



CHALLENGES AND OPPORTUNITIES OF AN OPEN DIGITAL DATA INFRASTRUCTURE FOR TOURISM

Results of the first Think Tank on Open Data in
Tourism and current developments

Prof. Dr. Guido Sommer (2018)

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EXECUTIVE SUMMARY

With the digital transformation and the increasing technological requirements that the tourism industry has to face in the future, the importance of data quality and digital data streams is growing. As more and more data is collected from a few large platforms and often used as an exclusive basis for the development of new services, both, the tourism industry and users are becoming increasingly dependent on the business models and applications of global players. In order to guarantee a digital market for data and applications in the coming years and to find an answer on how to react actively to the outlined developments, it is necessary to consider certain data as infrastructure and as a public good. Following this thought, it must be ensured that the relevant digital information flows in tourism will be transparent and openly available as a crucial basis for innovation and new business models for the general public in the future. The provision of data as Open Data is an approach that has become more and more established worldwide and beyond the field of tourism, and it has been anchored in legislation since the signing of the Open Data Charter by the G8 states in June 2013 (1). In addition to increasing transparency and more data democracy, Open Data is also associated with high economic expectations.

An EU study estimates that, based on the free flow of data, the added value for the European data economy could increase from just under € 300 billion in 2016 to € 739 billion in 2020 (2). For Germany, the authors of a study commissioned by the Konrad-Adenauer-Stiftung estimated between 20.1 and 131.1 billion euros in potential added value through Open Data by 2026, depending on the degree to which Open Data can be established as a key

strategic component of social action (3). However, in the field of tourism, the topic of Open Data is still relatively new. For this reason, a Think Tank with international and cross-industry experts set a first goal to discuss and evaluate the significance of Open Data for the tourism industry in September 2017. At the heart of the shared vision on exploiting the emerging opportunities is the development of an Open Digital Data Infrastructure for tourism, where all relevant information in tourism should be provided as Open Data through a coordinated collaboration and cross-industry networking of stakeholders. The joint development of an Open Knowledge Graph for tourism in Europe based on Linked Open Data proposed by Prof. Dr. Fensel of the Semantic Technology Institute in Innsbruck could be an approach to realise the vision.

Since trust is an important basis for creating purposeful networks of people and data, the development of coordinated strategies for the implementation of the vision was primarily considered as a leadership challenge. In addition, the need to prepare the topic of Open Data in tourism for different stakeholders in such a way that the respective challenges and opportunities for tourism become transparent and clearly understandable, was also identified. This white paper summarizes the main findings of the Think Tank and provides an overview and recommendations on current developments in Open Data in tourism. At the same time, it is a call to the industry to actively participate in the strategic discussion and to take on part of the leadership task for the implementation of an Open Digital Data Infrastructure in tourism.

TRANSFORMATIONS IN THE TOURISM INDUSTRY

There is much to suggest that in the not-too-distant future, we will live in a world of artificial intelligence and digital assistants that accompany us every day. If we then ask our digital assistant to recommend a local leisure activity for the next day, the answers from Alexa (Amazon), Siri (Apple), Cortana (Microsoft) or Google Assistant are less than ideal (4). If things progress according to the plans of Amazon, Apple, Microsoft or Google, however, this situation will change soon. But where does the information for the language assistant's answers come from? From Google? From Facebook? From the guest? From the agency that deals with tourism marketing? Is this authentic, reliable data or is it fake news? Is the information being provided up-to-date and in real time?

Where is this data located and who owns it? Or what would be a suitable repository for this data? Why is it that despite smartphones, big data and intelligent services, you still cannot find a public toilet in the area? Ultimately, the information that these devices and services provide is only as good as the underlying data. Today, both the quality and quantity of such information are lacking. The necessary data and detailed information needed to provide a good answer for various applications in tourism are either not available today or they are not readily available, transparent and comprehensive. So what has to happen for this to change in the future? The first Think Tank on Open Data in Tourism dealt with this question on 26 September 2017.

