capacities of a tourist destination cannot be quantified unambiguously, as is the case, for example, with public transport or a museum (number of people per square metre). Therefore, the **carrying capacity** is always at the centre of the debate. Social carrying capacity means the limit of tourism carrying capacity that is accepted by the destination or the local population. As a multidimensional construct, however, it is **not easy to grasp** - tolerance and limit are relative, subjective and freely interpretable terms that depend on the respective individual destination with its specific characteristics.[3,4] In addition to social carrying capacity, ecological, economic and infrastructural carrying capacity are also important in Alpine tourism.

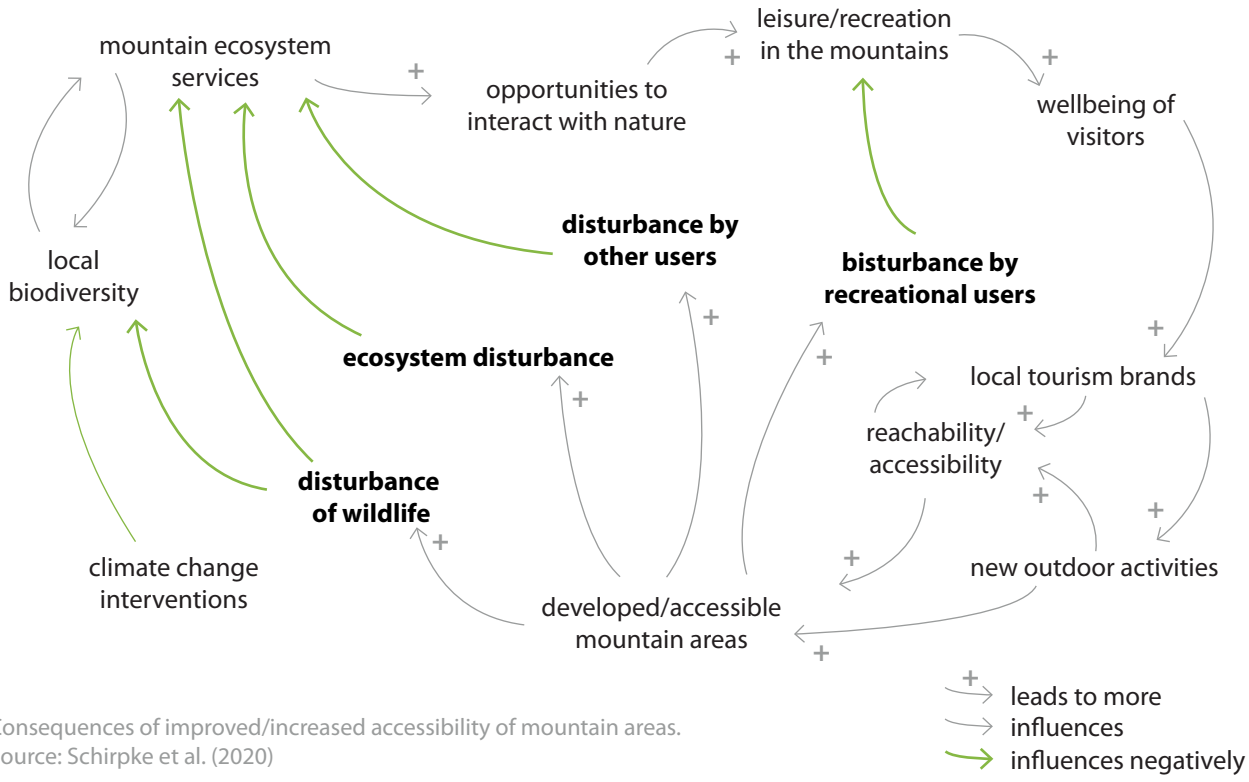


Factors influencing the carrying capacity.
Source: Own illustration

Carrying capacity is a term that is associated with a number of different concepts: It takes on **different meanings** depending on the perspective from which the problem behind it is viewed. The term carrying capacity is also used in several disciplines and in everyday language. Due to this wealth of facets, special attention should always be paid to the context in which the term is used, and the understanding of the term should be specified accordingly.[5]

Overtourism means the creation of **negative consequences by exceeding carrying capacity limits** in tourism.[3] These mostly affect host communities and/or the natural environment. The debate on overtourism addresses many **multidimensional phenomena,** some of which go beyond tourism (including, for example, economic, spatial, cultural, social, psychological, ecological and/or infrastructural dimensions). Due to the high (media) attention on this topic, one also repeatedly encounters **popular perceptions** and **myths** in connection with overtourism.[4] The focus of the global discussion on overtourism is mostly on urban areas (for example Dubrovnik, Venice, Barcelona) and describes the overstepping of social carrying capacity limits.[3] However, in the context of rural areas - as in many areas of the Alps - other carrying capacities (ecological, economic, infrastructural) have to be considered for the areas influenced by tourism.

Although in the past the question of the limits of carrying capacity and saturation was repeatedly raised in the high-growth economic sector of tourism for sub-sectors of the overall market, the question of the limits of growth has played only a minor role overall. For most tourism market segments, this discourse was simply not very relevant; private sector, political and tourism science actors were dominated by the growth-oriented forecasts. Since the summer of 2017, however, the **discussions** about and **protests** by local people against visitors to destinations and the associated effects have increased significantly; this topic has also been communicated strongly in the media since then.[3]



Consequences of improved/increased accessibility of mountain areas.
Source: Schirpke et al. (2020)

Buzzword overtourism in context

Paper: Is overtourism overused? Understanding the Impact of Tourism in a City Context

authors: Ko Koens, Albert Postma, Bernadett Papp
published: 2018
methodology: qualitative (interviews) und quantitative (survey)
abstract link

Refuting seven myths of overtourism

Overtourism is not only a problem in cities.

Much of the discussion about overtourism focuses on the tourism context of cities, but it can also be observed in rural areas.

Overtourism is not a new phenomenon.

Although overtourism has received increased attention recently, the underlying problems are not new, although they may be more intense and expressed in new ways.

Overtourism is not the same as mass tourism.

While increasing numbers of tourists are a cause of overtourism, some areas are able to cope with large numbers of tourists. It is about perceived tourist encounters, environmental changes and interference in people's lives. Even a small absolute increase in tourist numbers can have a large negative impact in tourist areas.

The impact of overtourism is not universal.

Overtourism is observed, especially in (increasingly) popular areas, at a certain time or during certain events. It is not a concept that can be objectively measured.

Overtourism is not a pure tourism problem.

Overtourism is caused by overuse of the resources, infrastructure or facilities of a destination or parts of it. Tourists share these with residents, commuters and day visitors, and their numbers have also increased in recent years. In addition, general social trends and events (for example, the global economic crisis of 2008, real estate speculation, the increasing use of the internet for shopping and/or social media) have also contributed to the problems associated with overtourism today.

Technological or smart solutions alone will not solve the problem of overtourism.

The importance of technological solutions to combat overtourism should not be overwestimated, as the problem is largely social and environmental - different individuals with different needs share and compete for the same space. Moreover, new technologies also lead to or exacerbate specific problems.

There is no one-size-fits-all solution to overtourism.

The way overtourism manifests itself and the ways to deal with the problems depend strongly on the context. Solutions need to be adapted to this local context. To achieve this, stakeholders need to engage with each other to find inclusive solutions.[6]

Overtourism, optimisation and destination performance indicators

Paper: Overtourism, optimisation, and destination performance indicators: a case study of activities in Fjord Norway

authors: Ove Oklevik, Stefan Gössling, C. Michael Hall, Jens Kristian Steen Jacobsen, Ivar Petter Grøtte, Scott McCabe
published: 2019
methodology: quantitative (survey)
abstract link

Competing or cooperating? Intercommunal management of over-tourism

Paper: To Compete or Cooperate? Intermunicipal Management of Overtourism

authors: Fany Yuval
published: 2022
methodology: literature analysis
abstract link

The Living Lab as a tool to promote the participation of residents in the governance process of a destination

Paper: The Living Lab as a Tool to Promote Residents' Participation in Destination Governance

authors: Hannes Thees, Harald Pechlaner, Natalie Olbrich, Arne Schuhbert
published: 2020
methodology: literature analysis
abstract link

Overtourism in the area of tension between anti-tourism, sustainability and participation

Paper: Quo vadis tourism? Problem-centred perspectives on overtourism in the field of tension between anti-tourism, sustainability and participation (German)

authors: Nicolai Scherle, Markus Pillmayer, Marcus Herntrei
published: 2021
methodology: literature analysis
abstract link

Model for monitoring, diagnosing and influencing the risk of overtourism

Paper: Conceptualising overtourism: A sustainability approach

authors: Tanja Mihalic
published: 2020
methodology: literature analysis
abstract link

Repercussions of overtourism on the tourism industry itself

Paper: The Decline of Tourist Destinations: An Evolutionary Perspective on Overtourism

authors: Maximilian Benner
published: 2020
methodology: literature analysis
abstract link

In summer 2021, **visitor surveys** were conducted by the Alpinium **at the Gaisalpsee and the Schrecksee in the Oberallgäu.** The surveys showed that half of the respondents found it too crowded when there were 400-600 visitors per day. Locals, on the other hand, found it too crowded even with fewer visitors. Based on the results, recommendations for action are presented to counteract overcrowding. These include measures for digital visitor guidance and the presence of rangers on site on days when many visitors are expected. In this way, potential violations such as littering or drone flights can be responded to directly.

project name: Besucherbefragung am Gaisalpsee und am Schrecksee im Oberallgäu, Sommer 2021
project duration: 2021
project partner/implementation: Alpinium Zentrum Naturerlebnis Alpin, Government of Swabia

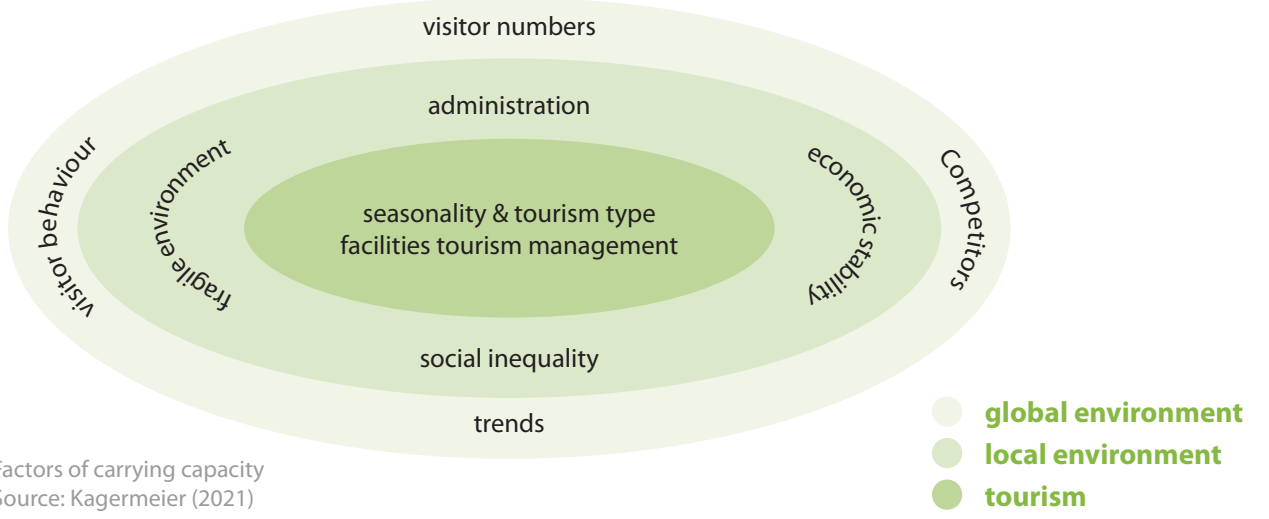
Customer benefits in tourism

Paper: Consumer value in tourism: a perspective article

authors: Martina G. Gallarza, Irene Gil Saura
published: 2020
methodology: literature analysis
abstract link

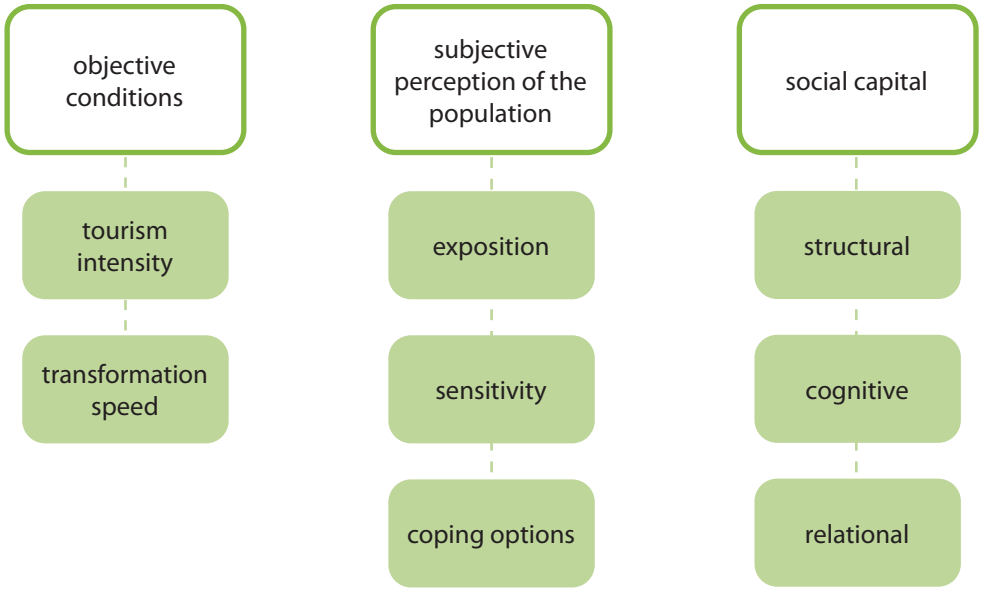
Social and societal effects

Alpine tourism has an impact on the **social life** of the population in the destinations. This is particularly evident in the change in the employment structure (absolute number, distribution among sectors) and the changes in the quality of life and housing. In addition, the age and social structure as well as the differentiation of the social fabric change. The positive socio-cultural effects lead, among other things, to the rejuvenation of the age structure and the dynamisation of rigid social structures. Negative socio-cultural effects of tourism can result from selective overloading of the infrastructure and disturbances at the socio-social level.[1]



Factors of carrying capacity
Source: Kagermeier (2021)

Quantitatively measurable indicators, such as tourism intensity and the growth rate of tourism, offer first clues for measuring overtourism. However, as abstract parameters, these standardised measurements are only partially suitable to depict overtourism or the danger of overtourism. Subjective perception (partly also in connection with other factors) plays the central role here. Rapid increases in tourism, for example, have a negative influence on the sensitivity of the population.[3] Influencing factors are, among others, the perceived affectedness, sensitivity and exposure. In order to determine these, a complex analysis of the population-visitor relationship is necessary. Sensitivity and resilience of the inhabitants differ regionally and locally and also depend, for example, on the economic relationship of the individual to tourism. Relevant for dealing with and coping with the stress are coping strategies such as spatial avoidance or the temporal dimension of the stress.[3]



Measurement of social carrying capacity / risk of overtourism. Source: Kagermeier (2021)

A survey on the acceptance of tourism in Garmisch-Partenkirchen showed that the population of Garmisch-Partenkirchen is aware of the importance of tourism for the municipality: The majority of respondents attribute great importance to local tourism for the market town and evaluate it positively for the most part. While positive effects of tourism, such as the increase in reputation and awareness, the profit for everyone and the creation of attractive jobs, are definitely perceived by the residents surveyed, the respondents often see negative effects of tourism for themselves. These include, above all, traffic problems, price increases and inappropriate behaviour of the guests. More than half of the respondents stated that they experience restrictions in their daily and weekly routines due to the many visitors; slightly fewer are also of the opinion that their quality of life suffers due to tourism. The perceived burdens of tourism are mainly of an ecological and economic nature, especially due to day tourism. Nevertheless, almost all of the study participants still enjoy living in Garmisch-Partenkirchen and consider hospitable behaviour to be a matter of course.

project name: Befragung zur Tourismusakzeptanz in Garmisch-Partenkirchen
project duration: 2021
project partner/implementation: GaPa Tourismus GmbH, dwif

Socio-economic monitoring of Bavarian national parks

Paper: Park-People Relationships: The Socioeconomic Monitoring of National Parks in Bavaria, Germany

authors: Hubert Job, Sarah Bittlingmaier, Marius Mayer, Eick von Ruschkowski, Manuel Woltering
published: 2021
methodology: literature analysis
abstract link

Perceived crowding in nature, distance perceptions and avoidance: case study in Switzerland

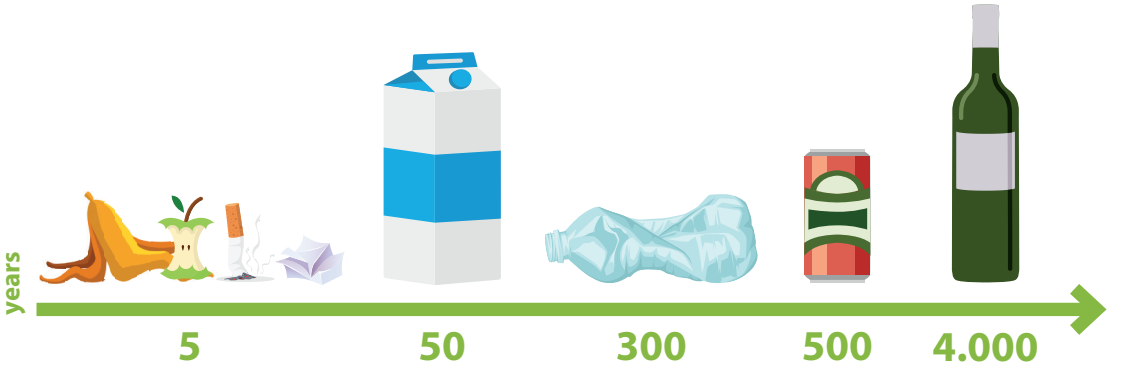
Paper: Does Perceived Crowding Cause Winter Backcountry Recreationists to Displace?

authors: Reto Rupf, Pascal Haegeli, Barbara Karlen, Martin Wyttenbach
published: 2019
methodology: quantitative (survey)
abstract link

Ecological effects

Ecological effects are of particular importance in tourism in the Alpine region, as intact nature and intact landscapes are the **basic requirement** for tourism and play a major role in tourists' destination decisions. The basic conflict in tourism development is between economic and social success and ecological overload.[1]

Tourism has **negative impacts** on nature and biodiversity; they are visible in almost every form of recreational use. The impacts are mainly caused by a **high spatial and temporal concentration** of visitors on facilities or infrastructure and by a dispersion of activities in the area. The extent of the pressures depends on the type of tourism use, the intensity of use and the sensitivity of the ecosystem concerned and the environmental goods occurring in it. Mountain ecosystems (high mountains, cliffs, slopes, mountain forests, oligotrophic mountain waters) are among the ecosystems particularly stressed by tourism. As tourism preferably takes place in regions and areas that are ecologically valuable and sensitive, there is a fundamental **potential for conflict** in its use (competition for land, location, intensity/frequency/period of use, uncontrolled growth of tourist activities, behaviour of tourists).[7]



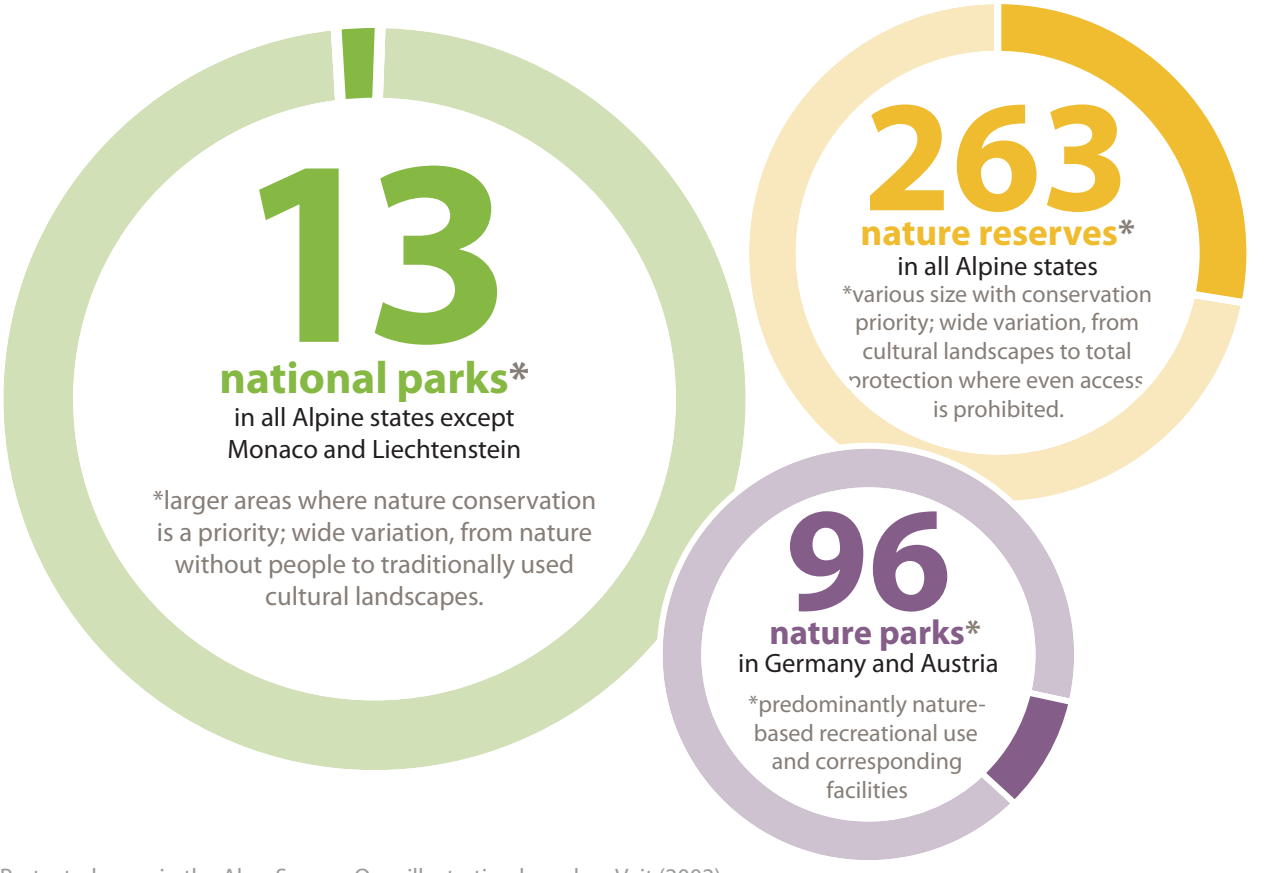
Duration of decomposition of waste in alpine terrain.
Source: Own illustration based on Schnitzler (2017)

Nature conservation

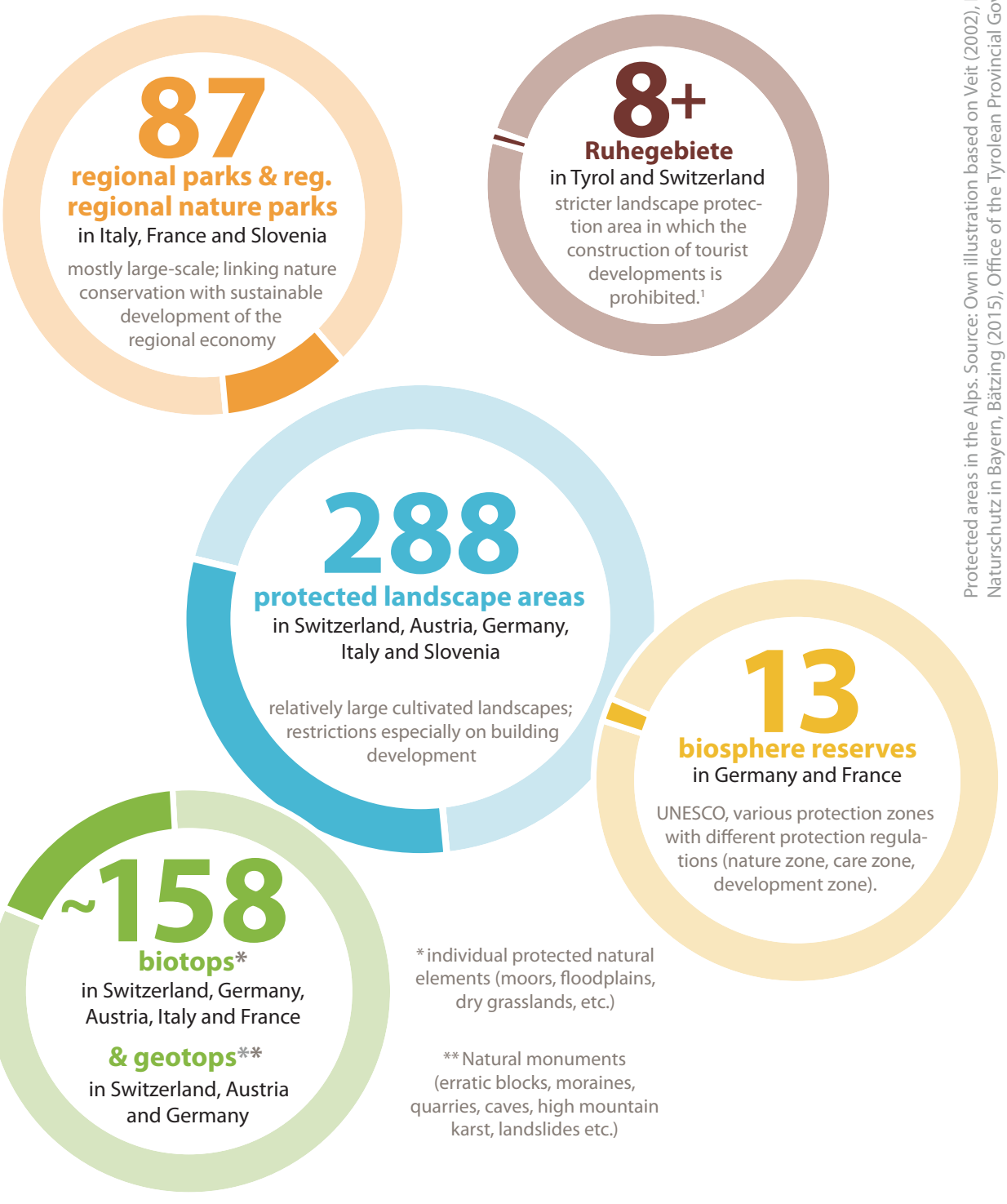
The basic idea of nature conservation (i.e. the protection of nature from the negative influence of humans) in the Alps developed in parallel with industrial society. In the romantic image of the Alps of early nature conservation, the landscape of the Alps was perceived as ideal nature worthy of protection, from which humans should withdraw completely, although it is actually a cultural landscape shaped by human intervention. If this cultural landscape is no longer managed or cared for, the existence of many plant communities that have adapted to the way they are managed is threatened. The classic example of this is the alpine pastures, whose areas become overgrown and shaded when they are no longer used, so that rare plant species disappear.[8]

This ideological conflict continued to intensify in the Alps until a fundamental paradigm shift took place in the 1980s. Instead of „classical" nature conservation, which does not allow any use, a different approach has been taken since then: In order to achieve the nature conservation goals, i.e. the preservation of biodiversity, biotopes and landscapes, emphasis is placed on an „adapted" form of agricultural use in cooperation. Thus, integrative environmental protection takes place in the Alps today, involving the economy and society on an equal footing (in contrast to the former sectoral environmental protection, which had the mono-function of nature conservation).[8]

Today, about 25 % of the entire Alpine area is under variously defined and distinct protection. The total of 926 protected areas cover an area of 54,471.8 km².[8,9]



Protected areas in the Alps. Source: Own illustration based on Veit (2002), BUND Naturschutz in Bayern, Bätzing (2015), Office of the Tyrolean Provincial Government



Protected areas in the Alps. Source: Own illustration based on Veit (2002), BUND Naturschutz in Bayern, Bätzing (2015), Office of the Tyrolean Provincial Government

[1] Due to the similarities of Zone C of the Alpine Plan *(cf. Tourism effects)* to the quiet areas mentioned here, Zone C is also often called quiet zone.

People – landscape

Influence of human activities on mountain lakes

Paper: How do anthropogenic pressures affect the provision of ecosystem services of small mountain lakes?

authors: Manuel Ebner, Uta Schirpke, Ulrike Tappeiner
published: 2022
methodology: literature analysis
abstract link

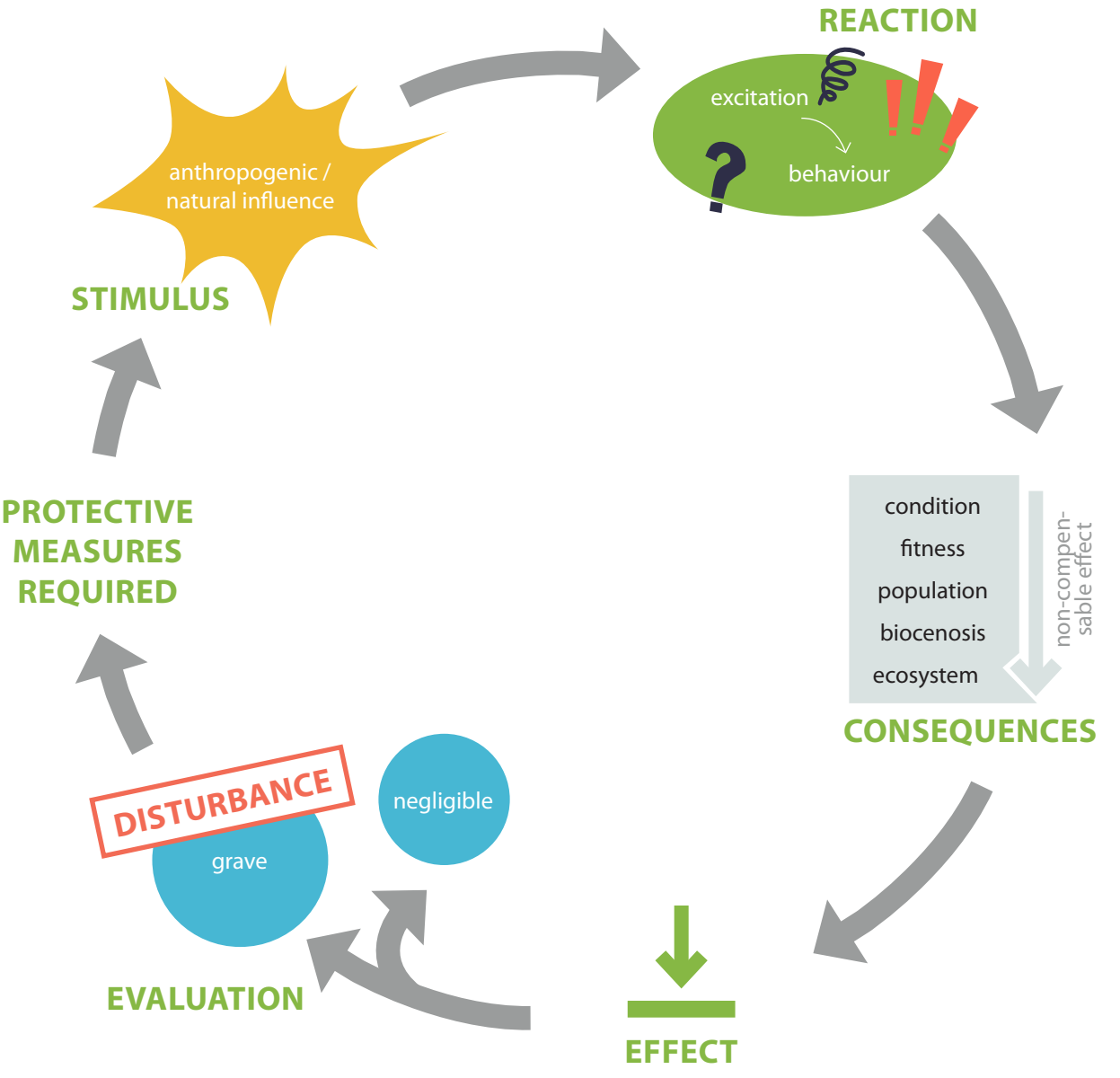
The **ecological carrying capacity** indicates the maximum amount of tourist use or intensity of a form or type of use that a certain landscape area can tolerate in a certain period of time without suffering lasting, irreparable or irreversible damage or losing significant recreational value.[7, 10] The capacity limit refers to the maximum number of people who can use an area without causing unacceptable changes to the environment and reducing the quality of the holidaymaker's experience.[11]

Objectively, the ecological carrying capacity can **hardly be determined as a value,** as it depends on many influencing factors that are difficult to put into figures and do not do justice to reality even with the greatest care. In addition to the number of visitors, the degree of pollution and the extent of territorial change also have a negative impact on nature. **Absolute indicators** for measuring the impacts of tourism activities therefore **do not exist.** In order to be able to determine the impacts nevertheless, **qualitative** approaches are increasingly being pursued. The most widely used is the concept of **Limits of Acceptable Change,** which consists of four principles:[7,10,12]

1. Setting acceptable and achievable standards regarding the state of ecosystems
2. Identifying discrepancies between desired and actual conditions
3. Identification and comparative assessment of possible management tools
4. Monitoring and evaluation of the effectiveness of the chosen management strategy

Disturbances are defined as factors or complexes of factors that are not part of the normal environment of organisms, populations or the normal household of ecosystems, often triggered by humans, which cause reversible or irreversible changes in the properties of these systems. An intervention or influence in the broader ecological sense, such as fire, wind breakage, mowing or grazing, can also be referred to as a disturbance. Therefore, a disturbance event should be differentiated into **disturbance stimulus** and **disturbance effect** (reaction of the disturbed individual). The disturbance stimulus, disturbance effect and the consequences for the disturbed individual (or population/biocenosis/ecosystems) should be differentiated at the various levels (individual, population, etc.) and recorded as precisely as possible.[13]

Ecosystem services (ESD) describe services that are provided by nature and used by humans. These include basic services (such as soil formation), provisioning services (such as nutrition), regulating services (for example erosion control) and cultural services (for example recreation). Based on the sustainability categories, ecosystem services can also be divided into three classes: **Provisioning, regulating** and **socio-cultural services.** Vital human welfare services are based on these. These include, among others, food security, protection against natural hazards and the availability of clean water. Societal value creation is to be weighted via the ESS concept and also, but not only, evaluated in monetary terms (cost-benefit calculation), in order to commit to the conservation of nature for economic reasons as well.[14]



Scheme of disturbances.
Source: Own illustration based on Stock et al. (1994)

Kulturelle Ökosystemdienstleistungen in Gebirgslandschaften

Paper: Cultural ecosystem services in mountain regions: Conceptualising conflicts among users and limitations of use

authors: Uta Schirpke, Rocco Scolozzi, Graeme Dean, Andreas Haller, Hieronymus Jäger, Jutta Kister, Barbara Kovács, Fausto O. Sarmiento, Birgit Sattler, Christian Schleyer
published: 2020
methodology: qualitative (expert interviews, case studies)
abstract link

Availability of cultural ecosystem services in mountain protected areas

Paper: Potential supply and actual use of cultural ecosystem services in mountain protected areas and their surroundings

authors: Emilie Crouzat, Angel De Frutos, Volker Grescho, Steve Carver, Andrea Büermann, Claudia Carvalho-Santos, Roland Kraemer, Sarah Mayor, Franziska Popperl, Christian Rossi, Matthias Schröter, Ana Stritih, Ana Sofia Vaz, Jan Watzema, Aletta Bonn
published: 2022
methodology: qualitative (workshops) und quantitative (survey)
abstract link

Managing disturbance risks to mountain forest ecosystem services

Paper: Addressing disturbance risk to mountain forest ecosystem services

authors: Ana Stritih, Peter Bebi, Christian Rossi, Adrienne Grêt-Regamey
published: 2021
methodology: qualitative (case studies)
abstract link

Ecosystem services for assessing the transformation of agricultural landscapes

Paper: Using the Ecosystem Services Concept to Assess Transformation of Agricultural Landscapes in the European Alps

authors: Uta Schirpke, Erich Tasser, Georg Leitinger, Ulrike Tappeiner
published: 2022
methodology: qualitative (case studies)
abstract link

E-mountain bikes in mountain regions

Paper: Electrically assisted mountain biking: Riding faster, higher, farther in natural mountain systems

authors: Veronika Mitterwallner, Manuel J. Steinbauer, Andreas Besold, Andreas Dreitz, Matthias Karl, Nadine Wachsmuth, Veronika Züglert', Volker Audorff
published: 2021
methodology: quantitative (Evaluation of a test with test persons with MTB and E-MTB)
abstract link

Reasons for leaving marked paths and implications for management

Paper: Why do people leave marked trails? Implications for managing outdoor recreationists

authors: Vera Kopp, Joy Coppes
published: 2020
methodology: quantitative (survey)
abstract link

Identification of conflict tendencies between tourism and nature conservation

Paper: Identifying conflicts tendency between nature-based tourism development and ecological protection in China

authors: Zeng Yuxi, Zhong Linsheng
published: 2020
methodology: quantitative (data evaluation)
abstract link

Anthropogenic influences on water quality in mountainous areas: Case study in the Black Forest (DE)

Paper: Anthropogenic Impacts on Water Quality in a Small, Forested Mountain Catchment: A case Study of the Seebächle, Black Forest, South Germany

authors: Laura Siegwald, Carmen de Jong
published: 2020
methodology: qualitative (case study)
abstract link

Thresholds for potential problems and limits of acceptable changes due to tourism in nature.

Paper: Managing Tourism and Environment – Trail Erosion, Thresholds of Potential Concern and Limits of Acceptable Change

authors: Deirdre Dragovich, Sunil Bajpai
published: 2022
methodology: quantitative (survey) und qualitative (measurements)
abstract link

Trail use and landscape perception of hikers: case study in the Allgäu High Alps (DE)

Paper: Trail use and perception of a diverse mountain farming landscape by hikers in the protected area Allgäuer Hochalpen in the German Alps

authors: Gerd Lupp, Markus Feuerstein, Linda Heuchele, Werner Konold
published: 2015
methodology: qualitative (case study, observations, interviews) und quantitative (image evaluation)
abstract link

People – animals

Behavioral changes of wildlife by human activities: case study in the Massif des Bauges Nature Park (FR)

Paper: Interacting lethal and nonlethal human activities sharpen complex risk tolerance behaviors in a mountain herbivore

authors: Nicolas Courbin, Mathieu Garel, Pascal Marchand, Antoine Duparc, Lucie Debeffe, Luca Börger, Anne Loisin
published: 2022
methodology: quantitative (GPS data from humans and chamois)
abstract link

The **Gams & Tourengeher** campaign aims to make tourers aware of the wintering of wild animals and the fatal loss of energy due to disturbances by providing precise information on the needs of the animals and on ascents and descents that are compatible with wildlife. As a result, the sensitive wintering areas should be avoided.

project name: Erlebnis Göller: Gams & Tourengeher
project duration: since 2009
project partner/implementation: Österreichischer Alpenverein/Sektion Austria and Sektion Edelweiss, Familie Hoyos, Naturfreunde Österreich

Behavioral responses of alpine choughs to human disturbance: case study in the Aosta Valley (IT).

Paper: Behavioural responses to human disturbance in an alpine bird

authors: Cristina Vallino, Enrico Caprio, Fabrizio Genco, Dan Chamberlain, Claudia Palestrini, Angela Roggero, Massimo Bocca, Antonio Rolando
published: 2019
methodology: qualitative (observations)
abstract link

In the **Natürlich auf Tour** campaign, part of the „Ski Mountaineering Environmentally Friendly" project, visitors are informed about the correct behavior during activities through information boards at the parking lots and at the starting points for tours, in addition to route recommendations. Stop signs warn of particularly sensitive areas, so-called forest-wildlife sanctuaries, and point out prohibitions on entering. The campaign focuses on motivating people to behave in a way that is compatible with nature, which is to be achieved with positive guidance measures. The DAV also developed the F.U.N. principle (Friendly. Prudent. Nature-compatible.), which is intended to encourage mountain sports enthusiasts, as part of the problem of overtourism, not to thoughtlessly pursue fun activities in nature, but to protect human coexistence, their own fitness, health and integrity, as well as plants, animals and the climate through good behavior.

project name: Natürlich auf Tour
project duration: since 2003
project partner/implementation: Deutscher Alpenverein

Impact of tourism on black grouse habitat use

Paper: Impact of tourism on habitat use of black grouse (Tetrao tetrix) in an isolated population in northern Germany

authors: Daniel Tost, Egbert Strauß, Klaus Jung, Ursula Siebert
published: 2020
methodology: quantitative (GPS data, infrared light barriers)
abstract link

The **Look B4 you go** project uses cartoons to sensitize ski tourers and cross-country skiers off the slopes to a considerate approach to nature and wildlife. With the help of emotional identification, ski tourers are to be persuaded to change their behavior and show consideration. The posters are placed at ski lifts in ski resorts.

project name: Look B4 you go
project duration: since 2005
project partner/implementation: Tiroler Landesregierung/Abt. Landschaftsdienst, Österreichischer Alpenverein, Jägerschaft, Tiroler Waldverein, Österreichischer Schiverband, SITOUR

Effects of free-flight activities on wildlife

Paper: Effects of free-flight activities on wildlife: a poorly understood issue in conservation

authors: Jorge Tobajas, Francisco Guil, Antoni Margalida
published: 2021
methodology: literature analysis
abstract link

Interactions between key vertebrates and outdoor activities: case study in the Écrins and Vanoise Alpine National Parks (FR)

Paper: Interactions between outdoor recreation and iconic terrestrial vertebrates in two French alpine national parks

authors: Sandra Lavorel, Pierre-Louis Rey, Karl Grigulis, Mégane Zawada, Coline Byczek
published: 2020
methodology: qualitative (case study)
abstract link

Methods for assessing conflicts between winter sports activities and grouse species

Paper: Assessing conflicts between winter recreational activities and grouse species

authors: Hieronymus Jäger, Uta Schirpke, Ulrike Tappeiner
published: 2020
methodology: qualitative (GPS-Daten) und literature analysis
abstract link

The **Respektiere deine Grenzen** campaign raises awareness among visitors for a more respectful approach to nature. To prevent people from spending time in important natural areas and causing potential damage there, for example, information boards with the slogan „Respect your boundaries" mark important protected zones in Vorarlberg. These zones are marked with the same logo in hiking and skiing maps. The campaign also provides tips and info for environmentally friendly behavior online. An interactive map helps plan the next freeride adventure or mountain tour - always with respect for nature.

project name: Respektiere deine Grenzen
project duration: since 2004
project partner/implementation: Amt der Vorarlberger Landesregierung, Abteilung Umwelt- und Klimaschutz

Awareness of recreationists to wildlife disturbance.

Paper: Aware or not aware? A literature review reveals the dearth of evidence on recreationists awareness of wildlife disturbance

authors: Léna Gruas, Clémence Perrin-Malterre, Anne Loison
published: 2020
methodology: literature analysis
abstract link

People – vegetation

Vegetation change as an indicator of and assessment of human disturbance

Paper: Impact of tourism disturbance on forest vegetation in Wutai Mountain, China

authors: Liqin Niu, Zhanhong Cheng
published: 2019
methodology: qualitative (interviews, observations)
abstract link

Drones as a tool for monitoring human interventions and vegetation changes in parks and protected areas

Paper: Drones as a tool to monitor human impacts and vegetation changes in parks and protected areas

authors: Francisco Javier Ancin-Murguzur, Lorena Munoz, Christopher Monz, Vera H. Hausner
published: 2019
methodology: quantitative (evaluation of drone images)
abstract link

Interactions between cross-country skiing and vegetation

Paper: Positive sport-biosphere interactions? – Cross-country skiing delays spring phenology of meadow vegetation

authors: Manuel J. Steinbauer, Juergen Kreyling, Caroline Stöhr, Volker Audorff
published: 2017
methodology: qualitative (case study)
abstract link

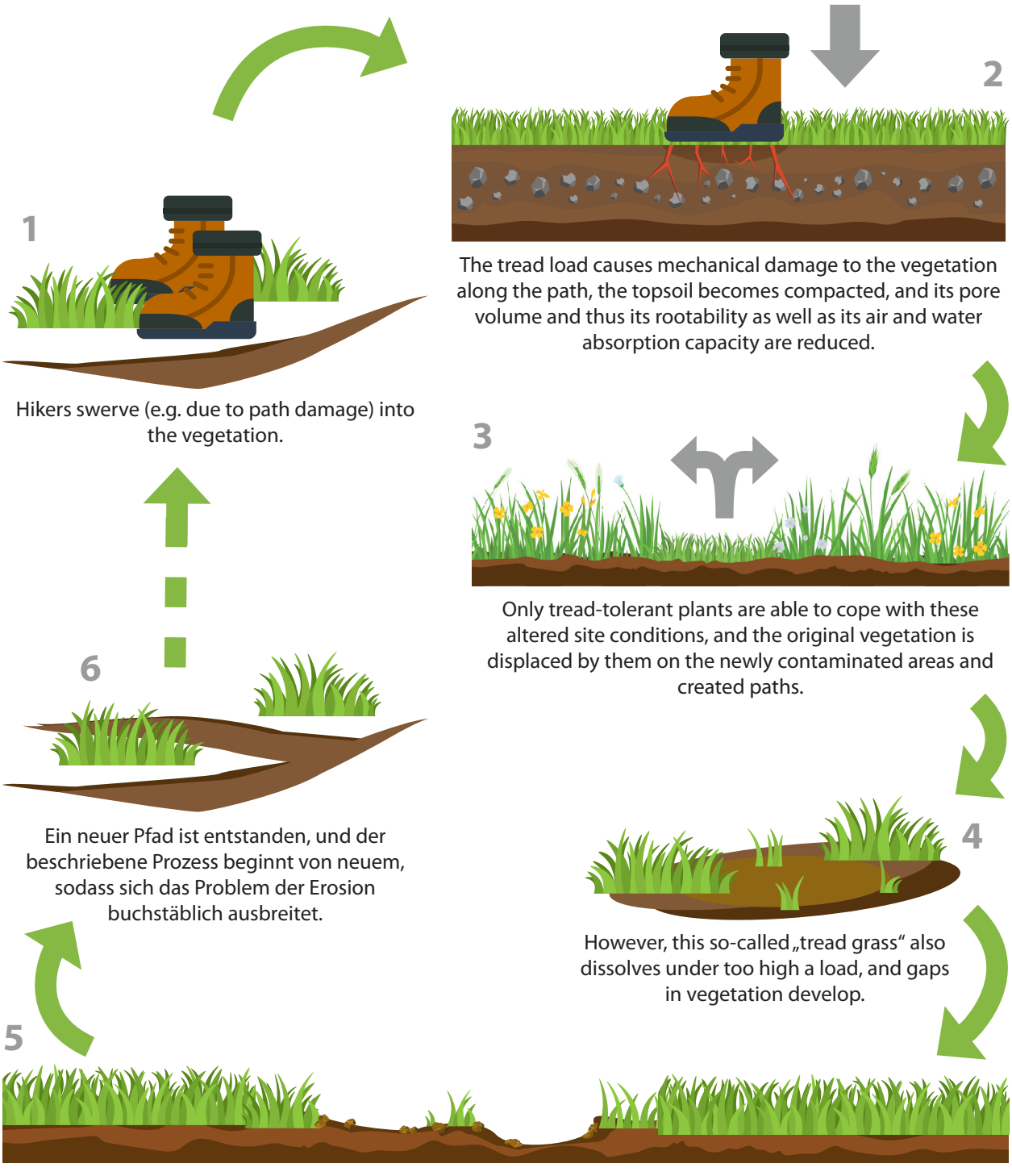
Longest-term changes in mountain vegetation due to human disturbance

Paper: Anthropogenic disturbance modifies long-term changes of boreal mountain vegetation under contemporary climate warming

authors: Tuija Maliniemi, Risto Virtanen
published: 2021
methodology: qualitative (case study, observations)
abstract link

Soil stress due to tread and the development of erosion

The tread load by an average person is about 400 g/cm^2. When descending the mountain, this load can increase to as much as 57 kg/cm^2. At these points, the soil is heavily compacted and as a result surface runoff is increased, so that the paths are sometimes heavily washed out and deepened by up to one meter after just one snowmelt period.[15] Some alpine plant species or plant communities, such as the curved sedge meadow (Carex curvula) or the alpine motherwort (Ligusticum mutellina), are very resistant to this stress and can withstand a very high footfall of up to 150 tourists per day and season. On the other hand, other species occurring at alpine altitudes, such as lichens, mosses, broad-leaved grasses, and some herbs, are not particularly resistant. Already on stepping sites that register less than ten tourists per day and season, these sensitive alpine species disappear.[15] Certain grass communities in the high mountains can even be destroyed by the impact of only 80 mountain hikers per year.[16]



Damage sequence of erosion due to trampling damage. Source: Own illustration based on Robens und Blacek (1993)

Mensch – Boden

Invertebrates as indicators of ecological impacts of trails

Paper: The importance of invertebrates in assessing the ecological impacts of hiking trails: A review of its role as indicators and recommendations for future research

authors: Pedro Leote, Reinaldo Lucas Cajaiba, Helena Moreira, Ronaldo Gabriel, Mário Santos
published: 2022
methodology: literature analysis
abstract link

Influence of tourist disturbances on soils and their microbial structure

Paper: Influence of Tourism Disturbance on Soil Microbial Community Structure in Dawei Mountain National Forest Park

authors: Qunjun Li, Meiqi Dai, Fen Luo
published: 2022
methodology: quantitative (chemische Untersuchungen)
abstract link

Effects of tourist disturbances on soil ecosystems

Paper: Review on the effects of tourism disturbance on soil ecosystem

authors: Duan Guilan, Zhu Yinjian
published: 2019
methodology: literature analysis
abstract link

Economical effects

Tourism is of great economic importance for the Alpine region. In many regions, tourism and related industries such as accommodation, catering, transport and leisure activities are important **economic factors.** Tourism thus contributes to job creation, income generation and prosperity in the region.

Economic effects arise from both day and overnight tourism. There are both **monetary** and **non-monetary** effects. The former result from income and turnover in the destinations, for example in accommodation, gastronomy or mobility services. Non-monetary economic effects can be seen, for example, in effects on the labor market, cultural exchange, changes in regional economic structures, such as regional equalization effects, or improvements in infrastructure, image or competence due to the framework conditions of tourism. These effects can also be divided into tangible and intangible effects. Due to its diverse effects, tourism is often referred to as a growth engine. However, due to the **globalization** of tourism, revenues are declining again in some countries. Due to the cross-sectional nature and seasonality of tourism, the exact number of jobs in tourism cannot be determined, but only estimated. However, in addition to the positive and neutral economic effects of tourism, negative economic effects can also be observed, especially when there are hardly any other economic structures besides tourism **(monostructure).** These effects are, for example, displacement, shortage, price increase, labor withdrawal, seasonality, dependency and investment substitution effects.[1,17]

Economic carrying capactiy is determined by the current ratio of employment opportunities and the number of people in the labor force. The effect of exceeding the limit is unemployment. As with social and environmental carrying capacity, economic carrying capacity is not absolute; its capacity limits are

dynamic and depend on many different factors.[5]

The economic carrying capacity can be used to determine approximately how much tourism activity is **at least** necessary to enable the economic existence or livelihood of the regional population or businesses in tourism. The concepts of **sufficiency,** the **degrowth movement** and the **post-growth society** also work with an orientation towards economic carrying capacity, the fulfillment of basic needs and the enabling of a good life for all people, instead of competition and permanent growth as in the current economic system.

Influence of the intensity of physical activity on the spending of visitors

Paper: The economic impact of tourism on protected natural areas: examining the influence of physical activity intensity on visitors' spending levels

authors: Estela Inés Farías-Torbidoni, Demir Barić
published: 2020
methodology: qualitative (survey)
abstract link

Opportunities, dangers and areas of conflict when ski touring on slopes

Paper: Ski touring on groomed slopes: Analyzing opportunities, threats and areas of conflict associated with an emerging outdoor activity

authors: Elisabeth Happ, Martin Schnitzer
published: 2022
methodology: qualitative (expert-interviews)
abstract link

Degrowth in tourism: rethinking tourism

Paper: Degrowing tourism: rethinking tourism

authors: Freya Higgins-Desbiolles, Sandro Carnicelli, Chris Krolikowski, Gayathri Wijesinghe, Karla Boluk
published: 2019
methodology: literature analysis
abstract link

Non-market value of outdoor activities in winter: case study in Val Bedretto (CH)

Paper: Non-market Value of Winter Outdoor Recreation in the Swiss Alps: The Case of Val Bedretto

authors: Massimo Filippini, William Greene, Adan L. Martinez-Cruz
published: 2018
methodology: quantitative (survey)
abstract link

Involvement of farmers in protected areas

Paper: How can farmers be better integrated into nature parks? AgriPark – Transdisciplinary development of approaches for better cooperation between agriculture and Regional Nature Parks

authors: Sonja Trachsel, Ruth Moser, Birgit Reutz, Rebecca Göpfert
published: 2022
methodology: qualitative (workshops, interviews) und quantitative (survey)
abstract link

Infrastructure effects and traffic

Tourism in rural areas, which includes a large part of the Alps, goes hand in hand with the **development and expansion of infrastructural facilities,** which **enhances** the value of the villages and regions concerned and also offers an advantage to the local population: Tourist communities have a denser network of hiking and biking trails as well as socio-cultural facilities (swimming pools, entertainment venues) than non-touristy places. Furthermore, tourist demand ensures the availability of **public transportation** in rural areas - in many places, only tourist demand allows for a wider range of services, especially on weekends and during vacation periods. There are also benefits from tourism in the area of road infrastructure, as more funds are generally available for renovation and new construction; especially for the municipal road network. This also applies to the development and expansion of the network of hiking and biking trails.[1]

The awareness and popularity of destinations or regions, caused or reinforced by tourism, also has an impact on the real estate market: Due to many second and old residences, **real estate prices** are rising. Especially at the edge of the Alps and in easily accessible areas, this phenomenon is very strong and has negative effects on the local population.[12]

Tourism, leisure-oriented immigration and residential real estate market development

Paper: Tourism, leisure-oriented migration and residential property market development: Current findings and implications for sustainable tourism and regional development using the example of Garmisch-Partenkirchen (German)

authors: Theresa Kors, Christian Steiner, Gerhard Rainer, Frank Zirkl
published: 2022
methodology: qualitative (case study) and quantitative (data evaluation)
abstract link

Zermatt in Switzerland is a popular tourist destination and has a high proportion of second homes. As a result, housing prices for primary residences are also rising. Due to rising rental costs, many locals and year-round residents of Zermatt have to leave the region. To break this negative dynamic, the municipality of Zermatt took regulatory measures. These are intended to strengthen the construction of primary residences and prevent the conversion of existing primary residences into secondary residences. Complementing this, the neighboring Swiss communities of Zermatt, Täsch and Randa joined forces in the **Sustainable Spatial Development Model Project 2014-2018** and founded a regional cooperative to improve the supply of affordable housing in the inner Mattertal in Switzerland. They manage existing properties to maintain primary residences and mobilize additional affordable housing. According to the rental regulations, only households with limited income should benefit from this, provided they have their main residence in the inner Mattertal and also work there.

project name: Modellvorhaben Nachhaltige Raumentwicklung 2014–2018
project duration: since 2014
project partner/implementation: Schweizer Gemeinden Zermatt, Täsch und Randa (withdrawn from the project in 2018)

The Alps are crossed by numerous major international transport axes, including road corridors. In recent decades, **traffic** in and through the Alps has **increased extremely.** In the process, rail traffic increased by a factor of 1.5, while road transport increased by a factor of more than eight. Every year, the Alpine road network is used by millions of trucks, tourists and Alpine residents: An average of 40,000 vehicles per day travel over the Brenner Pass alone (as of 2019), and 38.8 million net tons of goods are transported by road over the pass each year (2018). At the same time, intra- and transalpine traffic is expected to continue growing. The challenges here are the **management of traffic flows** - especially the separation of transit and local road traffic - and the **emissions** of CO^2, pollutants and noise.

Because of the topography of the valleys, the environmental impacts of traffic and the impacts on health and on the landscape are greater in mountain areas than elsewhere: pollutant accumulations can reach **metropolitan proportions.** In transit communities, two-thirds of people experience high or very high levels of noise pollution. Another important aspect of traffic in the Alps is the **dissection** and **fragmentation** of the natural habitat for wildlife. However, not only transit traffic, but to a large extent also intra-Alpine freight and passenger traffic - including tourist source and destination traffic - contribute to these burdens.[15,18,19]

The attractive areas for recreation and tourism in the Alps are mostly **natural areas** and are often located in more remote areas that are not well served by public transport or are **not well connected.** As a result, both vacation and day tourism are very much dominated by **motorized individual transport** or by passenger cars. As described above, this creates a variety of problems for nature conservation and environmental protection, for recreation seekers and residents, and for the recreational attractiveness of the areas (contribution to climate change, air pollution, noise, land consumption, etc.). In order to avoid or at least reduce these problems, it is very important in visitor management to **influence the mobility** of visitors (both on arrival and departure as well as on site); however, this requires the cooperation of many different actors. This requires a great deal of **coordination, communication and networking.** For this reason, the focus has so far mostly been on measures to shift car traffic to local public transport. For local traffic, guest cards for overnight guests, which allow them to use the region's mobility services free of charge, stand out in particular. Supplementary concepts are needed for arrival and departure as well as for day tourism. The provision and targeted advertising of public transport concepts also enables visit management to spatially steer.[10]

With the KÖNIGSCARD, an all-inclusive guest card for the regions of Allgäu, Tyrol and Upper Bavaria, overnight guests can use many offers in the regions (for example, guided cycling and hiking tours, swimming pools and thermal spas, mountain railroads, cultural facilities, toboggan run, climbing forest) free of charge. Currently, almost 500 accommodations participate in the KÖNIGSCARD program.

project name: KÖNIGSCARD
project duration: since 2019
project partner/implementation: KÖNIGSCARD Gästekarten GmbH, over 250 service providers

Planning and deployment of autonomous shuttle buses for tourist mobility: case study in the Berchtesgaden-Königssee region (DE)

Paper: Planning and Implementation of Autonomous Shuttle Buses in Tourism Mobility in the Region Berchtesgaden-Königssee, Germany

authors: Carolin Altena, Hannes Thees
published: 2022
methodology: qualitative (interviews)
abstract link

Car-free mobility in winter sports tourism

Paper: Car-free skiing - Are winter sports resorts in the Alps suitable for travel by public transport and soft mobility on site? (German)

authors: Marius Hellmund
published: 2021
methodology: quantitative (survey)
abstract link

The umbrella brand Alpine Pearls (Pearls of the Alps) unites environmentally friendly vacation destinations in the Alps that offer visitors special offers for a vacation without their own car with full mobility guarantee on site. This already begins with the car-free journey by train and bus. Getting around locally is ensured by soft mobility options such as shuttle services, hiking and ski buses, cabs, electric cars, bicycles and e-bikes. Guest and mobility cards allow free use of local public transport. The goals of the cooperation are to promote soft tourism, sustainable vacations and climate protection in the Alps. The Alpine Pearls are made up of 19 communities from five countries (Germany, Austria, Slovenia, Switzerland and Italy). German Alpine Pearls are the Alpine communities of Bad Reichenhall and Berchtesgaden. The initiative grew out of the EU projects „Alps Mobility" and „Alps Mobility II".

project name: Alpine Pearls
project duration: since 2006
project partner/implementation: EVTZ Alpine Pearls mbH

Mobility in tourism: challenges and changes

Paper: Tourism mobility: challenges and transformations

authors: Anna Scuttari
published: 2019
methodology: literature analysis
abstract link

Fahrtziel Natur is a cooperation between the three associations BUND für Umwelt und Naturschutz Deutschland (BUND), Naturschutzbund Deutschland (NABU) and Verkehrsclub Deutschland (VCD) with Deutsche Bahn to promote environmentally friendly mobility and sustainable nature tourism. The aim of the cooperation is to shift tourist traffic from private cars to public transport. To achieve this, attractive local tourism offers are linked with climate-friendly mobility concepts. Currently, 23 areas in Germany, Austria and Switzerland are partners in the cooperation, including the Ammergauen Alpen Nature Park, the Allgäuer Hochalpen Nature Reserve and the Berchtesgaden National Park. In most of the participating nature areas, overnight guests can use public transportation free of charge during their entire stay with their guest card. In der Schweiz gibt es since 2016 ein ähnliches, gleichnamiges Projekt, bei dem das Netzwerk Schweizer Pärke, der Verkehrs-Club der Schweiz und der Bündner Vogelschutz mit der Rhätischen Bahn und PostAuto Graubünden kooperieren (Fahrtziel Natur).

project name: Fahrtziel Natur
project duration: since 2001
project partner/implementation: Bund Naturschutz, Naturschutzbund NABU, Verkehrsclub Deutschland VCD, Deutsche Bahn

On the multilingual platform Changer d'approche („other approach"), mountain enthusiasts can find 15,000 routes and tours throughout the Alps that are accessible by public transport. Climbers, ski tourers and other nature sports enthusiasts can click through and download maps and additional information on the website. The Austrian initiative „Bahn zum Berg" also collects and disseminates tour tips for outdoor activities using public transport in Austria and Bavaria. The Italian Gran Paradiso National Park is doing similar work with its project „A piedi tra le nuvole" (On foot to the clouds).

project name: Changer d´approche
project duration: 2007
project partner/implementation: Mountain Wilderness

The **Zuugle** search engine for publicly accessible mountain tours offers the possibility to search for mountain tours available on the Internet and to add the journey by public transport. For this purpose, mountain tours accessible by public transport are displayed, the connection options and the walking distances to and from the stop are included and displayed. Special emphasis was placed on ease of use and clear presentation. The search results can be filtered by starting station, mountain group, type of sport, duration of the trip, degree of difficulty, altitude difference and some more. Zuugle is currently available for Austria and the first departure stations in Germany and South Tyrol with over 10,000 „public transport mountain tours" in 78 hiking regions. Gradually, the offer will be expanded to the entire German-speaking Alpine region in Austria, Germany, Switzerland and Italy.

project name: Zuugle
project duration: since 2022
project partner/implementation: Bahn zum Berg e. V.

Parking facilities in nature reserves and their use by visitors

Paper: Parking provision at nature conservation sites and its implications for visitor use

authors: Damiano C. Weitowitz, Chris Panter, Rachel Hoskin, Durwyn Liley
published: 2019
methodology: quantitative (counts)
abstract link

As part of the **#Dolomitesvive** initiative, the Sella Pass between Selva Gardena and Canazei in the Dolomites was closed on Wednesdays between 9 a.m. and 4 p.m. during the summers of 2017 and 2018. This allowed visitors to visit the region around the pass by sustainable means of transport such as buses or bicycles or on foot. The road closure initiative was accompanied by increased bus services and a series of cultural, sports, gastronomic and musical events in the pass area. The aim of the project was to reduce the volume of traffic and the associated noise pollution, and to improve the local tourist experience.

project name: #Dolomitesvive
project duration 2017–2018
project partner/implementation: Autonome Provinz Bozen Südtirol, Autonome Provinz Trento

Travel behavior of tourists to, in and between destinations in the Alps

Paper: Intra destination travel behavior of alpine tourists: a literature review on choice determinants and the survey work

authors: Bartosz Bursa, Markus Mailer, Kay W. Axhausen
published: 2022
methodology: literature analysis
abstract link

Tourism mobility and climate change

Paper: Tourism mobility and climate change - A review of the situation in Austria

authors: Astrid Gühnemann, Agnes Kurzweil, Markus Mailer
published: 2021
methodology: literature analysis
abstract link

Further development and improvement of demand-driven transportation planning in protected areas.

Paper: A systems-based approach to address unintended consequences of demand-driven transportation planning in national parks and public lands

authors: Steven R. Lawson, Peter Newman, Christopher Monz
published: 2017
methodology: quantitative (survey)
abstract link

Perception of annoyance by motorcycle noise: cross-sectional study in the Alps

Paper: Effects of Motorcycle Noise on Annoyance – A Cross-Sectional Study in the Alps

authors: Christoph Lechner, David Schnaiter, Uwe Siebert, Stephan Böse-O'Reilly
published: 2020
methodology: quantitative (sound measurements, survey)
abstract link

Impact of access restrictions on transport mode choice in the Alps.

Paper: Assessing the effects of access policies on travel mode choices in an Alpine tourist destination

authors: Francesco Orsi, Davide Geneletti
published: 2014
methodology: quantitative (survey)
abstract link

Paradox between tourism and traffic in mountain areas: case study on the Dolomite passes (IT)

Paper: Assessing the tourism-traffic paradox in mountain destinations. A stated preference survey on the Dolomites' passes (Italy)

authors: Anna Scuttari, Francesco Orsi, Ruben Bassani
published: 2019
methodology: quantitative (survey)
abstract link

Spatial prediction of demand for leisure activities: case study in Switzerland.

Paper: Predicting outdoor recreation demand on a national scale – The case of Switzerland

authors: Fabian Willibald, Maarten J. van Strien, Victor Blanco, Adrienne Grêt-Regamey
published: 2019
methodology: quantitative (Mikrozensus-survey) and literature analysis
abstract link

The Swiss village of Zermatt has been car-free or combustion engine-free since the 1930s. Access for private motorized traffic is only allowed as far as Täsch (approx. 5 km away), where visitors can park their cars in a parking garage. Shuttle trains take guests from Täsch, who have not already arrived from Visp with the Matterhorn-Gotthard-Bahn, to Zermatt in twelve minutes. Only residents, delivery trucks and seasonal commuters from the hotel and restaurant sector are allowed to use the road to Zermatt and park their cars underground. In Zermatt, you can get around on foot, by horse-drawn carriage, electric cabs, bicycles, mountain bikes or e-buses. The ban on cars to and in Zermatt arose as a settlement from a dispute between the Matterhorn-Gotthard Railway (then Visp-

Zermatt Railway) and the canton of Valais in 1931: While the canton of Valais wanted to open up every community in the canton that was not yet accessible by automobile by means of an access road, the railroad company was opposed to this in the case of Zermatt and threatened to no longer serve the community in winter. This would have been a disaster for winter tourism at the time, since almost all arrivals were by train. For this reason, the road was built but closed to automobile traffic. In return, the Visp-Zermatt railroad began year-round service to Zermatt in 1933.

project name: Zermatt autofrei
project duration: since 1931
project partner/implementation: Schweizer Gemeinde Zermatt

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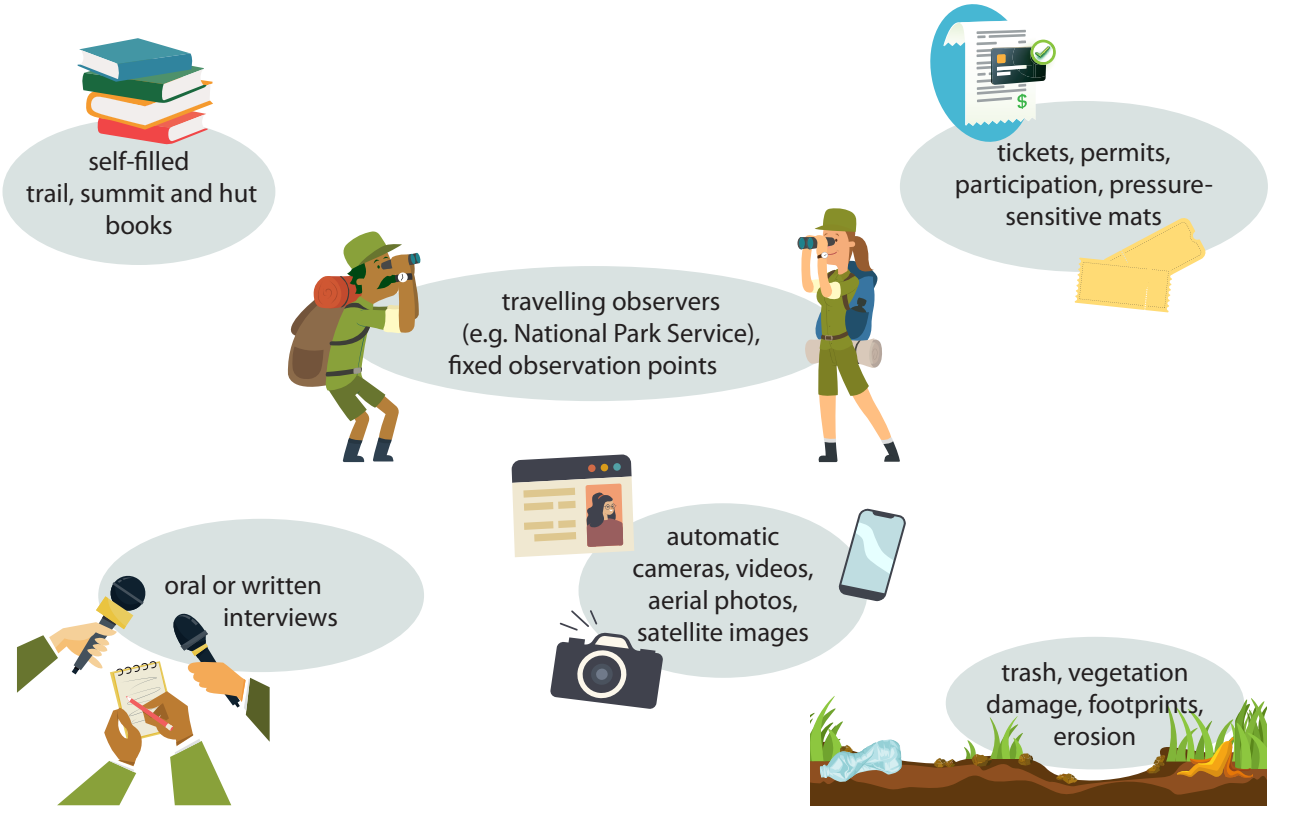
Tourism guidance

Tourism guidance

More and more people are seeking recreation and balance in the Alps and alpine nature, which puts increasing pressure on animals, plants, infrastructure and people. *(cf. Tourism effects)* The impacts of tourism can vary depending on the natural area, the type and intensity of use and the sensitivity of species and habitats. Especially in sensitive natural areas, tourism use can quickly lead to **disturbances** or **conflicts** that can damage them both temporarily and permanently. *(cf. Ecological effects)* Thus, the high necessity of effective management of tourist flows in the Alps becomes more and more evident. The negative effects and conflicts caused by recreation and tourism can be avoided, minimised or reduced by different instruments.[1]

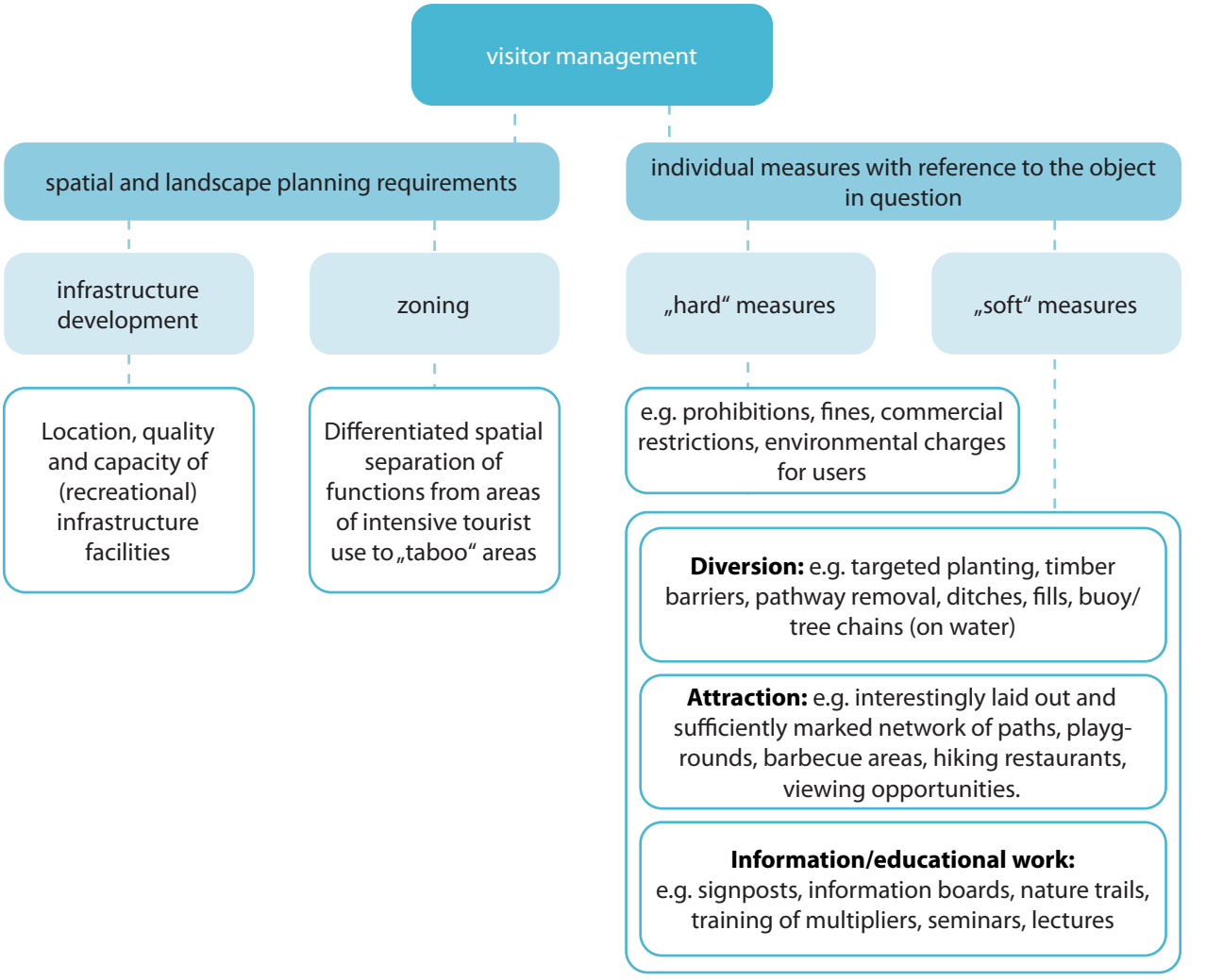
In **visitor monitoring,** the current status of visitors and visitor flows is recorded. These quantitativee and qualitative, spatial and standardised data form the basis for good management and the development of targeted measures. Relevant data for visitor monitoring include number of visitors, number of visits, visitor density, spatial and temporal distribution of visitors (where: attraction, vantage points, resting places, etc.; when: time of day, season).[1]

Methods of recording visitors are, for example:



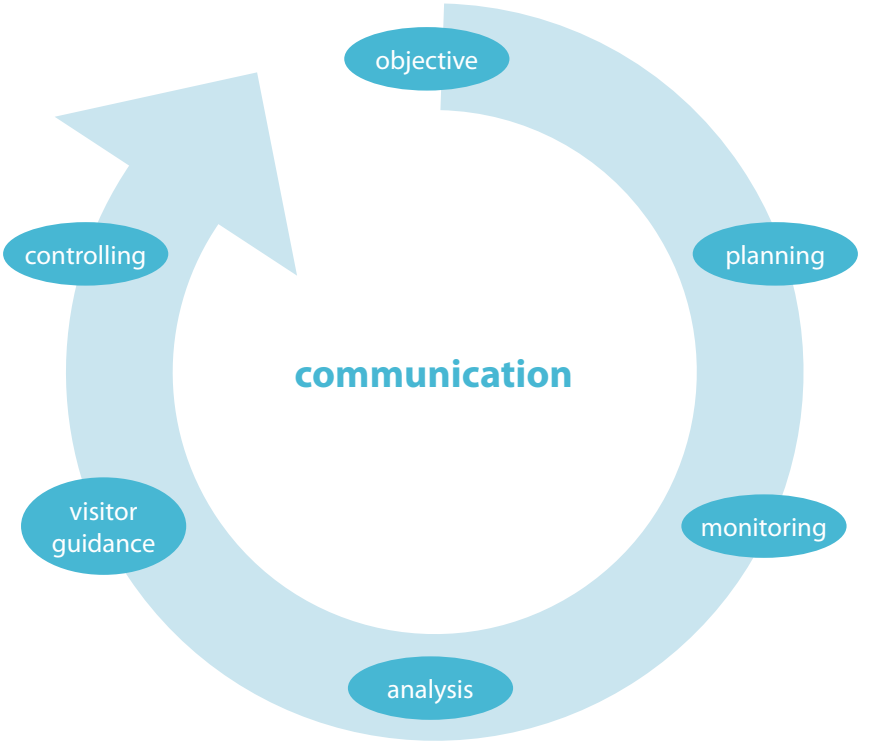
Visitor registration methods. Source: Own illustration based on Hennig (2013)

Visitor management includes measures to change the temporal, spatial or quantitativee distribution of visitors. The aim of visitor management is to avoid or reduce the impact on sensitive areas and negative influences on the local and regional population, infrastructure, economy and natural resources. This includes not only marketing activities, but also information and education work as well as infrastructure measures. These measures are often divided into direct and indirect or soft and hard measures.[1,2]



Systematic overview of strategies in visitor management.
Source: Rein and Schuler (2019)

Visitor management is a process that includes visitor monitoring and visitor guidance as sub-aspects. The two tools are also used in visitor management to minimise potential negative impacts of nature tourism on nature and landscape. At the same time, efforts are made to promote the positive impacts of these forms of tourism. The individual phases of the process are goal setting, planning, monitoring (visitor and nature area monitoring), analysis, visitor guidance and control. The focus, however, is on communication: Visitor management is complex and often conflictual, as many different interest and user groups are usually involved in the interaction between nature conservation and tourism. All-encompassing, transparent and fair communication is therefore a prerequisite for a stable basis of the visitor management process.[3]



The visitor management process.
Source: Dilzer (2017)

The Bavarian Centre for Tourism conducted an online survey on the **importance and measures of visitor guidance among Bavarian municipalities** that had significantly higher traffic volumes in 2020 than in 2019. While the number of day-trip visitors increased in all Bavarian regions in 2020, it was rated most problematic in Upper Bavaria. Reasons for the problematic rating were mainly visitor misbehaviour, parking and litter problems. Future control measures should primarily be in the area of traffic and parking guidance systems, in the area of infrastructure and path networks as well as in the area of rules of conduct.

project name: Bedeutung und Maßnahmen von Besucherlenkung in bayerischen Kommunen
project duration: 2021
project partner/implementation Bayerisches Zentrum für Tourismus

A survey of stakeholders from tourism associations, destination management, national and nature parks and tourism businesses that already implement visitor guidance measures revealed **positive effects of the guidance measures** for the year 2022. All actors were able to observe positive effects and also want to implement active guidance measures in the future. The focus of future guidance measures should be largely based on the further development of existing measures in order to generate maximum benefit for the region, the visitors and the local population. Nature-related management measures consisted mainly of informative measures to raise awareness. A decrease in violations of nature conservation regulations was observed in the areas concerned.[4]

Visitor research in national parks

Paper: Where did all the visitor research go? A systematic review of application areas in national parks

authors: Liandi Slabbert, Elizabeth Ann Du Preez
published: 2021
methodology: literature analysis
abstract link

The market research study **Naturerlebnis-Monitor Deutschland** (Nature Experience Monitor Germany) examines the travel behaviour of visitors (day and overnight guests) to natural landscapes in a differentiated manner. Within the framework of a nationwide online survey, data on the preparation of the trip, the awareness of natural landscapes, the activities carried out and the individual understanding of nature tourism and nature experience are analysed.

project name: Naturerlebnis-Monitor Deutschland
project duration: 2015–2016
project partner/implementation BTE Tourismus- und Regionalberatung, Verband Deutscher Nationalparke e. V., Europarc Deutschland e. V.

The model project **Besucherlenkung Alpen** (Visitor Guidance in the Alps) deals with visitor guidance in the Bavarian Alpine Space. It includes various measures such as the establishment of a new network of nature managers and management initiatives, further training for nature managers, new positions for area managers and the development of a „toolbox" for visitor management. The aim is to improve visitor management in the Bavarian Alps and to provide examples of best practice. Successful approaches can thus be transferred to other regions.

project name: Besucherlenkung Alpen
project duration: 2021–2024
project partner/implementation Bayerisches Staatsministerium für Umwelt und Verbraucherschutz

Education and awareness

In the Alpine region, education and sensitisation of tourists are particularly important, as the sensitive alpine ecosystems can be heavily burdened by tourism. *(cf. Ecological effects)* Many of these burdens are caused by ignorance or lack of awareness of the sometimes very specific alpine problems when certain rules are not observed.

Attitudes towards environmental protection measures in the Alps: case study in Friuli (IT)

Paper: Assessing environmental awareness towards protection of the Alps: a case study

authors: Ivana Bassi, Enrico Gori, Luca Iseppi
published: 2019
methodology: quantitative (survey)
abstract link

The role of local stakeholders and actors in tourism development in mountain areas

Paper: Tourism Development in Inner Mountain Areas – The Local Stakeholders' Point of View through a Mixed Method Approach

authors: Stefano Duglio, Alessandro Bonadonna, Marilisa Letey, Giovanni Peira, Laura Zavattaro, Giampeiro Lombardi
published: 2019
methodology: qualitative (Delphi-method)
abstract link

Impact of the sociable tourism strategy on visitors

Paper: Transforming the guest-host relationship: a convivial tourism approach

authors: Xinran Lehto, Dori Davari, Soona Park
published: 2020
methodology: literature analysis
abstract link

In the Tölzer Land, rangers are employed for informative visitor guidance measures. In addition to their educational work on the Isar and Walchensee, the **Isar rangers** monitor the development of flora and fauna. They also check that the park rules are being observed, as well as the ban on camping and overnight stays and the ban on fires. The rangers are authorised to record personal details and pass them on to the District Office, which can issue fines.

project name: Isar-Ranger
project duration: since 2018
project partner/implementation Landratsamt Bad Tölz-Wolfratshausen, Sachgebiet 35

The **GeHEIMATorte** campaign, initiated by Tourismus Oberbayern München e. V., aims to direct visitors to and through public transport. The aim - besides regaining trust in public transport after the Corona pandemic and relieving hotspots from car traffic - is to distribute and equalise the flow of visitors in Upper Bavaria. The associated website is intended to inspire visits to lesser-known places in and around Munich that are easily accessible by public transport.

project name: GeHEIMATorte
project duration: since 2021
project partner/implementation Tourismus Oberbayern München e. V., München Tourismus, Münchner Verkehrs- und Tarifverbund GmbH and Bayerische Eisenbahngesellschaft

The educational campaign **Servus auf der Alm** points out to visitors that they should behave considerately on the mountain pastures and in nature. The measures are cross-media and use different types of media such as brochures, video clips, social media and classic print products.

project name: Servus auf der Alm
project duration: since 2020
project partner/implementation Chiemsee Alpenland Tourismus, Urlaub auf dem Bauernhof Chiemsee-Wendelstein e. V.

Overcrowding and guest satisfaction in ski tourism

Paper: Exploring the crowding-satisfaction relationship of skiers: the role of social behavior and experiences

authors: Birgit Pikkemaat, Bernhard Fabian Bichler, Mike Peters
published: 2020
methodology: quantitative (survey)
abstract link

Impact of social media on visitor behaviour: case study in Berchtesgaden National Park (DE)

Paper: Visitor behaviour in Berchtesgaden National Park - Impact of social media (German)

authors: Nicola Moczek, Ulf Dworschak, Carolin Klar
published: 2019
methodology: quantitative (survey, media analysis)
abstract link

Wildlife-oriented visitor guidance in snow sports

Paper: Wildlife-oriented visitor guidance in snow sports - the „Respect Wildlife“ campaign and its evaluation (German)

authors: Marcel Hunziker, Eva Hubschmid, Reto Solèr
published: 2021
methodology: quantitative (survey)
abstract link

Relationships between national park affinity and attitudes towards protected area management: Case study in the Gesäuse National Park (AT)

Paper: Relationships between national-park affinity and attitudes towards protected area management of visitors to the Gesaeuse National Park, Austria

authors: Arne Arnberger, Renate Eder, Brigitte Allex, Petra Sterl, Robert C. Burns
published: 2012
methodology: quantitative (survey) and literature analysis
abstract link

Effects of communicative and on-site measures on the behaviour of winter sports enthusiasts in mountain protected areas: Case study in Switzerland

Paper: The effect of communicative and on-site measures on the behaviour of winter sports participants within protected mountain areas – results of a field experiment

authors: Ursula Immoos, Marcel Hunziker
published: 2015
methodology: quantitative (survey)
abstract link

Signage concepts

Signs not only guide people on alpine hiking trails, but also fulfill many other functions. A signage concept should **direct** people and prevent them from making possible **wrong decisions.** This is done by providing information on the signs - through direction (path signs, guidance systems), naming (for example road signs) as well as through background information relevant to the location (information boards on the history of a place, ecosystem, behaviour, etc.). When developing signage concepts, attention should be paid to orientation points, the comprehensible selection of search terms and an appealing and accessible design; in the case of information systems, the **target group** and the **way of addressing** (tonality) should also be taken into account.[5] *(cf. Prohibitions, rules, punishments - psychology in environmental protection)*

Information boards should be **placed in a clearly visible position,** taking into account different weather conditions, and offer sufficient space for viewing and lingering, while ensuring road safety. If the information board is to show different routes, then in addition to a general overview of the routes including the course of the route and a representation of the altitude profile, a detailed section with relevant information such as places to stop for refreshments and the like should also be available. On central orientation boards, the route network should also be shown in connection with the public transport network. The costs of maintenance should be taken into account in the planning; this includes the care and cleaning of the boards as well as possible regular replacement due to the effects of the weather or necessary updates.[5]

Factors and characteristics for the design of signage information.
Source: Own illustration based on You et al. (2016), Allgemeiner Deutscher Fahrrad-Club

- Avoid overloading with information (put up more boards if necessary).
- Check the possibility of using the information board on both sides (front and back).
- High degree of robustness, offer vandalism as few points of attack as possible
- Size and material should correspond to the location and be uniform in design. A portrait format of 1.30 m x 1.10 m is recommended for the printed surface of the information boards.
- Film: self-adhesive ultra-high performance film laminated with anti-graffiti laminate, UV-resistant, weatherproof, lightfast, minimum shelf life 7 years

Design guideline for information boards in Bavarian protected areas

There is a detailed design guideline for protected area information boards issued by the Bavarian Ministry of the Environment, which is binding throughout the state („Informationsmedien für Schutzgebiete in Bayern – Gestaltungsrichtlinie für Hinweistafeln"). This is intended to create a certain uniformity as well as a high recognition value. Although the pictograms and contents may only be used by protected areas without a licence, the guideline can certainly be useful as design inspiration and as a reminder of important aspects in the design of information boards.[6]

Effects of geometric shapes for cartographic representations

Paper: Why Shape Matters – On the Inherent Qualities of Geometric Shapes for Cartographic Representations

authors: Silvia Klettner
published: 2019
methodology: quantitative (content-analysis) and qualitative (Samples from content analysis, trials with test persons)
abstract link

Influence of signage on wayfinding

Paper: Information Theoretic Model to Simulate Agent-Signage Interaction for Wayfinding

authors: Rohit K., Dubey Tyler Thrash, Mubbasir Kapadia, Christoph Hoelscher, Victor R. Schinazi
published: 2021
methodology: quantitative (trials with test persons)
abstract link

Design of information interfaces

Paper: Designing Attentive Information Dashboards

authors: Peyman Toreini, Moritz Langner, Alexander Maedche, Stefan Morana, Tobias Vogel
published: 2022
methodology: quantitative (trials with persons)
abstract link

Identifying diversity and seasonality of visitors in mountain protected areas: Case study in Stołowe Mountains National Park (PL)

Paper: A method to analyze variability and seasonality the visitors in mountain national park in period 2017–2020 (Stołowe Mts. National Park; Poland)

authors: Rogowski Mateusz
published: 2021
methodology: quantitative (statistic data)
abstract link

Culturally oriented information design

Paper: Value of culturally oriented information design

authors: Sicheon You, Myung-suk Kim, Youn-kyung Lim
published: 2016
methodology: qualitative (interviews) and quantitative (survey)
abstract link

Digital visitor management

Digitalisation creates new conditions for interaction with the guest or the target group. The strongly technologically influenced change in society can also have a positive impact on rural structures and enable **faster** and **easier interaction with guests.** The main challenge in alpine rural areas is the varying quality of **network coverage,** which is often a prerequisite for a satisfactory user experience and thus for the success of digital or web-based products. Furthermore, **data protection** often makes potential users and actors hesitant. Reaching the right target group should also be ensured.[7]

In connection with digital visitor registration and digital visitor monitoring, a wide range of sensitive personal data is collected. Therefore, addressing the issue of **data protection** and the European Union's General Data Protection Regulation is becoming increasingly important in the tourism sector as well. The data protection issue in digital visitor management is not addressed by most of the following papers.

Using Big Data to monitor visitor influences: Case study in the Dolomites (IT)

Paper: Tourism Peaks on the Three Peaks. Using big data to monitor where, when and how many visitors impact the Dolomites UNESCO World Heritage Site

authors: Dario Bertocchi, Nicola Camatti, Jan van der Borg
published: 2021
methodology: quantitative (data evaluation)
abstract link

The digital model project **Die Legende vom Ruf des Berges** (The Legend of the Mountain's Call) networks various actors in the rural area of the Zugspitze region. The project uses a trans-media storytelling approach and makes use of the so-called Suddenlife Gaming technology: By means of an interactive story that is told via several media and links various attractions, users can travel through the Zugspitze region and also influence the plot of the story. After prior activation in an app, the Suddenlife Gaming technology connects with the users at the stations through sudden interactions (calls, SMS, web content) and poses smaller puzzles and tasks. In this way, users are immersed even more deeply in the attraction and are guided to other places or attractions through targeted tips, which is intended to increase the length of stay and thus also the added value.

project name: Die Legende vom Ruf des Berges
project duration: 2018
project partner/implementation Thadeus Roth (A.R.p. GmbH), Zugspitz Region GmbH

User-generated geographical information for visitor monitoring: Case study in Pallas-Yllästunturi National Park (FI)

Paper: User-Generated Geographic Information for Visitor Monitoring in a National Park: A Comparison of Social Media Data and Visitor Survey

authors: Vuokko Heikinheimo, Enrico Di Minin, Henrikki Tenkanen, Anna Hausmann, Joel Erkkonen, Tuuli Toivonen
published: 2017
methodology: quantitative (social media data, survey)
abstract link

The **Ausflugsticker Bayern** (Bavarian Excursion Ticker) is a digital solution for visitor guidance programmed especially for Bavaria and displays information on daily closures, occupancy rates, traffic jams, warnings and the like in Bavarian tourist destinations bundled on a map. In the future, it will also be possible to display forecasts. At the moment, local tourism professionals still have to enter the messages by hand; however, the ticker is to be supplemented with automated interfaces

for mobility, public transport and weather data. Tourist providers can integrate the excursion ticker on their website via widgets, so that users are shown relevant information in a targeted manner.

project name: Ausflugsticker Bayern
project duration: since 2020
project partner/implementation BAYERN TOURISMUS Marketing GmbH

Use of passive infrared cameras to measure activity on hiking trails

Paper: Field Test of a Passive Infrared Camera for Measuring Trail-Based Physical Activity

authors: Christiaan G. Abildso, Vaike Haas, Shay M. Daily, Thomas K. Bias
published: 2017
methodology: quantitative (image evaluation)
abstract link

Use of Public Participation Geographic Information Systems (PPGIS) to inform and manage conflicts on multi-purpose routes

Paper: Applying public participation GIS (PPGIS) to inform and manage visitor conflict along multi-use trails

authors: Isabelle D. Wolf, Greg Brown, Teresa Wohlfart
published: 2017
methodology: quantitative (GPS data)
abstract link

Creating visitation models using social media

Paper: Next-generation visitation models using social media to estimate recreation on public lands

authors: Spencer A. Wood, Samantha G. Winder, Emilia H. Lia, Eric M. White, Christian p. L. Crowley, Adam A. Milnor
published: 2020
methodology: quantitative (evaluation of social media data)
abstract link

With the help of the **Hidden Places** Instagram campaign, the Franconia Tourism Association directs the focus to lesser-known places, paths or activities in Franconia in order to guide visitor flows in a targeted manner. The campaign is a gentle steering measure and uses so-called nudging (subtly steering people in a certain direction without exerting pressure, coercion or economic incentives).

project name: Hidden Places
project duration: since 2020
project partner/implementation Tourismusverband Franken

Visitor monitoring with self-triggering cameras and automatic image processing

Paper: Comparing established visitor monitoring approaches with triggered trail camera images and machine learning based computer vision

authors: Jeroen Staab, Erica Udas, Marius Mayer, Hannes Taubenbock, Hubert Job
published: 2021
methodology: quantitative (automated analysis of photos)
abstract link

Usability of data from social media for visitor monitoring in protected areas

Paper: Instagram, Flickr, or Twitter: Assessing the usability of social media data for visitor monitoring in protected areas

authors: Henrikki Tenkanen, Enrico Di Minin, Vuokko Heikinheimo, Anna Hausmann, Marna Herbst, Liisa Kajala, Tuuli Toivonen
published: 2017
methodology: quantitative (statistic Data)
abstract link

Insights into visitor use in protected mining areas through crowd-sourced data

Paper: Using crowd-sourced photos to assess seasonal patterns of visitor use in mountain-protected areas

authors: Chelsey Walden-Schreiner, Sebastian Dario Rossi, Agustina Barros, Catherine Pickering, Yu-Fai Leung
published: 2018
methodology: quantitative (evaluation of social media data)
abstract link

Cost-effective and efficient data collection for visitor movement patterns using GPS data from smartphones

Paper: Smartphone GPS tracking – Inexpensive and efficient data collection on recreational movement

authors: Silviya Korpiloa, Tarmo Virtanena, Susanna Lehvävirta
published: 2017
methodology: qualitative (case study), quantitative (GPS data)
abstract link

Visitor counting and monitoring through camera traps: Case study from Bavaria

Paper: Visitor Counting and Monitoring in Forests Using Camera Traps: A Case Study from Bavaria (Southern Germany)

authors: Gerd Lupp, Valerie Kantelberg, Bernhard Förster, Carolina Honert, Johannes Naumann, Tim Markmann, Stephan Pauleit
published: 2021
methodology: quantitative (evaluation of images) and qualitative (random, more detailed evaluation of images).
abstract link

Standardised visitor monitoring in German protected areas

Paper: Establishing a standard for park visitation analyses: Insights from Germany

authors: Hubert Job, Lisa Majewski, Manuel Engelbauer, Sarah Bittlingmaie, Manuel Woltering
published: 2021
methodology: literature analysis
abstract link

Visitor monitoring in protected areas via smartphone app: case study from the Hoge Kempen National Park (BE)

Paper: Facilitating hikers' mobility in protected areas through smartphone app: a case of the Hoge Kempen National Park, Belgium

authors: Muhammad Shaker, Ansar-ul-Haque Yasar, Elke Hermans, Veerle Cops, Yves Vanrompay, Muhammad Adnan, Roeland Maes
published: 2021
methodology: quantitative (evaulation of app data)
abstract link

To avoid congestion and closures at tourist hotspots, a digital visitor management system is being developed in the **AI-based Recommender für nachhaltigen Tourismus** (AI-based Recommender for sustainable tourism, AIR) project. The aim of the project is to provide visitors with real-time recommendations for less frequented locations in the pilot regions. This is to avoid the temporary overloading of visitor destinations. To this end, research is being conducted on optimised data collection and processing as well as on the respective interfaces.

project name: AI-basierter Recommender für nachhaltigen Tourismus (AIR)
project duration: 2022–2025
project partner/implementation Hochschule für angewandte Wissenschaften Kempten, Institut für Nachhaltige und Innovative Tourismusentwicklung in Füssen (INIT) in Kooperation mit Füssen Tourismus und Marketing AöR, Institut für Tourismus- und Bäderforschung in Nordeuropa GmbH (NIT) (Verbundkoordinator), Outdooractive AG, Fachhochschule Westküste, Deutsches Institut für Tourismusforschung, Forschungs- und Entwicklungszentrum Fachhochschule Kiel GmbH, Nordsee-Tourismus-Service GmbH, Tourismus-Agentur Lübecker Bucht AöR, Wintersport-Arena Sauerland/Siegerland-Wittgenstein e. V. in Kooperation mit Sauerland Tourismus e. V., Ruhr Tourismus GmbH

In addition to conventional navigation, the **natur.digital** app offers a detailed filter function according to nature topics (for example, botany or birds). The route suggestions with map view can also be used offline and are supplemented by a comprehensive knowledge database for identifying plants, animals and habitats as well as news on regional highlights. In addition, exciting information is displayed in real time along the route, such as current visibility of plants and animals in the area. The app and website should be available from 2023.

project name: Natur.Digital
project duration: from 2023
project partner/implementation Bayerisches Staatsministerium für Umwelt und Verbraucherschutz

The **IBIS HOT** project develops the basis for a data-based analysis of hotspots and for planning measures to guide visitors. For this purpose, the project created a freely accessible database that lists and describes data or data sources for describing different hotspot situations and evaluates their significance.

project name: IBIS HOT – Intelligentes Besuchermanagement-Informationssystem für touristische Hotspots in Bayern
project duration: ab 2023
project partner/implementation dwif-Consulting GmbH, Ludwig-Maximilians-Universität München

The pilot project **Intelligentes Parkraummanagement** (Intelligent Parking Management) of the Oberstdorf Kleinwalsertal Bergbahnen (OK Bergbahnen) in the Allgäu region collects data on entries and exits at the car parks and makes it available on a platform that informs visitors about the current parking situation. Capacity changes (e.g. if parking spaces are cancelled due to excessive snow) must currently still be entered manually. In the future, it will also be possible to reserve parking spaces via the internet, and display boards on site will provide information about the currently available parking spaces. In the long term, the ambition is to integrate the current occupancy rate of the parking spaces when entering the destination in the navigation device.

project name: Intelligentes Parkraummanagement
project duration: since 2019
project partner/implementation Oberstdorf Kleinwalsertal Bergbahnen

Prohibitions, rules, punishments - psychology in environmental protection

The right of access to the great outdoors is a highly valued constitutional right, especially in the Bavarian Alps. Accordingly, access bans are **highly debated** as the ultima ratio of visitor control.

Many of today's environmental problems are of human origin. To address them, **more than technological progress** is needed. Technologies cannot create sustainable change on their own, but must be adopted and accepted by people. Although additional knowledge, for example through knowledge-conveying environmental protection measures, is a good prerequisite for behavioural change, it is not sufficient because human behaviour is influenced by many more factors. Therefore, in addition to knowledge transfer, other motivating factors must be included.[8]

Environmental and environmental protection psychology

Environmental psychology examines how people think, feel and act in their environment and the interactions between the two. Environmental psychology shows how environmentally protective behaviour can be measured, what characteristics precede behaviour and how it can be changed.[8]

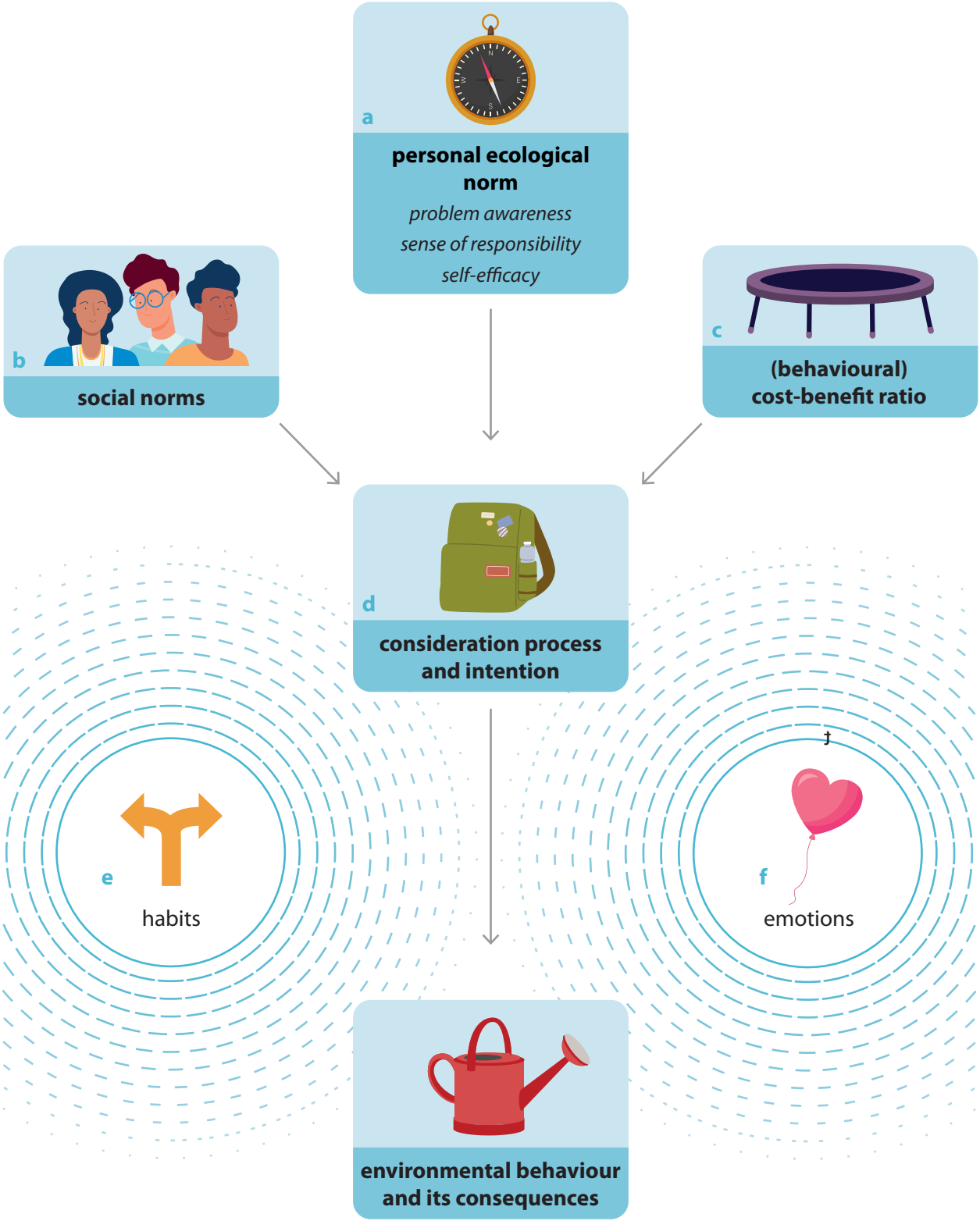
A person's **individual environmental protection behaviour** is influenced by various factors and components. First, different motivations - the personal ecological norm, influences from social norms and the (behavioural) cost-benefit ratio - are weighed against each other in a decision phase and an intention for environmental protection behaviour is obtained. The intention then influences the actual environmental protection behaviour. However, the latter is also influenced by individual habits and emotions. The other processes and motivations are also subject to their influence.

a The personal **ecological norm** is the perceived personal **commitment** to behave in an environmentally friendly way. It is activated by **problem awareness,** a **sense of responsibility** and **self-efficacy.**[8]

Problem awareness is promoted through knowledge transfer (information brochures, posters, lectures). A distinction can be made between problem knowledge (knowledge about problems) and action knowledge (knowledge about behaviour). Knowledge transfer alone does not create change, but it is an important basis. Conveying problem knowledge should therefore be combined with other strategies to promote motivation.[8]

Tips for imparting problem knowledge:

The target group should be attentive and feel involved. Information should be honest and presented in a pictorial and understandable way. Rumours should be addressed with a specific strategy: 1. state facts. 2. draw attention to the following incorrect information before each mention of the rumour. 3. present alternative explanation with reference to the rumour.[8]



Psychological model to explain sustainable action - supplemented by possible measures to promote environmental protection. Source: Hamann et al. (2016)

Tips for imparting action knowledge:

When imparting knowledge about action, relevance and usefulness for the environment and the person acting should be emphasised. Positive and negative examples facilitate the acquisition of knowledge and skills. When communicating action knowledge, simple behaviours should be suggested, prior knowledge should be used and transferability should be promoted. All information should be specifically tailored to the context of action.[8]

In order to strengthen the **sense of responsibility** in the long term, environmentally protective values should be imparted. Furthermore, self-awareness (matching behaviour with goals) and **cognitive dissonance** (identified differences between behaviour and goals) can be used to strengthen the sense of responsibility. Cognitive dissonance always entails either the alignment of values with behaviour or behaviour with values. Another strategy to strengthen the sense of responsibility is commitment (a declaration of intent to change one's behaviour). If one commits oneself to an action, it is more likely that it will be carried out, as the motivation comes from within.[8]

In the context of environmental protection, **self-efficacy** consists of the ability to behave in an environmentally protective manner and a perception of one's own competence („one's own behaviour makes a difference"). Collective self-efficacy („we as a group can achieve something") can have a stronger influence on environmentally protective behaviour than individual self-efficacy. Self-efficacy can be promoted by showing options for action and their effectiveness, as well as by training in competencies. It is important to offer information on the effectiveness of environmental protection behaviours so that action decisions can be made with effectiveness in mind. When training competencies, special attention should be paid to providing many experiences of success in order to maintain motivation. This can also be done through feedback on behaviour and changes in behaviour (for example, difference in energy consumption after a week of saving electricity); repeated feedback is particularly effective. Sustainable behaviours can also be made easy and enjoyable, while environmentally harmful actions can be made unpleasant or inconvenient. [8]

Tips for fostering the sense of responsibility:

Raising awareness of cognitive dissonance is, compared to feedback or reward, the most effective means of reinforcing pro-environmental behaviour. However, if ways to align behaviour with values are not found, behaviours may not be changed, but values may be redefined instead (for example, pro-environmental behaviour may be seen as less desirable), so raising awareness of cognitive dissonance should be used cautiously as a method. Self-commitments are particularly effective when they are advertised, public, voluntary and combined with information.[8]

b **Social norms** are rules and standards that are shared by many people and therefore guide the behaviour of individuals. They can be divided into **SHOULD** and **ACTUAL** norms. Should norms are moral rules that describe what should be done in a certain situation according to the opinion of others, i.e. what behaviour is accepted by the group. Actual norms, on the other hand, reflect actual (widespread) behaviour, i.e. what is observed in other people.[8]

In the environmental context, the should and should-not norms can often **contradict** each other (a common example is advocating for environmental protection while still taking holiday air trips), which is why their consideration and differentiation is important. Furthermore, in the environmental context, should and should-not norms should only be highlighted (for example, in information brochures or videos) when they advocate environmentally friendly behaviour. Otherwise, alternative favourable norms should be used. For example: „Many people take their trash home with them in the mountains - be one of them" instead of „Many people throw trash in nature - be none of them". If both the should and actual norms speak for environmental protection behaviour, both should be emphasised. Role model behaviour can also have an impact on social norms. Environmentally protective behaviour can therefore be promoted by other people (celebrities, influencers, people from one's personal circle) setting an example and making it visible. It is important that the address does not trigger a reaction (defiance). In addition to the influence of social majorities, minority opinions can also have an impact on individual environmental protection behaviour. Rejected proposals are often processed in silence and only show their effects later on.[8]

c Every decision is made by weighing positive and negative consequences. In general, this involves trying to keep **costs** (monetary costs and behavioural costs such as stress) low and maximise (**behavioural) benefits.**

Both **reward** and **punishment** have a powerful effect on behaviour. Actions can be rewarded by positive consequences or by the absence of negative consequences. Punishments occur through negative consequences or through the absence of positive consequences. In addition to reward and punishment, convenience also has an influence on behaviour, which is why environmental protection should be made as easy and pleasant as possible. It is also helpful to link already given interests and talents with environmental protection in order to create positive experiences in sustainable behaviours.[8]

Tips on reward and punishment

Reward is more effective than punishment because punishment does not provide a positive alternative course of action. Moreover, punishment encourages people to avoid it or to view those giving the punishment negatively. Since behaviours are only associated with an incentive if it is timely, rewards should be given in a timely manner. The reward or incentive should be appropriate and not too large so that the behaviour is repeated even if the reward is not given. Rewards are especially useful for one-time behaviour and less so for daily behaviour, as taking away the positive consequence is equivalent to punishment. Appeals to egoistic values (own benefit) should not be overemphasised and the benefit for nature and for other people should always be mentioned as well.[8]

After the end of festivals, which are often organised away from settlement areas and existing infrastructure networks, large accumulations of trash often remain. In addition to concepts for waste avoidance (free distribution of waste bags, waste drop-off stations in the grounds, rental tents) and cooperation with associations such as „Engel in den Straßen“ (Angels in the streets) or food sharing organisations to reuse the items left behind, rewards are also used to tackle the waste problem: At many festivals (such as „Fusion“), a trash deposit is included in the ticket price, which is paid out on departure in exchange for handing in a trash bag. The heavy metal festival Wacken also gives away top-class prizes among those who post a picture of their clean time spot on Instagram under the hashtag #greenwacken upon departure.

project name: Müllpfand Wacken / #greenwacken
project duration: since 2006 / since 2019
Projektpartner: WOA Festival GmbH

d In the **consideration process,** costs and benefits are weighed against each other and influenced by personal ecological norms as well as social norms. Expectations about the probabilities of certain advantages and disadvantages also play a major role in the consideration process. The consideration process then results in an **intention.** This is closely linked to the consideration process, but comes before action: It is the intention for a certain behaviour. However, the intention is not automatically actually implemented, but often fails due to barriers. Especially in environmental protection, many measures are not thought beyond the intention and neglect the actual behaviour.[8]

Small environmental behavioural measures can serve as door openers for greater commitment **(spill-over effect).** Nevertheless, it is important to focus on behaviours with a large environmental impact, as the effect of smaller environmental protection measures can easily be reversed **(rebound effect,** for example reinvesting saved energy in a second television). What is important for environmental communication is above all the **durability** of the effect and the **external impact** of the behaviour.[8]

Tips to aid the consideration process

Conscious reflection on the different aspects of the consideration process (for example by presenting advantages and disadvantages in a brochure) can contribute to the decision for the environmentally protective behaviour. However, as it does not automatically lead to the environmentally protective action, reflection should always be combined with further measures.[8]

Tips for implementing intentions

A concrete goal facilitates the implementation of behavioural intentions. Progress can be compared with this fixed point. Goal setting is most effective when the goals are high and at the same time realistic and can be achieved in a short time. Large goals should therefore be divided into sub-goals.

Prompts (small reminders, for example stickers) help to implement an environmental intention by reminding with a small message at the right moment. They point out a behaviour without providing further information. They are particularly effective if they are close in time and space, polite, unambiguous as well as easy to carry out and refer to the desired behaviour.[8]

e More than half of human behaviour is **habit.** Habits are behavioural scripts that have been internalised for many years and are linked to certain situations. They can have a direct or indirect **influence on environmental protection behaviour** in many places. For example, they can facilitate or impede the activation of norms. Habits also increase behavioural costs: unfamiliar behaviours are more uncomfortable than habitual ones because they cost energy and mental effort. Habits are often implemented unconsciously or without careful thought. Methods that help in changing habits include implementation intentions, prompts or changing the action situation for a short period of time (for example, free tickets for public transport). After this period, it is more likely that the action will be carried out more often and thus the original habit will change.[8]

f **Emotions** can have **both advantages and disadvantages** for environmental protection behaviour. Emotions that are felt **during or shortly after the action** are particularly relevant. Anticipated emotions occur even before the action and can influence the decision for the behaviour. If it is assumed that an action will trigger a positive or a negative emotion, this will also have an effect on the action of the individual. [8]

Social support and recognition trigger positive feelings and are related to belonging to a social group. Food, drink and humour also trigger a positive mood. Positive stories from environmental protection motivate - the more the characters and the situation from the story resemble one's own, the more empathy a person feels. However, positive emotions can often be distracting when the actual task at hand is not very engaging, and make people more likely to resort to social stereotypes. [8]

Negative situations, as they often occur in environmental protection, usually also trigger personal negative emotions. Negative emotions can lead to a focus on the problem and a narrowing of attention (for example, anger often plays an important role in political activism). While negative emotions help to raise awareness of the scale and significance of previously unknown conflicts, they have a frightening effect on familiar problems and trigger feelings of helplessness. For example, according to the current SINUS study, the majority of young people in Germany suffer from climate anxiety (the fear of ecological doom). Around half of the young women surveyed hesitate to have children for this reason.[9] Incidentally, climate anxiety is not classified as a mental illness, but as a natural reaction to a real threat.[10] However, strategies aimed at evoking fears have proven ineffective in many areas. Both positive and negative emotions have a contagious effect.[8]

Emotion-oriented coping strategies

Many people react to accusations or frightening information seemingly apathetically or with indifference. This effect is based on various strategies to avoid stress, pain or hopeless situations. These include:

Reinterpretation of the problem situation

Denial, relativisation and search for counterarguments; distortion of reality; denial of guilt; social comparisons

Selective attention

Avoidance of exposing oneself to negative feelings; focusing on the present (blocking out the future); concentrating attention on small, positive things

Justification

While such coping strategies lead to a reduction in negative emotions, most on the other hand also increase the probability of environmentally harmful behaviour and prevent other behaviour.[8]

Guidance strategies

In the Alps, a balance between nature conservation and recreational use can be achieved through visitor guidance. However, not all measures that have positive effects on nature also have positive aspects for recreational use or the tourism economy, and vice versa. Thus, a **perfect balance** between the interests and demands is usually **not possible,** which is why it must be weighed up in advance whether recreational use or nature conservation requirements have priority for the respective area, and then the appropriate **management or guidance strategy** must be selected.[1] Traffic measures and strategies can also be used as steering strategies. *(cf. Infrastructure effects and traffic)*

Nature conservation and nature-based tourism: a paradox?

Paper: Nature Conservation and Nature-Based Tourism: A Paradox?

authors: Isabelle D. Wolf, David B. Croft, Ronda J. Green
published: 2019
methodology: literature analysis
abstract link

Nowadays, outdoor sports activities such as hiking or ski tours are often planned via online platforms such as Komoot or Outdooractive. When planning these tours, visitors are often not aware that their tour runs through protected areas or quiet zones. This can have dramatic consequences, especially in winter, when wild animals are awakened during hibernation and lose valuable energy, which can lead to death. The **Digital Ranger** research project is concerned with how those platforms can contribute to avoiding the negative effects. Therefore, the project focuses on the technical implementation of the automatic integration of protected areas into route planning and the interaction with users during route planning on the online platforms. In this way, users can be informed about the areas during route planning, and if necessary, routes through the affected areas will no longer be planned. The project areas are the Nagelfluhkette and Fichtelgebirge nature parks in Bavaria.

project name: Digital Ranger
project duration: since 2022
project partner/implementation Universität Bayreuth, Hochschule für angewandte Wissenschaften Kempten, Digitize the Planet e. V., Naturpark Nagelfluhkette, Naturpark Fichtelgebirge

Linking visitors' spatial preferences with sustainable visitor management: case study in Rondane National Park (NO)

Paper: Linking visitors' spatial preferences to sustainable visitor management in a Norwegian national park

authors: Sofie Kjendlie Selvaag, Øystein Aas, Vegard Gundersen
published: 2020
methodology: quantitative (survey) and literature analysis
abstract link

Marketing, Congestion and Demarketing: Case Study in the National Parks of Utah (US)

Paper: Marketing, congestion, and demarketing in Utah's National Parks

authors: Tatiana Drugova, Man- Keun Kim, Paul M Jakus
published: 2020
methodology: qualitative (evaluation of statistic data)
abstract link

Since the filming of a TV series and the snowballing awareness via social media, the South Tyrolean mountain lake Pragser Wildsee has become very crowded; on peak days, up to 7,000 cars were counted on the access road and more than 17,000 visitors to the lake. In order to alleviate the situation, access by private car was closed in the period from 10 July to 10 September 2022 (peak season) and the lake was only accessible by public transport, on foot, by bicycle or on presentation of a parking reservation or transit permit (online booking, deposit of €20). Parking prices have also been increased. After the end of the main season 2022, responsible persons drew a positive balance from the measures. A bed freeze - a limitation of overnight accommodation - is also planned in South Tyrol; by 2023, all overnight accommodation (including Airbnb, extra beds, etc.) is to be identified in a first step.

project name: Pragser Wildsee
project duration: since 2022
project partner/implementation Land of South Tyrol

Perceived image of destinations: Case study in Oberstdorf (DE) and Saalbach-Hinterglemm (AT)

Paper: Perceived Destination Image: An Image Model for a Winter Sports Destination and Its Effect on Intention to Revisit

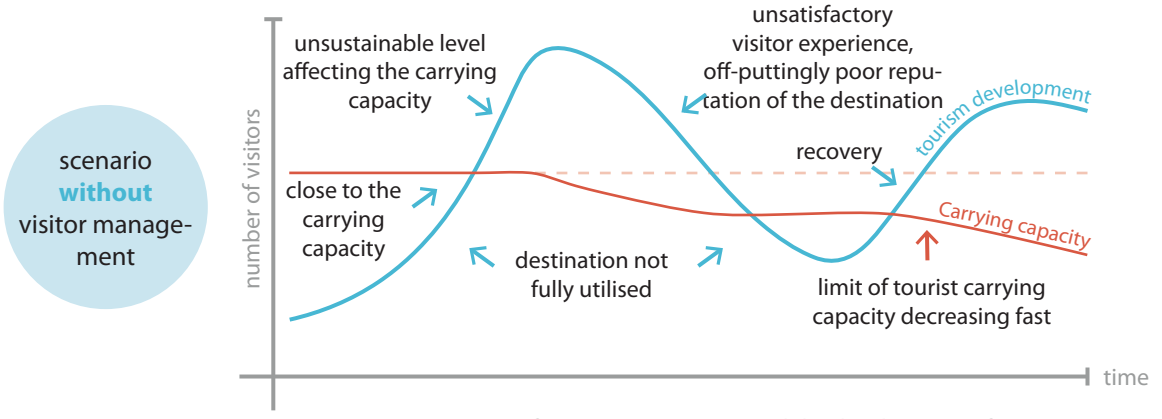
authors: Kirstin Hallmann, Anita Zehrer, Sabine Müller
published: 2013
methodology: quantitative (survey)
abstract link

Reconceptualising tourism carrying capacity: modelling and managing destinations

Paper: Tourism carrying capacity reconceptualization: Modelling and management of destinations

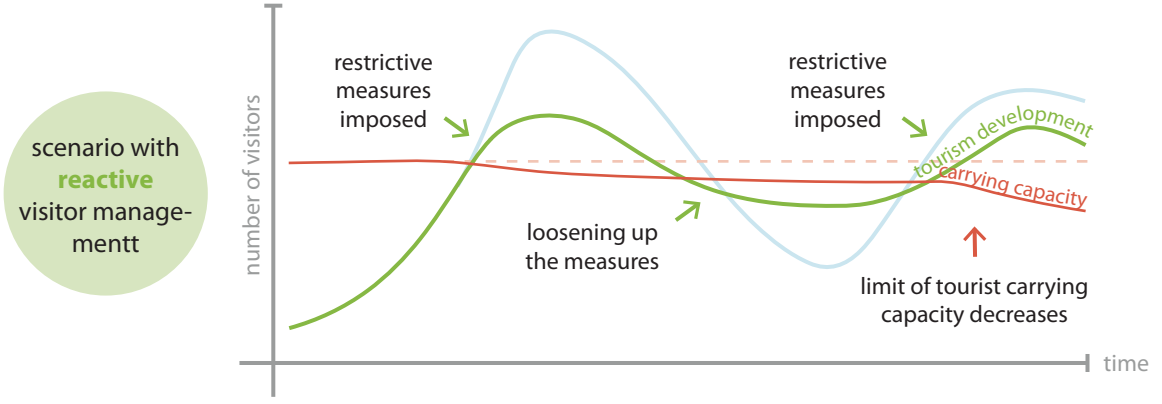
authors: Martina Pásková, Geoffrey Wall, David Zejda, Josef Zelenka
published: 2021
methodology: quantitative (data evaluation)
abstract link

The **influences of visitor management** on tourism development (no visitor management, reactive visitor management, proactive visitor management) differ greatly:



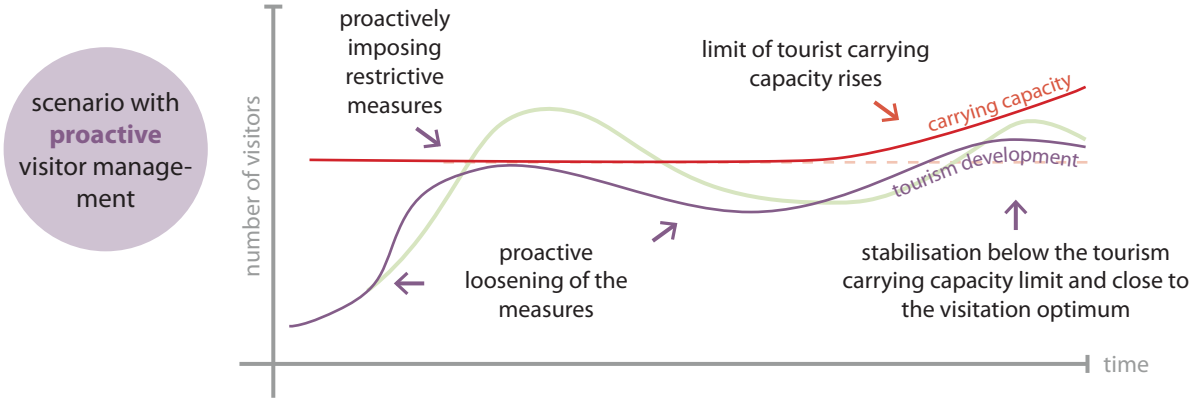
Scenarios of visitor management and the development of tourism carrying capacity without visitor management. Source: Pásková et al. (2021)

At the beginning of the tourism development of a destination, there are only a few visitors and the tourism potential is not sufficiently activated. Over time, however, the number of visitors gradually increases and exceeds the tourism carrying capacity. This has a negative impact on the local nature as well as on the direct benefits for the visitors (erosion, species composition, condition of ecosystems, quality of visitor experiences, social acceptance of tourism). This leads to a decrease in visitor interest and thus to a level of use below the tourism carrying capacity limit, which decreases due to the negative impacts mentioned above, and the scenario repeats itself.[11]



Scenarios of visitor management and the development of tourism carrying capacity with reactive visitor management. Source: Pásková et al. (2021)

If restrictive visitor management measures are implemented in the same scenario, tourism development fluctuates less and has a lower impact. Since the measures only react to one situation, irreversible effects that have a negative long-term impact on tourism carrying capacity can still occur. The carrying capacity limit therefore decreases, but more slowly than in the first scenario. The scenario repeats.[11]



Scenarios of visitor management and the development of tourism carrying capacity with proactive visitor management. Source: Pásková et al. (2021)

Tourist use of the area is stimulated and regulated by loose measures to reach the optimum level of visitation and subsequently maintain it at the desired level through a combination of proactive and reactive measures. The increased spatial and temporal dispersion of tourism flows through the measures, together with other visitor management tools, leads to an increase in the tourism carrying capacity of the destination.[11]

A **prerequisite** for proactive visitor management is an **accurate knowledge** of the destination, its processes, the key variables over time and availability, and instruments that can influence visitor flows and intensity of use. Since most of the time not all of these criteria are fulfilled, proactive visitor management is not implemented on a larger scale despite the well-documented benefits.[11]

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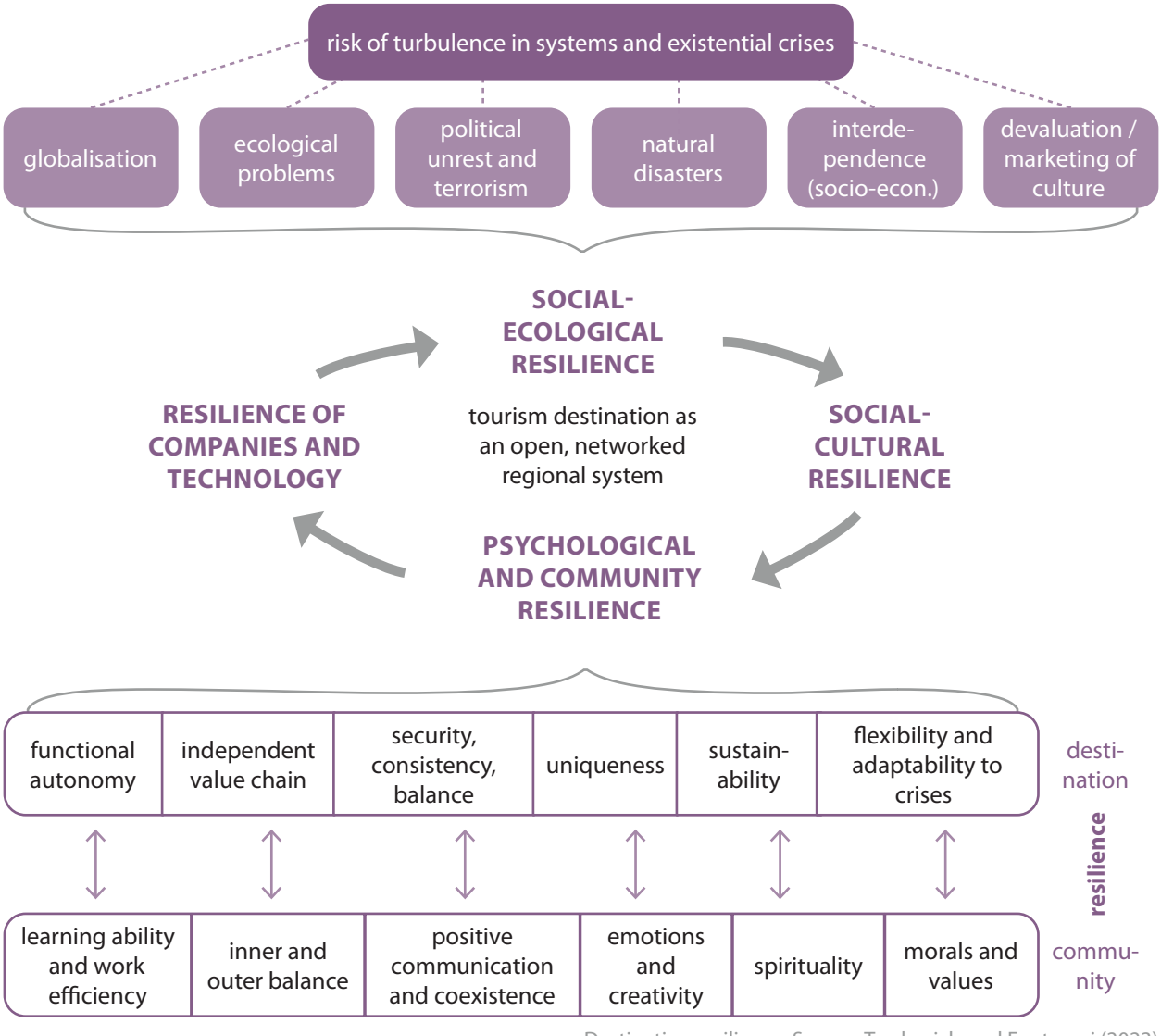
Tourism resilience

Tourism resilience

Tourism destinations (also) in the Alps are complex systems composed of several stakeholders and actors with different connections to each other and from different infrastructural, social and natural levels. *(cf. Tourism forms, Tourism effects)*

As a complex system, the tourism destination is exposed to a variety of **stressors** and **shocks** (crises) that can affect it differently in time and space. **Resilience** describes how resistant a destination is to this. Resilience is thus the ability of a destination to absorb and overcome shocks and disruptions in the face of uncertain knowledge through **ongoing adaptation, learning and self-renewal measures.** The term resilience is firmly linked to multidisciplinarity and is often defined as **resistance to crisis.** Resilience is thus the result of an interactive process of adaptation. Within tourism, resilience can take many forms and shapes. Resilience complements the concept of sustainability with regional crisis resilience.[1,2,3]

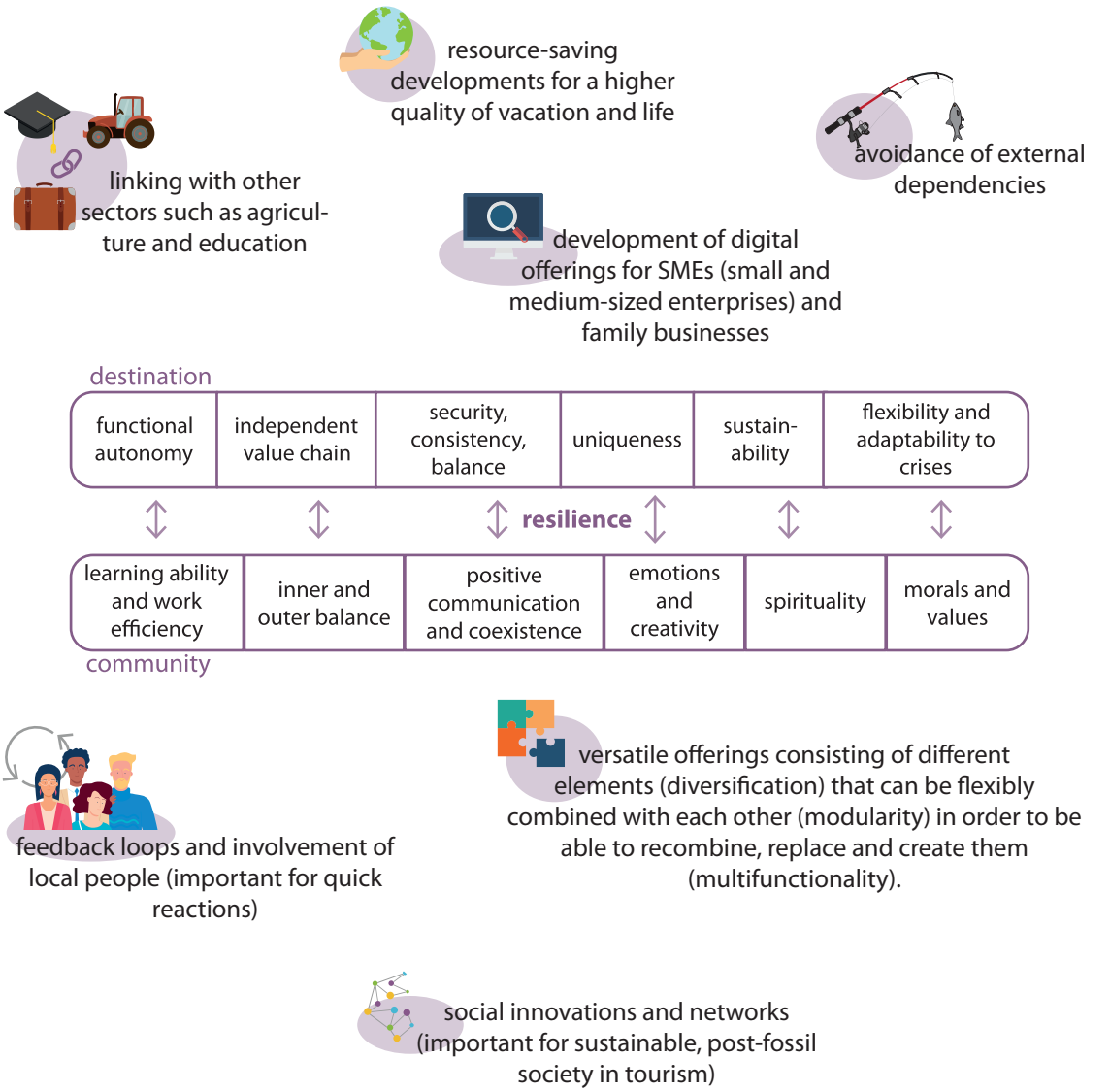


Destination resilience. Source: Traskevich und Fontanari (2023)

By deriving measures from resilience concepts, destinations can strengthen their ability to function during a crisis, mitigate critical situations and risks that have arisen due to the crisis, and transfer the findings to the entire development of the destination. In this way, they emerge stronger overall from a crisis.

Alpine tourism is constantly subject to global influences that have both positive and negative impacts. Therefore, when considering the resilience of tourism in the **Alpine Space,** one has to deal with the negative impacts that affect the Alps. Among a multitude of problems *(cf. Tourism effects, Tourism Guidance),* **climate change** (including biodiversity crisis) and **demographic change** stand out as long-term (and currently known) stressors. The **Corona pandemic,** whose impact in 2020 as a short-term and (from the tourism industry's point of view) unforeseeable external shock shut down global tourism, also developed as a longer-term stressor. External shocks can be divided into natural hazards (e.g. landslides, avalanches and floods), anthropogenic hazards (such as terrorist attacks or political unrest) and technical hazards (e.g. disasters caused by nuclear power plants).[4]

Measures for a more resilient tourism can be, for example:



Measures for a more resilient tourism. Source: Own illustration based on Euregio Inntal – Chiemsee – Kaisergebirge – Mangfalltal e. V. (2021), Traskevich und Fontanari (2023)

Two resilience approaches for protected mountain regions

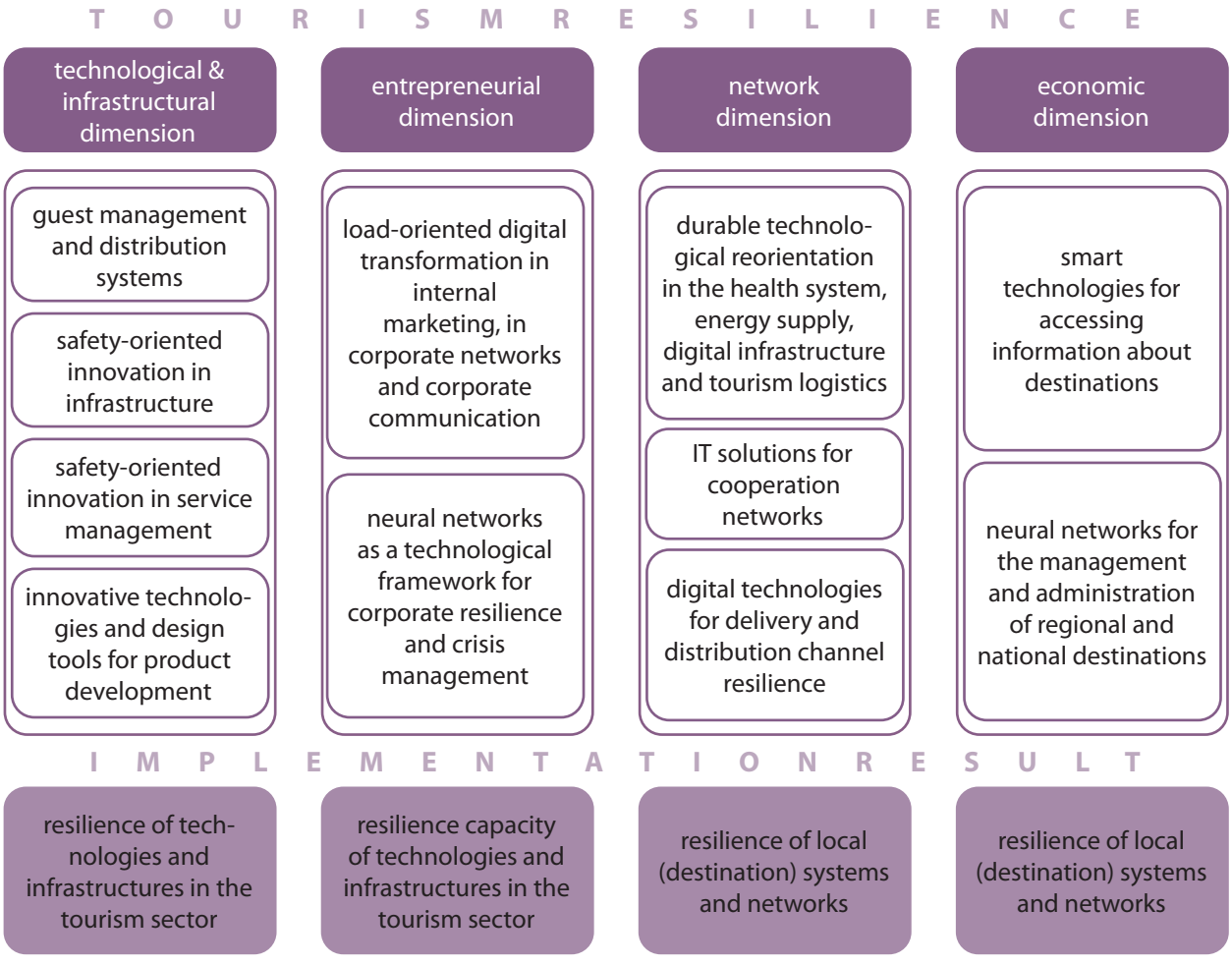
Paper: Two perspectives – one goal: resilience research in protected mountain regions

authors: Lisa Huber, Eva Posch, Rainer Bell, Karl Michael Höferl, Robert Steiger, Rike Stotten, Erich Tasser, Georg Leitinger
published: 2021
methodology: qualitative (case studies)
abstract link

Resilience for dealing with overtourism and with the post-Covid-19 era

Paper: Smart-Solutions for Handling Overtourism and Developing Destination Resilience for the Post-Covid-19 Era

authors: Martin Fontanari, Anastasia Traskevich
published: 2022
methodology: qualitative (expert interviews, Delphi-method)
abstract link



Smart technologies for resilient tourism development.
Source: Fontanari und Traskevich (2022)

Closure of ski resorts and opportunities for sustainability in North America

Paper: Ski Resort Closures and Opportunities for Sustainability in North America

authors: Daniel Moscovici
published: 2022
methodology: quantitative (data analysis)
abstract link

Closed ski resorts in the Alps

Many ski areas in the Alps have been closed or partially closed since the 1990s; in the Bavarian Alps there are 29 areas. Between Berchtesgaden and Lake Constance, an additional 25 or so T-bar lifts have been dismantled due to lack of snow. The term Lost Ski Area Projects (LSAP) has become established for this phenomenon. The main reason for the closure is climate change: it is causing a decline in snow cover throughout the Alps. The lack of snow has increased particularly strongly below 1,300 m altitude, which hits low-lying areas hard. But also the declining interest in alpine winter sports and problems with profitability are reasons for closures. The latter in particular was exacerbated by the Corona crisis and corresponding restrictions on winter sports. Even though there are some ski resorts that are still profitable, alpine winter sports are in a crisis that is only accelerated by cut-throat competition among municipalities.

As an alternative, many municipalities rely on cross-country skiing offers or switch to summer tourism by expanding cultural, art, music and hiking offers.[5]

Social-ecological resilience in remote mountain communities

Paper: Social-ecological resilience in remote mountain communities: toward a novel framework for an interdisciplinary investigation

authors: Rike Stotten, Lisa Ambrosi, Erich Tasser, Georg Leitinger
published: 2021
methodology: qualitative (interviews) and quantitative (survey)
abstract link

Lock-ins and community resilience: Two contrasting development paths in the Austrian Alps

Paper: Lock-ins and community resilience: Two contrasting development pathways in the Austrian Alps

authors: Rike Stotten, Markus Schermer, Geoff A. Wilson
published: 2021
methodology: literature analysis, quantitative (data analysis) and qualitative (interviews)
abstract link

Digitalisation, agility and customer benefit in tourism

Paper: Digitalization, agility, and customer value in tourism

authors: Elias Hadjielias, Michael Christofi, Prokopis Christou, Maria Hadjielia Drotarova
published: 2022
methodology: qualitative (interviews)
abstract link

Territorial capabilities as resilience factors in the Maurienne Valley (FR)

Paper: Analyzing the vulnerabilities and capabilities of wealth creation activities in the Maurienne valley in the French Alps

authors: Michela Bevione, Jean-Yves Courtonne, Nicolas Buclet, Pierre-Yves Longaretti, Quentin Desvaux
published: 2022
methodology: qualitative (interviews) and quantitative (report evaluation)
abstract link

Shared responsibility and understanding resilience from a DMO perspective - a Bavarian analysis

Paper: Joint responsibility and understanding of resilience from a DMO perspective – an analysis of different situations in Bavarian tourism destinations

authors: Harald Pechlaner, Daniel Zacher, Christian Eckert, Lukas Petersik
published: 2019
methodology: qualitative (interviews)
abstract link

Resilience-building travel

Paper: Resilient travel as a new paradigm?(German)

authors: Harald Pechlaner, Daniel Zacher
published: 2019
methodology: literature analysis
abstract link

Resilience and vulnerability of remote Alpine communities: case study in Vent (AT)

Paper: The resilience and vulnerability of remote mountain communities: the case of Vent, Austrian Alps

authors: Geoff A. Wilson, Markus Schermer, Rike Stotten
published: 2018
methodology: qualitative (interviews)
abstract link

The role of tourism in community resilience

Paper: Does tourism matter in measuring community resilience?

authors: Eunjung Yang, Jinwon Kimb, Lori Pennington-Gray, Kevin Ash
published: 2021
methodology: literature analysis and quantitative (statistical data)
abstract link

Culture-based practices as a driver of local development processes in mountain areas: case study in the province of Cuneo (IT)

Paper: Culture-Based Practices as Driver of Local Development Processes in Mountain Areas – Evidence from the Alpine Region of the Province of Cuneo (Italy)

authors: Maria Anna Bertolino, Federica Corrado
published: 2022
methodology: qualitative (case study)
abstract link

Does socio-economic diversification improve the multifunctionality of mountain landscapes?

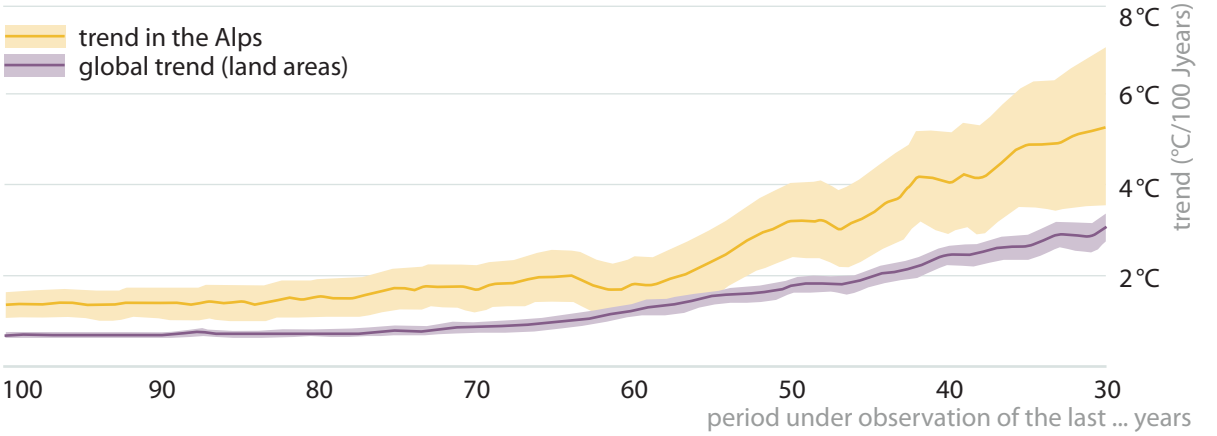
Paper: Does socioeconomic diversification enhance multifunctionality of mountain landscapes?

authors: Lisa Huber, Uta Schirpke, Thomas Marsoner, Erich Tasser, Georg Leitinger
published: 2020
methodology: quantitative (data analysis)
abstract link

Climate change

In the last two hundred years, i.e. since industrialisation, the concentration of greenhouse gases (carbon dioxide, methane and others) in the atmosphere has increased significantly due to human activities (burning of fossil fuels, deforestation, etc.). As a result, the global mean temperature has risen significantly; by 0.85 °C in the period from 1880 to 2012 **(greenhouse effect).** Besides temperature, other effects of man-made **climate change** are long-term changes in precipitation and ocean currents. This has far-reaching consequences for all ecosystems. The Intergovernmental Panel on Climate Change (IPCC) assumes that with an average global increase of 1.5 °C, around 20 to 30 percent of all species will become extinct.[6]

High mountain regions like the Alps react very sensitively to changes in temperature and climate. This is why they are often seen as an **early warning system for climate and environmental changes.** This is due to the many different climate zones and ecosystems, which are stacked on top of each other, so to speak, in a steep topography in the Alps - in the lowlands, comparable climate gradients extend over thousands of kilometres. While the air temperature has risen by an average of 0.85 °C worldwide during the last 150 years, as described above, the rise in the Alps was almost 2 °C. The warming of the air temperature in the Alps is thus clearly **above the global trend.** In technical terms, this is referred to as *elevation-dependent warming*.[6,7] Over the past century, the factor by which the Alps are warming more than the rest of the land masses has actually increased.



Temperature differences in warming.
Source: Marzeion (2011–2012)

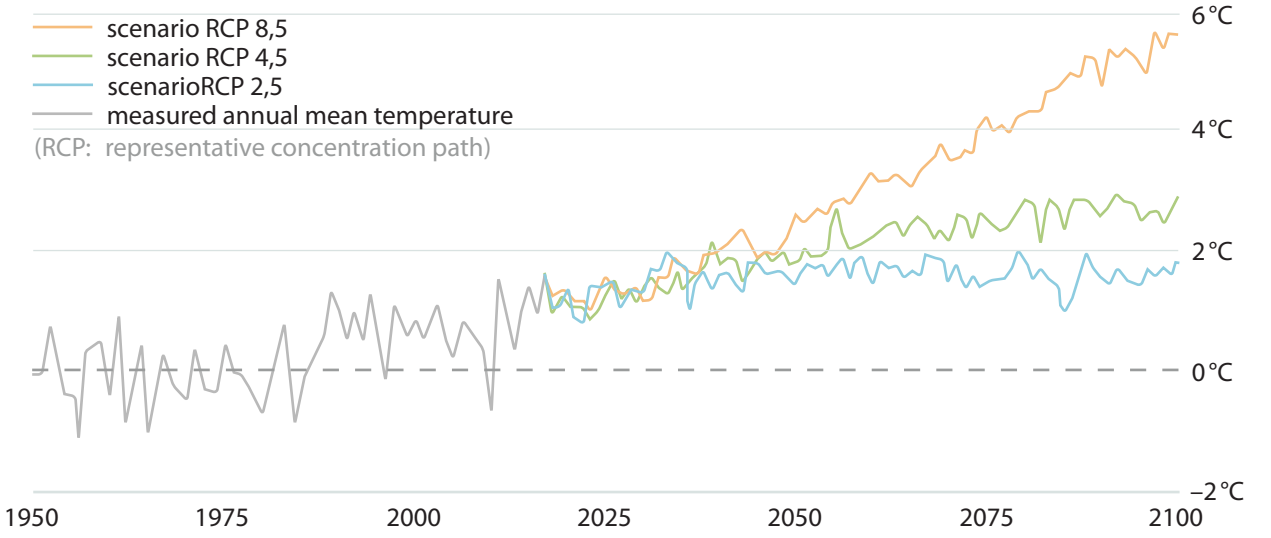
Why is the temperature in the Alps rising faster than the global trend?

Why the warming in the Alps is systematically stronger than the global average has not been conclusively clarified. Several possible causes - or combinations or interactions of several possible causes - come into question:

1. Due to changes in atmospheric movements, more warm air flows into the Alpine region, either temporarily or permanently.
2. An increase in precipitation and/or cloud formation brings more moisture into the Alpine region, which releases energy (heat) when it condenses.
3. Due to a higher water content in the atmosphere (either gaseous or condensed), less infrared radiation penetrates upwards through the atmosphere and the heat is „trapped" in the Alpine region.
4. Decreasing snow cover and ice surfaces expose more dark ground and less radiation is reflected while more is absorbed (albedo effect); the deposition of dust and soot on surfaces at high altitudes, which darken them, further increases the albedo effect. In addition, due to a lower cloud cover in the atmosphere, less radiation is already reflected here and more radiation can penetrate through it and reach the earth's surface.
5. Changes in the air layers of warm and cold air or the warming of the lower air layers with simultaneous cooling of the upper air layers lead to higher temperatures near the ground.

It is currently assumed that mainly the effects of the albedo effect (point 4) are responsible for the warming in the Alps and that due to a shorter snow season in spring and early summer less solar radiation is reflected and thus more heat is released. In addition, frequent high-pressure conditions have reduced cloud cover in the Alps, resulting in more hours of sunshine and higher temperatures. In other mountain regions, a connection with aerosol pollution at low altitudes has also been established. This reduces the warming at low altitudes and increases the difference between the warming rates at low and high altitudes.[8,9]

On the basis of different climate models, science is developing various **climate scenarios,** which in turn describe different development paths for humanity up to the year 2100. Up to 2050, the different forecasts behave similarly because the climate reacts with a delay. So it is almost certain today that the **glaciers** in the Alps will lose half their volume in the next 30 years. However, the development thereafter can still be influenced now. The most optimistic scenario, which assumes full implementation of the Paris climate goals adopted in 2015, stagnates at a warming of 2 to 3 °C in the Alps, while the most pessimistic forecasts a warming of the air temperature in the Alps by 6 °C.[10]



Temperature projections in the Alps compared to the 1961-1990 global annual mean, in 2017.
Source: Zekollari et al. (2019)

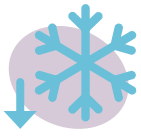
However, these figures are from the year 2020. In March 2023, the **IPCC** presented its latest synthesis report on global warming. In it, the 1.5°C target is considered **unlikely** to be reached and a limit of 2°C is also considered **difficult** to achieve.[11] This also influences the different scenarios regarding the warming of the Alps.

Impacts of climate change in the Alps are:

Summer decrease and winter increase in precipitation; higher fluctuations in both temperature and precipitation. As a result, increasing risk of extreme weather events.

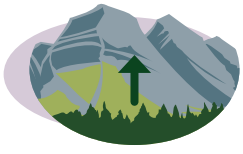
More debris and rubble fields are created - this means higher risk of rockfall, increased mudslides, unstable mountain slopes and landslides due to the retreat of glaciers

Thawing of the permafrost: The ground, which is frozen all year round in significant parts of the High Alps, warms up. This leads to unstable slopes, increased rockfalls and more rockfall; foundations sink down.



Change in snow cover and snow depth: decrease in ice and frost days; stronger increase in winter temperature than summer temperature; more rain than snowfall, higher snow line, fewer days with closed snow cover

Change in the water balance: Earlier snowmelt, shift of maximum water runoff from spring to winter, lack of water supply for the valleys due to glacial meltwater in summer



Change in vegetation zones:
Fewer high alpine vegetation zones, shift of zones upwards, increase in tree line, more mixed forests at lower altitudes.

Impacts of climate change in the Alps.
Source: Own illustration based on Weber and Köcher (2020)

Weather and climate are significant factors influencing tourism. Accordingly, in addition to its general impact on life in the Alps, climate change also has a major **influence on tourism.** In order to react to climate change, measures can be taken on the one hand to limit climate-damaging influences of tourism **(climate protection)** and on the other hand to make adjustments to the consequences of climate change - in tourism mainly the reorientation of the tourist offer **(climate change adaptation).** The increase in hot days (at least 30 °C), heavy precipitation and flooding, drought and low water, forest dieback and drought damage are consequences of climate change whose effects also affect tourism..[12]

The **Climate Action Plan 2.0** of the Alpine Convention Contracting States continues and fundamentally renews the proposals of the Action Plan on Climate Change in the Alps of the 10th Alpine Conference in 2009. Updated in 2020, the plan includes specific measures to implement the Alpine Climate Targets 2050 in ten sectors. The specific sectors are: Transport, Energy, Tourism, Natural Hazards, Water, Spatial Planning, Soil, Mountain Agriculture, Mountain Forests, and Ecosystems and Biodiversity. The Climate Action Plan 2.0 focuses on the next five to ten years (medium-term time horizon) and includes detailed implementation pathways that are about to be launched or can be launched within the next one to two years and further developed until 2030. With the provision of the implementation paths, the goals of the strategy „Alpine Climate Targets 2050" should be operationalised. Three goals have been set for tourism: car-free, attractive tourism transport; sustainable diversification of Alpine tourism; minimisation of the ecological footprint of the Alpine hotel and catering industry.

project name: Klimaaktionsplan 2.0
project duration: 2019–2020
project partners/implementation: Alpine Climate Council, Alpine Convention

Overview of the impacts of climate change on mountain tourism

Paper: Impacts of climate change on mountain tourism: a review

authors: Robert Steiger, Natalie Knowles, Katharina Pöll, Michelle Rutty
published: 2022
methodology: literature analysis
abstract link

Interactions between the effects of nature-based recreation and climate change

Paper: Understanding and managing the interactions of impacts from nature-based recreation and climate change

authors: Christopher A. Monz, Kevin J. Gutzwiller, Vera Helene Hausner, Mark W. Brunson, Ralf Buckley, Catherine M. Pickering
published: 2020
methodology: literature analysis
abstract link

Impact of a changing alpine environment on tourism: case study at Aoraki/Mount Cook (NZ)

Paper: Implications of a changing alpine environment for geotourism: A case study from Aoraki/Mount Cook, New Zealand

authors: Heather Purdie, Jessica Hughes Hutton, Emma Stewart, Stephen Espiner
published: 2020
methodology: quantitative (survey, observations) and qualitative (interviews)
abstract link

Risk assessment of the destabilisation of infrastructures due to global warming in the French High Alps

Paper: Risk assessment of infrastructure destabilisation due to global warming in the high French Alps

authors: Pierre-Allain Duvillard, Ludovic Ravanel, Philip Deline
published: 2015
methodology: quantitative (data analysis)
abstract link

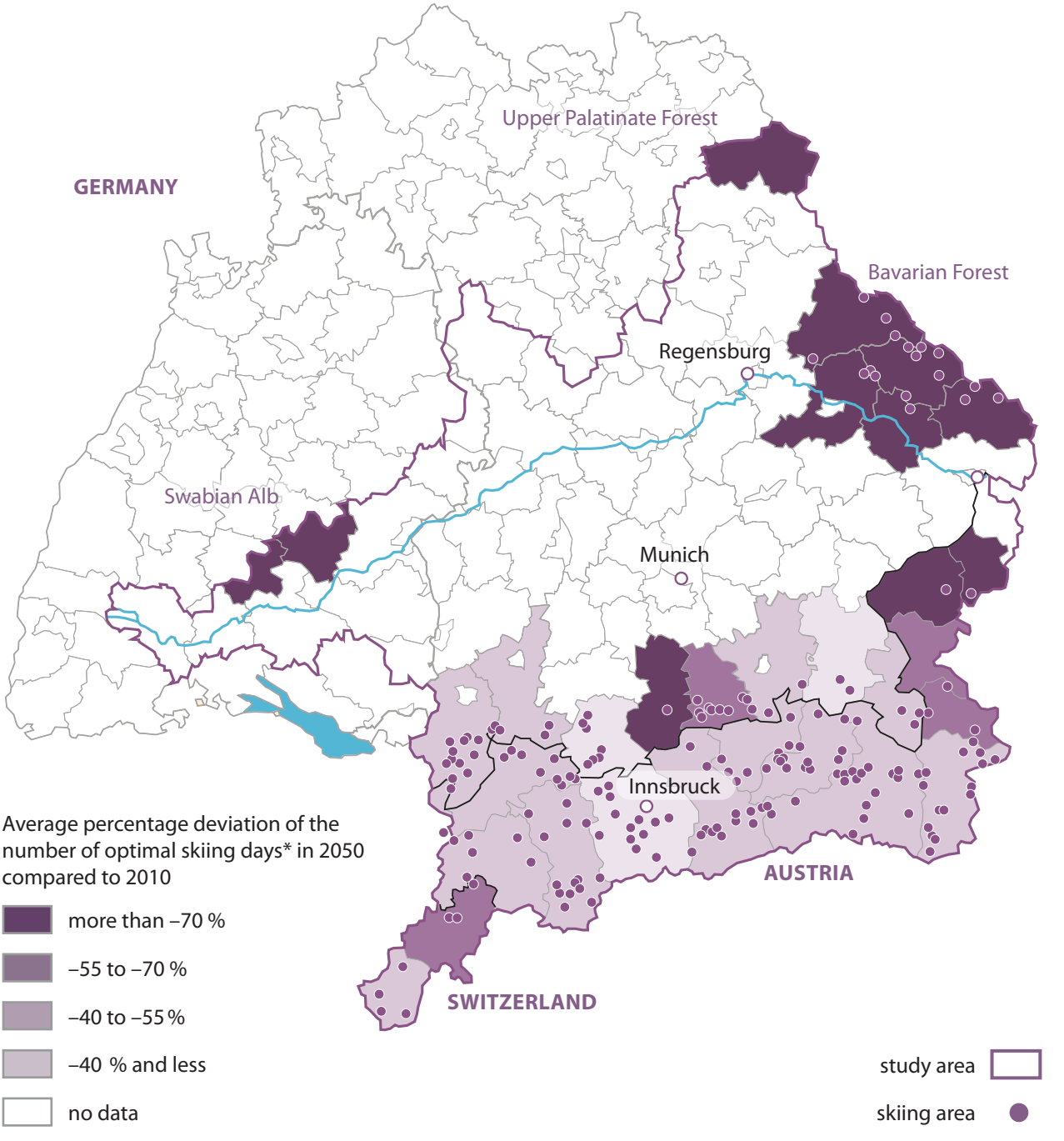
Effects of climate change on tourism in the Bavarian Alps

In the Bavarian Alps, winter tourism is a multifaceted product which, due to the rather small ski areas, is not limited to ski tourism but also includes other offers such as winter hiking, cross-country skiing, tobogganing and the like. Due to the proximity to the metropolitan region of Munich, there is great demand.[13]

However, winter tourism in particular is already affected by climate change: The amount of natural snowfall, the number of days with snow cover and all other parameters relevant to snow safety have decreased significantly in the Bavarian Alps. The decline in snow reliability in Bavaria leads to a decrease in classic winter sports opportunities and to the migration of athletes to higher altitudes in the central Alps. In addition to the shortening of the snow season, there is also a shift in the season („Christmas-Easter-Shift"). But also outside winter sports, a snow-covered landscape with a real winter atmosphere is a central element for winter vacationmakers. In order to remain competitive in winter, adaptation strategies must be developed. These should include an analysis of the strengths and weaknesses of the destination as well as changing expectations and preferences of guests for the summer season.[13,14]

Rising temperatures and lower precipitation due to climate change in summer, on the other hand, may benefit summer tourism in Bavaria and extend the season. Summer tourism in Bavaria could also benefit from the northward shift of tourism from the increasingly hot Mediterranean regions.[15]

Average number of optimal ski days* in 2050 compared to 2010:



Average number of optimal ski days in 2050.
Source: Berghammer and Schmude (2014)

* Assumptions for an optimal ski day: no precipitation, ski area fully operational, (artificial) snow depth on slopes 30 cm or more, surrounding snow cover (scene function) present, perceived temperature between –5 and +5 °C, sunshine duration 5 hours or more, wind speed 10 m/s or less, weekend or public holiday.

Adaptation strategies to climate change in tourism can take place both on the supply side (stakeholders in the tourism industry) and the demand side (tourists). Different adaptation strategies are for example:

1 Reduction of CO_2 emissions

Particularly important in winter tourism, as arrival/departure accounts for the majority of emissions

2 Technical solutions

Snow cannons, for example, can help to maintain the attractiveness of winter sports regions in the short term

3 Expansion of the original offer (diversification)

They contribute to maintaining the attractiveness of destinations for visitors

4 Switch to new products

For example, the switch from winter tourism to summer tourism

5 Change to new destinations

on the part of the visitors

In the future, the challenge for destination managers will be to ensure economic viability despite changing demand and rising costs due to climate change.[12,16]

The **AdaPT Mont-Blanc** project uses a digital toolbox to show what climate change adaptation measures exist at the spatial planning level in France. Descriptions of practical examples from the fields of urban planning, sustainable construction, ski resorts and mountain climbing are provided. The wide range of proposed measures for local adaptation to climate change in mountain areas can be adopted by other regions. However, the legal framework conditions vary.

project name: AdaPT Mont-Blanc
project duration: 2017–2021
project partners/implementation: Espace Mont-Blanc

Deficits in responding to climate change at local level

Paper: Closing the Adaptation Gap in Mountains

authors: Graham McDowell, Madison Stevens, Alexandra Lesnikowski, Christian Huggel, Alexandra Harden
published: 2021
methodology: literature analysis
abstract link

Winter Tourism in the European Alps: Is a New Paradigm Needed?

Paper: Winter tourism in the European Alps: Is a new paradigm needed?

authors: Thomas Bausch, William C. Gartner
published: 2020
methodology: literature analysis, quantitative (survey)
abstract link

Characterisation of the reaction behaviour of winter (sports) tourists to climate change in two German destinations

Paper: Behavioural change or „business as usual"? Characterising the reaction behaviour of winter (sport) tourists to climate change in two German destinations

authors: Maximilian Witting, Michael Bischof, Jürgen Schmude
published: 2021
methodology: quantitative (survey)
abstract link

Artificial snow

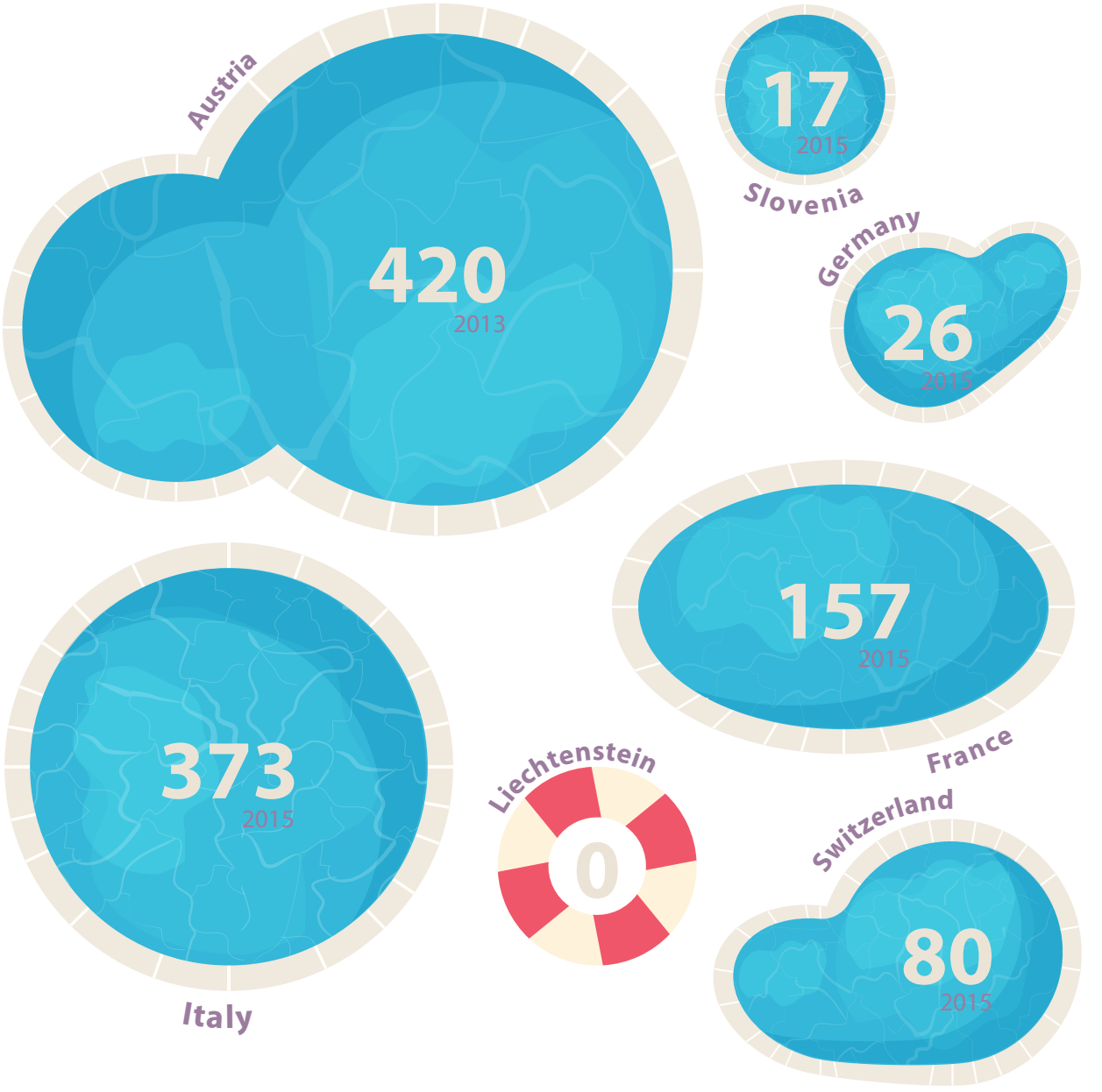
Artificial snow consists mainly of quickly frozen water. In snow cannons or snow lances, the water fed into pipes is atomised into water droplets with the help of compressed air and catapulted out. Only at temperatures below zero do these droplets freeze and fall to the ground. In contrast to natural snowflakes, artificial snow consists of small, rounded ice particles that form a much denser, harder and less oxygen-rich snow cover than natural snow.[17]

Often there are more nutrients in the water used for snowmaking than in the natural snow, which creates a fertilising effect. Additives in the water, such as snow stabilisers (for example Snomax© in Switzerland)[18] or salts for preparing the slopes (for example at the ski championships in all Alpine countries)[19] reinforce this effect. However, these additives are subject to strict regulations in most Alpine countries.

Conditions for the production of artificial snow:

1. temperatures of –3 to –5 °C continuously for a period of 72 hours, without subsequent thawing weather
2. sufficient water availability[17]

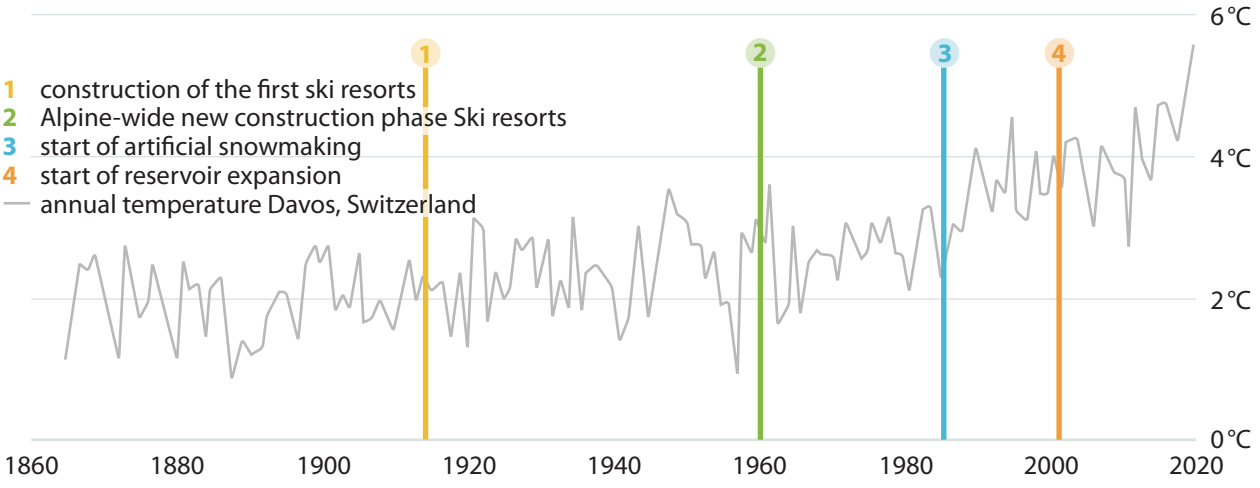
Rising temperatures, winters with low precipitation and the resulting decline in the number of snow days in the Alps in recent years have changed the use of **snow cannons** from single-point snowmaking at problem locations to area snowmaking on entire slopes. For snowmaking in the Alps, an amount of water equivalent to about three times the annual consumption of the city of Munich was already used per season in 2014; since then, many more snowmaking systems have been added. 40-60 % of the water used is **lost** through evaporation during snowmaking as well as in the reservoirs, through wind drifts or leaking pipes. These amounts of water are **taken** from local springs, streams and rivers, collected as rain or pumped up from the valley and collected in storage reservoirs. The construction of the pipes and storage reservoirs means a massive intervention in nature. The increasingly low precipitation winters also lead to **conflicts** over residual water quantities and drinking water.[7,10,17]



1.073 Reservoirs in 2013/2015

1.500 Reservoirs in 2020 (estimated)

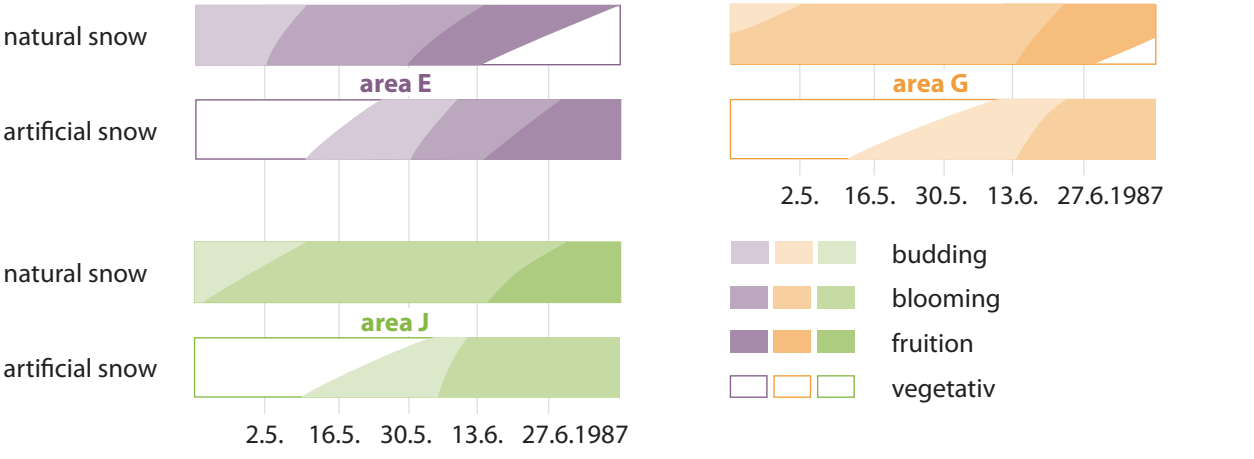
Number of reservoirs for artificial snowmaking in the Alps.
Source: Own illustration based on de Jong (2020)



Ski area expansion and increase in mean annual temperature in Davos, Switzerland (1594 m).
Source: de Jong (2020):

The **energy consumption** of the snow cannons is also very high; about 20,000 kilowatt hours of electricity are needed for one hectare of snow. The artificial snow produced is denser, wetter and harder than natural snow and thus provides poorer insulation for the soil and vegetation. Furthermore, due to its physical properties, artificial snow delays the development of vegetation in spring by several weeks, which has **negative consequences** for the development and reproduction of flora, as it then no longer comes to fruition in the short vegetation phase in the mountains. The fertilising effect of the artificial snow also causes species loss, as the original vegetation is specialised in nutrient poverty.[7,10]

Although artificial snowmaking in ski resorts is considered an **adaptation strategy** to climate change, the expansion of artificial snow infrastructure and storage reservoirs, roads and pistes has led to **profound landscape changes,** some of which are irreversible. In the competition between ski resorts, snow is being made earlier and more frequently, and thinner snow cover and lack of snowfall are being compensated for more systematically by artificial snow, even though droughts and lack of winter water are an increasingly critical problem. This development also impacts local water resources and water quality, as well as biodiversity, and makes soils vulnerable to erosion. Existing environmental certifications and procedures are often lacking in transparency.[17]



Delayed development of tall buttercup due to artificial snow.
Source: Ellenberg and Dierschke (2010)

Climate change and sustainability in ski tourism: an integrated model of adaptation dynamics between resort operations and skier demand

Paper: Climate Change and Ski Tourism Sustainability: An Integrated Model of the Adaptive Dynamics between Ski Area Operations and Skier Demand

authors: Daniel Scott, Robert Steiger, Michelle Rutty, Marc Pons, Peter Johnson
published: 2020
methodology: quantitative (data analysis, survey)
abstract link

Impact of climate change on tourism mobility in mountain areas: case study in South Tyrol (IT)

Paper: The impacts of climate change on tourist mobility in mountain areas

authors: Federico Cavallaro, Francesco Ciari, Silvio Nocera, Franz Prettenthaler, Anna Scuttari
published: 2016
methodology: literature analysis, quantitative (data analysis)and qualitative (case study)
abstract link

Effects of climatic and demographic change on the future demand of skiers and their economic consequences using the example of Sudelfeld (DE)

Paper: Impacts of climate and demographic change on future skier demand and its economic consequences – Evidence from a ski resort in the German Alps

authors: Maximilian Witting, Jürgen Schmude
published: 2019
methodology: qualitative (expert interviews)
abstract link

The **Beyond Snow** project aims to increase the climate resilience of small mid-altitude snow tourism destinations and communities so that they can maintain their attractiveness for residents and tourists. The project will jointly elaborate new sustainable development pathways, transition processes and implementable solutions in specific pilot areas from six Alpine countries.

project name: Beyond Snow
project duration: 2022–2025
project partners/implementation: Eurac Research, Legambiente Lombardei, Polytechnische Hochschule Turin, Metropolitanstadt Turin, Berggemeinde Carnia, EVTZ Alpine Pearls ltd, Entwicklungsagentur für Ober-Gorenjska, Arctur Computertechnik d.o.o., Technische Hochschule Deggendorf, Skigebiet Métabief, Schweizerische Arbeitsgemeinschaft für die Berggebiete, Gemeindenetzwerk „Allianz in den Alpen", Verein zur Förderung der Transitionsfabrik

Managing climate change adaptation and resilience in Tyrolean mountain agriculture

Paper: Why do we not pick the low-hanging fruit? Governing adaptation to climate change and resilience in Tyrolean mountain agriculture

authors: Heidelinde Grüneis, Marianne Penker, Karl-Michael Höferl, Markus Schermer, Patrick Scherhaufer
published: 2018
methodology: qualitative (interviews)
abstract link

Alpine pastures in times of climate change and protection of biodiversity through (re)grazing: case study Brunnenkopfalm in the Ammergebirge (DE)

Paper: Alpine pastures in times of climate change - protecting biodiversity through (re)grazing? The case study Brunnenkopfalm in the Ammer Mountains (German)

authors: Andreas von Heßberg, Anke Berauer, Bernd Berauer, Jörg Ewald, Sarah Fütterer, Armin Görgen, Stefan Kluth, Alexander Krämer, Thomas Köllner, Marit Scharmann, Michael Schlotter, Thomas Schmitt, Michael Schödl, Max Schuchardt, Anne Schucknecht, Siegfried Steinberger, Alix Vida, Johannes Voith, Martin Wiesmeier, Michael Dannemann
published: 2021
methodology: qualitative (case study)
abstract link

The connection between climate change and major events in Austria

Paper: The relationship of climate change & major events in Austria

authors: Anna Burton, Oliver Fritz, Ulrike Pröbstl-Haider, Kathrin Ginner, Herbert Formayer
published: 2021
methodology: literature analysis
abstract link

Impacts, Adaptations and Perspectives on Glacier Tourism and Climate Change in the Alps

Paper: Glacier tourism and climate change: effects, adaptations, and perspectives in the Alps

authors: Emmanuel Salim, Ludovic Ravanel, Philippe Bourdeau, Philip Deline
published: 2021
methodology: literature analysis and qualitative (interviews)
abstract link

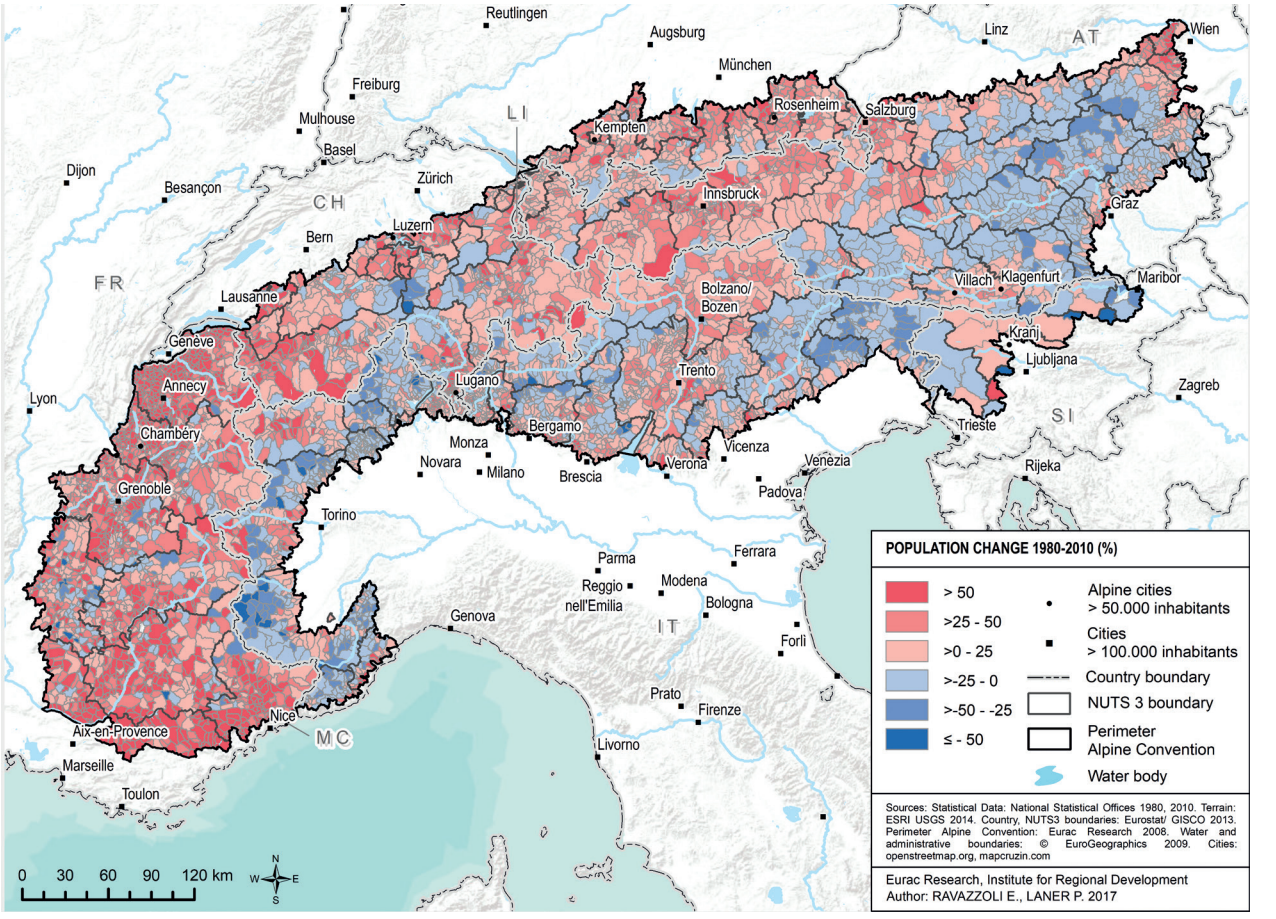
Aesthetic perception of a shrinking glacier: case study in the Mont Blanc massif (FR)

Paper: Aesthetic perceptions of the landscape of a shrinking glacier: Evidence from the Mont Blanc massif

authors: Emmanuel Salim, Ludovic Ravanel, Christophe Gauchon
published: 2021
methodology: qualitative (interviews) and quantitative (survey)
abstract link

Demographic change

Today, more than 14 million people live and work in the Alps. At the same time, the distribution of populations in the Alpine area has changed again and again depending on economic conditions and accessibility. After a long period of **emigration,** the total population in the Alps has grown steadily again since the 1980s. However, this growth is not evenly distributed across the regions: In the Alpine fringe areas, the areas close to cities and the easily accessible valleys, the population is growing the most, while in most of the remote and poorly accessible valleys the population decline continues **(urbanisation** and **agglomeration).**[20]



Change in population density in the Alps 1980–2010.
Source: Permanent Secretariat of the Alpine Convention (2017)

Currently, urbanisation continues - but the trend for remote areas is changing: While many young adults leave the region, entrepreneurs, digital workers, amenity migrants and other so-called **New Highlanders** move in and bring innovative lifestyles and work styles with them and into the shaping of the Alps.[20,21] In areas with a strong tourism structure, the population generally decreases much less. However, the population is often strongly subject to **seasonality;** in some cases the population shrinks by more than half in the mid-season.[22]

Plattform Land draws attention to vacancies in South Tyrolean pilot municipalities and shows how vacant properties can be put to good use. Since 2017, Plattform Land has been conducting a pilot project on vacancy management in 19 selected municipalities in South Tyrol (IT). In cooperation with the participating municipalities, they record vacant flats and commercial properties and make them visible on a digital map. The local population then has a say in what should happen

to the vacant buildings. Through these opportunities for participation, the project creates awareness about how to deal with vacancies. Plattform Land is particularly committed to promoting inner-city development and redevelopment. It offers initial consultations to affected owners.

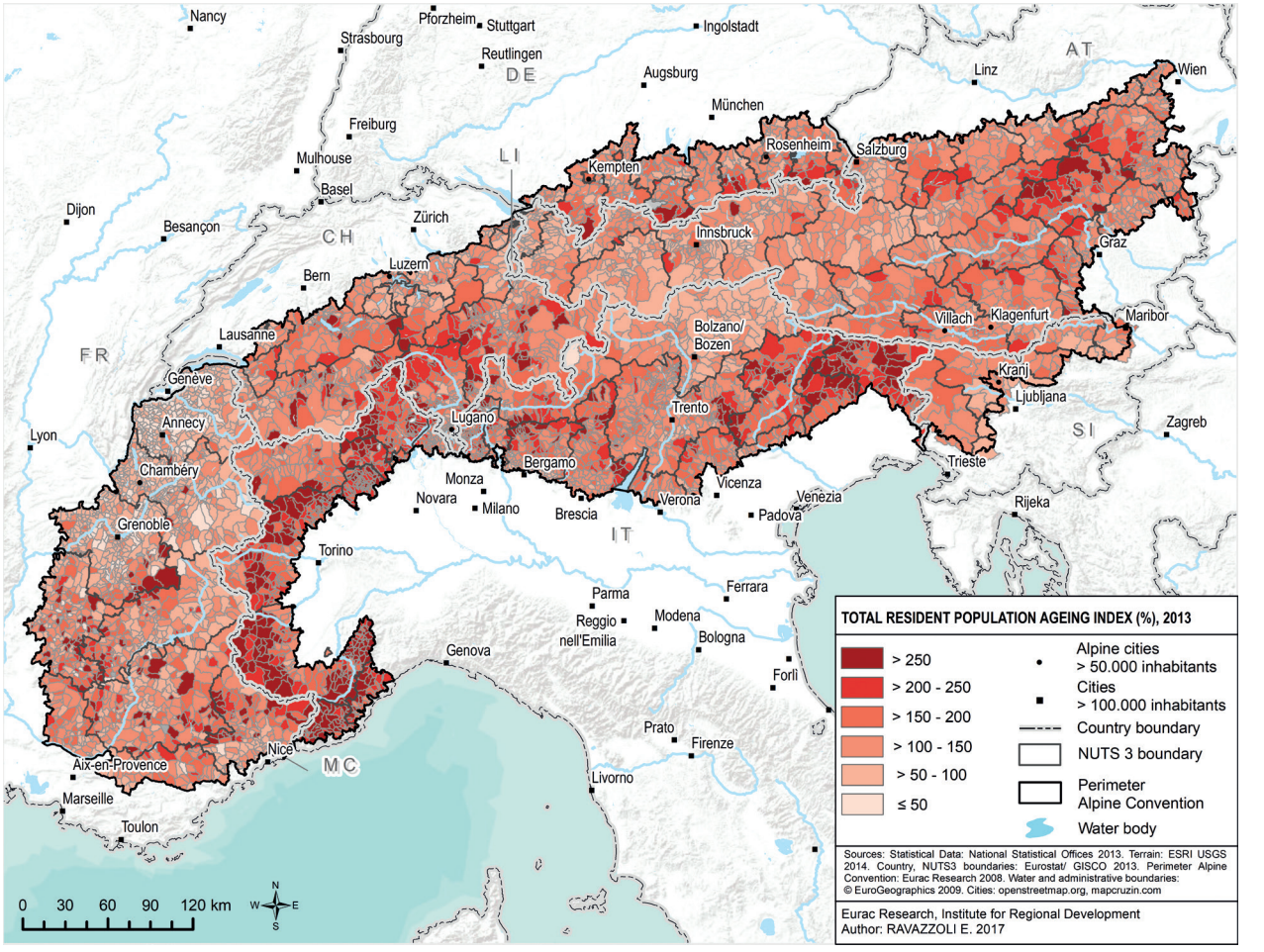
project name: Plattform Land
project duration: since 2017
project partner/implementation: Plattform Land

Agrotourism initiatives in the context of ongoing migration: comparative perspectives for the Alps and for Chinese mountain regions

Paper: Agritourism Initiatives in the Context of Continuous Out-Migration: Comparative Perspectives for the Alps and Chinese Mountain Regions

authors: Thomas Dax, Dachang Zhang, Yanying Chen
published: 2019
methodology: literature analysis
abstract link

As in almost all European countries, an **ageing population** is also developing in the Alps. In most Alpine countries (including Germany), the respective national average is even exceeded. In the Bavarian Alps, more than one in five people is over 65 years old. This trend is expected to increase in the future. This has a great impact on the available infrastructure and services, especially in regions where ageing meets depopulated areas.[20]



Ageing in the Alps.
Source: Permanent Secretariat of the Alpine Convention (2017)

Population development in the Bavarian Alps

A positive population development (compared to 2021) is forecast for the Bavarian Alps until 2041. Especially in the districts of Ostallgäu, Bad Tölz-Wolfratshausen and Rosenheim, a strong increasing trend is expected. The average age will rise continuously until 2041. The average age in the Oberland region, the Allgäu region and the districts of Berchtesgaden, Traunstein and Rosenheim is significantly above the Bavarian average both today and in the future. For 2041, the average age of the population in these areas is expected to be over 46 years; only in the Allgäu region will the future average age be just under 46 years. According to the model calculation of the Bavarian State Office for Statistics, the proportion of people over 75 years of age in particular will rise sharply in the Bavarian Alps in the coming years.[23,24,25,26,27]

With regard to tourism in the Bavarian Alpine Space, the **effects of demographic change** on voluntary nature conservation, land use change and business succession in tourism enterprises have to be taken into account. However, demographic change is also taking place in most of the areas of origin of Alpine tourists **(source areas).** Therefore, ageing must also be taken into account in visitor management: Adaptation of nature experience offers, the change in the spatio-temporal behaviour of visitors and a barrier-free tourism service chain are only some of the relevant topics for destinations. Due to the effects of demographic change and especially due to the effects of ageing on tourism, both positive and negative regional economic and ecological effects can be expected.[28] If the ageing process in the Alps continues to worsen, this can trigger a negative cycle for the tourism industry.[22]

„New Highlander" as reshapers in the Eastern Italian Alps

Paper: Neue Pioniere in ostalpinen Peripherräumen: die Wiederbelebung von Geisterdörfern und partiellen Wüstungen in Friaul

authors: Michael Beismann, Peter Čede, Ernst Steinicke
published: 2022
methodology: quantitative (statistical data, site visits) and qualitative (interviews)
abstract link

Selection of tourism activities in Silver Hair tourism

Paper: Factors Affecting Tourism Activity Selection among Silver Hair Tourists

authors: Mihaela Kežman, Jana Goriup
published: 2022
methodology: quantitative (survey)
abstract link

Preferences and characteristics of older tourists

Paper: Understanding senior tourists' preferences and characteristics based on their overseas travel motivation clusters

authors: Felix Elvis Otoo, Seongseop Kim, Youngjoon Choi
published: 2020
methodology: literature analysis, quantitative (online survey)
abstract link

Demographic perspective on movement patterns of hikers in mountain areas: case study in Berchtesgaden (DE)

Paper: A demographic perspective on the spatial behaviour of hikers in mountain areas: the example of Berchtesgaden

authors: Johannes Schamel
published: 2017
methodology: quantitative (survey, GPS data)
abstract link

Accessibility of areas in the Alps in demographic change

Paper: National Parks and demographic change – Modelling the effects of ageing hikers on mountain landscape intra-area accessibility

authors: Johannes Schamel, Hubert Job
published: 2017
methodology: quantitative (survey, GPS data)
abstract link

Silver-hair tourism as a factor for resilience in tourism

Paper: Silver Tourism and Recreational Activities as Possible Factors to Support Active Ageing and the Resilience of the Tourism Sector

authors: Ana-Maria Taloș, Ana-Irina Lequeux-Dincă, Mihaela Preda, Camelia Surugiu, Alina Mareci, Juliana Vijulie
published: 2021
methodology: quantitative (survey)
abstract link

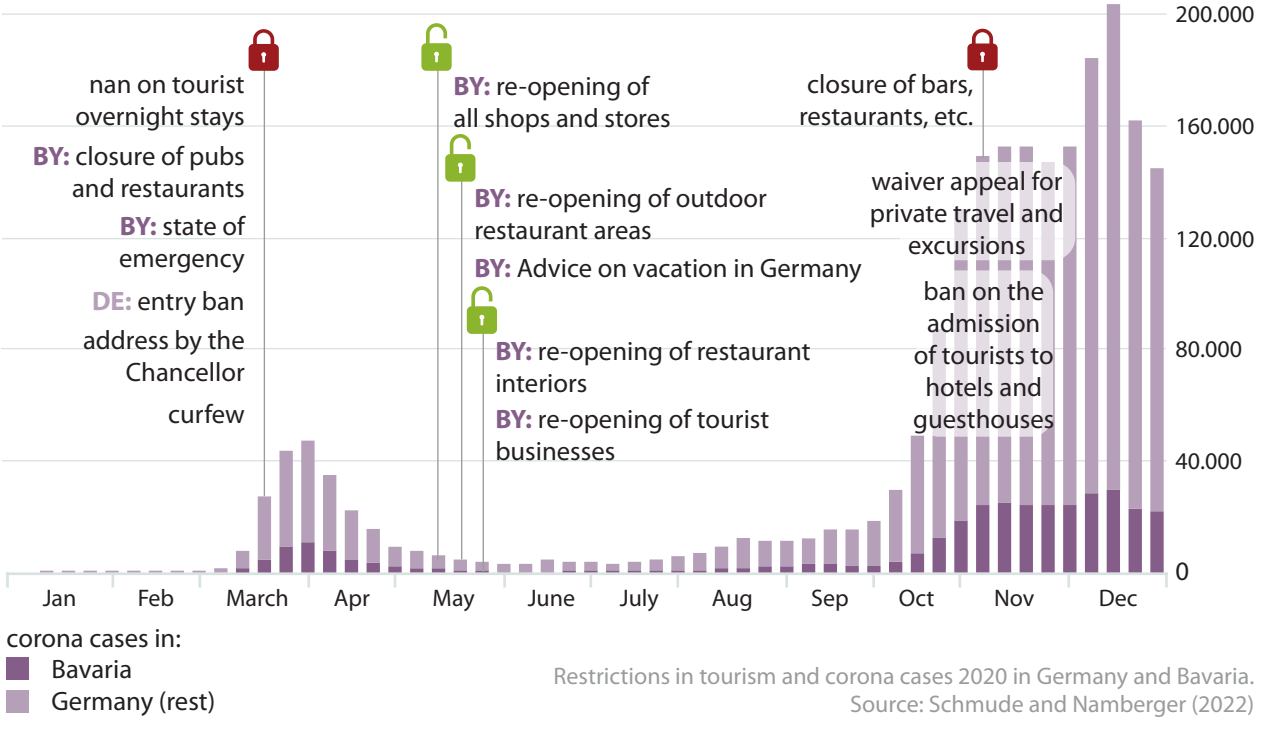
Demographic change as a driver for automation in tourism

Paper: Demographic change as a driver for tourism automation

authors: Craig Webster, Stanislav Ivanov
published: 2020
methodology: literature analysis
abstract link

Covid 19 pandemic

Tourism was one of the economic sectors most affected by the Covid 19 pandemic. The pandemic led to massive restrictions on cross-border tourism almost everywhere in the world. Local, regional and international travel restrictions, government-imposed restrictions and behavioural changes of potential visitors affected all parts of the tourism value chain directly or indirectly.[4] This was also true for destinations in mountain regions: Due to the slump in tourist arrivals, only few revenues could be generated, which led to lower value added and layoffs.[29]



Restrictions in tourism and corona cases 2020 in Germany and Bavaria.
Source: Schmude and Namberger (2022)

The gastronomy sector in particular was threatened by shorter opening hours and closures during the lockdowns; some establishments had to close permanently. In the hotel industry, cancellations and free travel cancellations also led to a **loss of revenue.** According to calculations in Switzerland, tourism contributed to 18% of the spread of Covid-19; several tourist resorts in the Alps such as Ischgl (AT) in spring 2020 or Wengen (CH) in winter 2021 were **hotspots for the spreading of the virus.** Especially the opening or closing of ski resorts and the losses for lift operators were discussed a lot during the pandemic; the Alpine countries each took different approaches. On the other hand, sports not linked to infrastructures (for example cross-country skiing or ski touring) and the corresponding outfitters experienced a great upswing.[3]

However, due to the restriction of movement and reduced economic activities in most regions of the world, air and water quality improved, noise was reduced and **ecological restoration** began. The pandemic also promoted responsible tourism and environmental awareness. Without the international guests, domestic tourism in mountain areas increased, which is lower in emissions and more historically and culturally open compared to international travel. Developments during the pandemic suggest that domestic tourism and linking tourism to the interests of local people have a positive impact on the resilience of mountain destinations.[29]

The Covid 19 pandemic as a driver of innovation in the tourism industry? Case study in Lower Austria (AT)

Paper: The COVID 19 pandemic as a driver of innovation in the tourism industry? A case study of the Lower Austrian mountain lifts (German)

authors: Robert Steiger, Mike Peters, Markus Redl, Martin Schnitzer
published: 2021
methodology: qualitative (interviews, case study)
abstract link

Impact of the Covid 19 pandemic on cycling activity

Paper: Outdoor cycling activity affected by COVID-19 related epidemic-control-decisions

authors: Anne-Maria Schweizer, Anna Leiderer, Veronika Mitterwallner, Anna Walentowitz, Gregor Hans Mathes, Manuel Jonas Steinbauer
published: 2021
methodology: quantitaitv (app data analysis)
abstract link

Covid-19 and organisational learning for crisis planning and management in tourism enterprises

Paper: The COVID-19 pandemic and organisational learning for disaster planning and management: A perspective of tourism businesses from a destination prone to consecutive disasters

authors: Gde Indra Bhaskara, Viachaslau Filimonau
published: 2021
methodology: qualitative (interviews)
abtract link

Resilience during the Corona pandemic: case study in North and South Tyrol (AT, IT)

Paper: Contextual Factors of Resilient Tourism Destinations in a Pandemic Situation: Selected Cases from North and South Tyrol during the SARS-CoV-2 Pandemic

authors: Elisabeth Nöhammer, Marco Haid, Philipp Corradini, Susanne Attenbrunner, Peter Heimerl, Robert Schorn
published: 2022
methodology: qualitative (interviews)
abstract link

Digital tourism instead of mass tourism

Paper: Post-COVID 19 Tourism: Will Digital Tourism Replace Mass Tourism?

authors: Nadeem Akhtar, Nohman Khan, Muhammad Mahroof Khan, Shagufta Ashraf, Muhammad Saim Hashmi, Muhammad Muddassar Khan, Sanil p. Hishan
published: 2021
methodology: literature analysis
abstract link

Travel participation of Germans before and during the Covid 19 pandemic

Paper: Travel participation of Germans before and during the COVID-19 pandemic – the effects of sociodemographic variables

authors: Sascha Filimon, Cathrin Schiemenz, Elisabeth Bartl, Erik Lindner, Philipp Namberger, Jürgen Schmude
published: 2022
methodology: quantitative (surveys, data analysis)
abstract link

On the operation of ski resorts during the Covid 19 pandemic

Paper: COVID-19 and Recreational Skiing: Results of a Rapid Systematic Review and Possible Preventive Measures

authors: Vincenza Gianfredi, Nicole Sibilla Mauer, Leandro Gentile, Matteo Riccò, Anna Odone, Carlo Signorelli
published: 2021
methodology: literature analysis
abstract link

Strengthening destinations after the Corona pandemic

Paper: Empowering destinations after-COVID. Boosting confidence through the SDGs application and the 'glocal' development

authors: Jonatan Gómez Punzón
published: 2021
methodology: literature analysis and qualitative (media analysis)
abstract link

Responses of tourism organisations to the Covid 19 pandemic

Paper: Tourism organizations' responses to the COVID-19 pandemic: an investigation of the lockdown period

authors: Kir Kuščer, Sarah Eichelberger, Mike Peters
published: 2022
methodology: qualitative (interviews)
abstract link

The impact of the Covid 19 pandemic on ski touring on groomed slopes: case study in Austria

Paper: Research note: Ski touring on groomed slopes and the COVID-19 pandemic as a potential trigger for motivational changes

authors: Philipp Schlemmer, Martin Schnitzer
published: 2021
methodology: quantitative (survey)
abstract link

The Covid 19 pandemic as evidence of negative ecological impacts of mass tourism

Paper: COVID-19 lockdown shows how much natural mountain regions are affected by heavy tourism

authors: Anna M. Lenart-Borón, Piotr M. Borón, Justyna A. Prajsnar, Maciej W. Guzik, Mirosław p. Żelazny, Marta D. Pufelska, Maria J. Chmiel
published: 2022
methodology: qualitative (chemical analysis, observations)
abstract link

Resilience in family hospitality businesses during the Covid 19 pandemic

Paper: Organizational resilience in hospitality family businesses during the COVID-19 pandemic: a qualitative approach

authors: Katrin Schwaiger, Anita Zehrer, Boris Braun
published: 2022
methodology: qualitative (interviews)
abstract link

Effects of political decisions on the occupancy of tourist accommodations

Paper: The impact of political decisions on the tourist accommodation occupancy – Central Europe in the time of the COVID-19 pandemic

authors: Bartosz Korinth
published: 2021
methodology: literature analysis and quantitative (statistical data)
abstract link

Impact of the Covid 19 pandemic on travel risk perception and risk management

Paper: Effect of Covid-19 pandemic on tourist travel risk and management perceptions

authors: Muhammad Khalilur Rahman, Md. Abu Issa Gazi, Miraj Ahmed Bhuiyan, Md. Atikur Rahaman
published: 2021
methodology: quantitative (survey)
abstract link

New travel trends at the time of the Covid 19 pandemic

Paper: Virtual and Space Tourism as New Trends in Travelling at the Time of the COVID-19 Pandemic

authors: Michał Roman, Robert Kosiński, Kumar Bhatta, Arkadiusz Niedziółka, Andrzej Krasnodębski
published: 2022
methodology: quantitative (survey)
abstract link

Further information

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Closing words

Closing words

The diversity of topics and perspectives in this book reflects the complexity of tourism. From environmental and social impacts and carrying capacities to digital innovations, marketing strategies and visitor management – the content covers a wide range of relevant aspects that shape modern tourism management.

Perhaps most pressing is the question of the resilience of Alpine tourism in the midst of climate change, biodiversity crisis and societal challenges. Alpine tourism is dependent on nature, climate and local people; at the same time, it threatens to exceed the ecological and social carrying capacity limits in many places and contributes not insignificantly to the emission of greenhouse gases. So is a balance between a good life for Alpine inhabitants, recreation and leisure for visitors in harmony with nature possible at all?

We started with the conviction that this is possible. But also that only tourism within certain limits can be „ viable“ in the long term. The preservation of (winter tourism) monostructures and a dependence on tourism are not fit for the future and endanger not only the local added value of the next decades but also the regenerative capacity of nature, on which we depend in all areas of our lives. The scientific findings from this dossier confirmed us in this conviction. The dossier also shows in many small steps and thematic areas what can be changed, what contribution these changes would make to the big picture and how much everything is interconnected. The research work of science not only creates a gain in knowledge, but also sets the course for practice-oriented problem solving and innovation. When scientific findings are taken up locally, discussed and taken into account in decision-making, a more sustainable and future-oriented tourism can succeed. Where research results are communicated in a comprehensible way and receive attention, they can contribute to improving the quality of life in the Alps as well as to social progress.

In its collection of scientific findings, however, the dossier also shows where research gaps still exist in the Alps and where knowledge still needs to be generated in order to be successfully put into practice. Some questions that arose in the context of this project had to remain unanswered - either there was no current research in this regard, or its content was not transferable to the Alpine region. However, the identification of these research gaps (also in cooperation with the partner destinations in the project) is already the first step towards filling them - we will communicate the gaps accordingly and are confident that researchers will take them up.

We hope that this collection of facts and new findings from research will help to create a basis for discussions at eye level; to promote innovative ideas and approaches, to dare new projects, to look up connections and terms, and at the same time to raise awareness of the need for sustainable and responsible development of the tourism sector. Perhaps this book can help to create new impulses in the tourism sector, open up new perspectives and move towards sustainable tourism in the Alps that focuses on experiencing and respecting the environment.

Munich, 19 June 2023

Appendix

Solution Alpine Destination Types

The quiz to find out your destination type is on page 25.

A description of the alpine destination types can be found on page 26 et seqq.

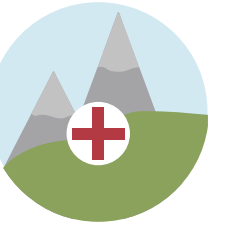
mtn.	☐	●
res.	☐	●
acc.	☐	●
sais.	●	☐
tour.	●	☐

or

mtn.	☐	●
res.	☐	●
acc.	●	☐
sais.	●	☐
tour.	●	☐

type 1
Summer destination in the Alpine foothills

mtn.	●	☐
res.	●	☐
acc.	☐	●
sais.	☐	●
tour.	●	☐



type 2
Health destination

mtn.	●	☐
res.	●	☐
acc.	☐	●
sais.	●	☐
tour.	☐	●

type 3
Nature experience destination

mtn.	●	☐
res.	☐	●
acc.	●	☐
sais.	☐	●
tour.	☐	●

or

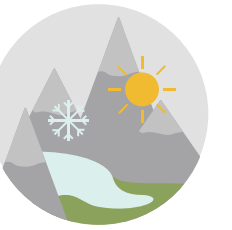
mtn.	●	☐
res.	●	☐
acc.	●	☐
sais.	☐	●
tour.	☐	●

type 4
Alpine cities and villages

mtn.	●	
res.		●
acc.		●
sais.		●
tour.	●	

or

mtn.	●	
res.	●	
acc.		●
sais.		●
tour.	●	



type 5

Year-round destination in the inner mountain areas

mtn.	●	
res.		●
acc.	●	
sais.	●	
tour.	●	

type 6

Ski resorts

mtn.	●	
res.		●
acc.	●	
sais.		●
tour.	●	

type 7

Year-round tourism in the mountains at the edge of the Alps

Index of practical examples

Konferenzen über nachhaltigen Tourismus: Project duration: since 2020. Project partners/implementation: Permanent Secretariat of the Alpine Convention with changing project partners

KÖNIGSCARD: Project duration: since 2019. Project partners/implementation: KÖNIGSCARD Gästekarten GmbH, over 250 service providers

Look B4 you go: Project duration: since 2005. Project partners/implementation: Tiroler Landesregierung/Abt. Landschaftsdienst, Österreichischer Alpenverein, Jägerschaft, Tiroler Waldverein, Österreichischer Schiverband, SITOUR

Modellvorhaben Nachhaltige Raumentwicklung 2014–2018: Project duration: since 2014. Project partners/implementation: Schweizer Gemeinden Zermatt, Täsch and Randa (dropped out of the project in 2018)

Mountainbike-Modell 2.0: Project duration: since 2014. Project partners/implementation: Amt der Tiroler Landesregierung (Abteilungen Forst, Sport, Tourismus), Landesradsportverband, Landwirtschaftskammer Tirol, Österreichischer Alpenverein, Österreichische Bundesforste AG, Tiroler Jägerverband, Tirol Werbung, Vertrider (aktive Mountainbiker), Wirtschaftskammer Tirol (Fachgruppe Seilbahnen)

Müllpfand Wacken / #greenwacken: Project duration: since 2006 / seit 2019. Projektpartner: WOA Festival GmbH

NAT:KIT: Project duration: 2021–2023. Project partners/implementation: Mountainbike Tourismusforum Deutschland e. V., Naturpark Ammergauer Alpen, Geo-Naturpark Bergstraße-Odenwald, Nationalpark Bayerischer Wald

Natur.Digital: Project duration: from 2023. Project partners/implementation: Bayerisches Staatsministerium für Umwelt und Verbraucherschutz

Naturerlebnis-Monitor Deutschland: Project duration: 2015–2016. Project partners/implementation: BTE Tourismus- und Regionalberatung, Verband Deutscher Nationalparke e. V., Europarc Deutschland e. V.

Natürlich auf Tour: Project duration: since 2003. Project partners/implementation: Deutscher Alpenverein

Plattform Land: Project duration: since 2017. Projekpartner/Durchführung: Plattform Land

Pragser Wildsee: Project duration: since 2022. Project partners/implementation: Land Südtirol

Respektiere deine Grenzen: Project duration: since 2004. Project partners/implementation: Amt der Vorarlberger Landesregierung, Abteilung Umwelt- und Klimaschutz

Servus auf der Alm : Project duration: since 2020. Project partners/implementation: Chiemsee Alpenland Tourismus, Urlaub auf dem Bauernhof Chiemsee-Wendelstein e. V.

Waldbasierter Gesundheitstourismus / Wissensdialog Nordschwarzwald: Project duration: 2015–2020. Project partners/implementation: Universität Freiburg, Hochschule für Forstwirtschaft Rottenburg, Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg, Öko-Institut e. V., Nationalpark Schwarzwald, Naturpark Schwarzwald Mitte/Nord

Zermatt autofrei: Project duration: since 1931. Project partners/implementation: Schweizer Gemeinde Zermatt

Zuugle: Project duration: since 2022. Project partners/implementation: Bahn zum Berg e. V.

Index of further information

In order of appearance.

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Megaphone Icon Cartoon Illustration: Adobe Stock/Good Studio

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Girl lies on on stack of big books with open book in her hands.Literature fan. Concept illustration of earning, distance studying and self education. Young woman study. Vector illustration: Adobe Stock/Oksana

Science communication

Set of 50 science web icons. Outline thin line icons such as pour, microorganisms, eye protector, vortex, pulley, vial, notes, beaker. Vector illustration: Adobe Stock/Digital Bazaar

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Tourism forms

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European village on lake in autumn landscape vector illustration. Cartoon scenic autumn landscape in yellow orange fall colors, small town houses and reflection in calm waters of lake in Europe: Adobe stock/Flash concept

Summer set, accessories. Beach, sunglasses, umbrella, fruit, sunscreen, surfboard, ice cream, soft drinks, slippers. Vector illustration: Adobe Stock/ Діана Карч

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Restaurant icons set.Fork, Spoon, and Knife icon. food icon. Eat. cooking icon: Adobe Stock/Oliviart

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Pink quill pen for writing: Adobe Stock/Tartila

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Teenagers sitting in office chairs semi flat color vector characters set. Full body people on white. Teens isolated modern cartoon style illustration collection for graphic design and animation: Adobe Stock/The img

5866988 People with backpacks are hiking: Adobe Stock/trokerr

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Set of eco save environment pictures. people taking care of planet. Zero waste, think green, save the planet, our home hand-written text: Adobe Stock/virinaflora

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Banana peel icon, flat design: Adobe Stock/Jemastock

Green Apple Bite Stage Concept. Step of Eating Apple from Whole to Half and Core. Healthy Fresh Organic Food. Isolated Vector Illustration: Adobe Stock/Toxa2x2

White Cigarette butt Flat illustration vector: Adobe Stock/focus_bell

Cellulose production toilet paper, towel with perforation, napkins in carton box, crumpled page and rolls. Hygiene or office accessories isolated on grey background, Cartoon vector illustration, set: Adobe Stock/klyaksun

Colored set of milk carton packages. Vector illustration: Adobe Stock/Sylfida

Set of plastic trash bags and bottles recycling ecology problem vector illustration isolated on white background: Adobe Stock/Alfmaler

Collection of beer cans and bottles. Template flat icon. Alcoholic drink. Illustration isolated on white background: Adobe Stock/Alfmaler

Alcoholic drinks. Bottles. Vector illustration in a flat style. The collection includes red wine, white wine, sparkling wine, vodka, cognac, liquor. Illustration for bars‘ and restaurants‘ menu: Adobe Stock/Anna

Male Character Cover Ears to Stop Hearing Car Honk, Loud Sounds and Tinnitus. Man Suffering of Noise Pollution. Big City Dweller Social Problem of Uproar and Din. Cartoon People Vector Illustration: Adobe Stock/Pavlo Syvak

Set of green grass isolated on white background. Vector illustration: Adobe Stock/Piyathida P

Soil seamless layers. Layer of soil with grass and stones. The texture of the cut soil. Vector graphics: Adobe Stock/Igor

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Payment transaction via credit card success on yellow backround. Money approved online shopping sign or symbol design for mobile banking applications and website concept 3d vector illustration style: Adobe Stock/kaedeezign

Ticket icons. Coupon icons. Various yellow ticket templates. Vector illustration: Adobe Stock/Роман Ярощук

Journalist concept: Adobe Stock/inspiring.team

Journalistics Profession. Journalists and Cameraman Male and Female Characters with Professional Equipment Microphones: Adobe Stock/Pavlo Syvak

Sign concept: Adobe Stock/inspiring.team

Compass travel location: Adobe Stock/Gstudio

Group of different people flat vector set: Adobe Stock/HilaryDesign

People Jump on Trampoline Website Landing Page, Outdoors, Fitness Center, Summer Time Attraction, Leisure, Sports Acrobatics Training, Entertainment Web Page. Cartoon Flat Vector Illustration, Banner: Adobe Stock/Pavlo Syvak

Green metal watering can or pot isolated on white background: Adobe Stock/Good Studio

Tourism resilience

Chain: Adobe Stock/popcornarts

A collection of luggage icons for travel. Bags, tourist suitcase, luggage, backpack. Vector illustration: Adobe Stock/diluck

Digital marketing campaign for business website, digital content for audience engagement concept, information technology, seo, social media, flat design web banner template: Adobe Stock/Sammby

Multi-colored fishing rod with fish. Isolated on a white background. Vector graphics. Vector EPS10: Adobe Stock/Andrii Artamonov

Team work business illustration concept, business hands connect puzzle, flat design vector illustration: Adobe Stock/Agung

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Cartoon fluffy white clouds on summer blue sky. Cloudy weather comics elements. Simple flat abstract cloud shape for game or logo vector set: Adobe Stock/Tartila

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Set swimming pools of different shapes top view in cartoon style isolated on white background. Water texture, vacation: Adobe Stock/Alyona

Lifebuoy isolated on blue background. Vector illustration: Adobe Stock/Zhanna

Padlock icon, lock and unlock icon vector design: Adobe Stock/Agung

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