THINK TANK OPEN DATA IN TOURISM 2017

On 26 September, 2017, the first Think Tank on Open Data in Tourism, supported by Outdooractive and led by Prof. Dr. Guido Sommer from the University of Applied Sciences in Kempten and Christian Dosch from the Digital Start-up Center Allgaeu, took place with international representatives from politics, science and businesses in Immenstadt in Allgaeu. The goal of the Think Tank was to develop recommendations for action on the subject of Open Data in tourism and make these openly available for discussion in the industry. The results produced by the participants of the Think Tank represent the essential basis of this White Paper. In addition, current developments in 2018 were also taken into account when presenting the derived challenges and recommendations for action.

Representatives from destinations, scientific institutions, associations and companies from Germany, Austria, Italy and Switzerland participated in the Think Tank, including the Federal Ministry for Transport and Digital Infrastructure (BMVI) and the Bavarian Ministry of Economic Affairs and Energy and Technology. In addition to members of Allgaeu GmbH, Bayern Tourismus Marketing GmbH, Tirol Werbung, Rheinland-Palatinate Tourism, as well as the German National Tourist Board, it was also possible to bring in experts from outside the industry, including Wikimedia Deutschland and Audi. The event was the start signal for a number of other event formats and initiatives.

Organisation and moderation:

- **Prof. Dr. Sommer, Guido** (University of Applied Sciences, Kempten, Germany)
- **Dosch, Christian** (Digitales Zentrum Schwaben (DZ.S))



Participants:

- Buller, Michael** (Verband Internet Reisevertrieb e.V. (VIR))
- Drexel, Peter** (State Office for Surveying and Geoinformation Vorarlberg)
- Egenter, Stefan** (Allgaeu GmbH)
- Feustel, Konstantin Andreas** (GEIOS AG)
- Prof. Dr. Fensel, Dieter** (Semantic Technology Institute (STI) International, University of Innsbruck)
- Gebert, Pascal** (Tourismuszukunft)
- Huber, Stefan** (hubermedia GmbH)
- Klingler, Christian** (Tirol Werbung GmbH)
- Lenz, Anette** (Bavarian Ministry of Economic Affairs and Media, Energy and Technology (StMWi))
- Loris, Yves** (Rheinland-Pfalz Tourismus GmbH)
- Moleski, Sebastian** (Wikimedia Germany e.V.)
- Nehr, Jochen** (Deutsche Zentrale für Tourismus e.V.)
- Peer, Christian** (AlpineBits Alliance)
- Pfaff, Matthias** (fortiss GmbH)
- Dr.-Ing. Remlinger, Wolfram** (Audi AG)
- Univ.-Prof. Dr.-Ing. Schilcher, Matthäus** ("EMERIT" Technical University Munich)
- RDir Dr. Schlosser, Christian** (Federal Ministry of Transport and Digital Infrastructure, Germany)
- Solenthaler, Thomas** (TSO AG)
- Soutschek, Martin** (Outdooractive GmbH & Co. KG)
- Steincke, Willi** (Zentrum Digitalisierung.Bayern (Z.DB))
- Wagner, Wolfgang** (BAYERN TOURISMUS Marketing GmbH (by.TM))

CHALLENGES FOR OPEN DATA IN TOURISM

A report from the European Data Portal cites lack of awareness and knowledge, unclear responsibilities, data quality, internal IT and legal licensing issues as common barriers to Open Data (5). Other obstacles that tourism in particular often

has to deal with in practice are the existing competitive thinking instead of cooperation and a lack of political support. Based on the results of the Think Tank 2017, the following major challenges for the tourism industry have been identified:

Challenges of Open Data in Tourism
1. Cooperation and leadership
2. Standardization and data quality
3. Legal and political framework
4. Tourism marketing challenges
5. Cross-border and cross-industry

1. COOPERATION AND LEADERSHIP

The **digital transformation** has also affected the tourism industry. It is a **disruptive process** that challenges traditional business models. Especially those models that are based on **proprietary data logic and parochial thinking**, as is still the case with most destination marketing organizations (DMOs). New strong players with centralization and monopolistic tendencies such as Amazon, Google or TripAdvisor are striving to establish information monopolies. The question arises as to how critical - if at all - the users view this. Do they not care who is the source of the information? Do they not simply use the tool that requires the least effort, the best comfort or the greatest trust?

In view of the challenges posed by the digital transformation, the tourism industry seems to remain in a state of shock or has not yet recognized the signs of the times. So far, a proactive or coordinated approach is hardly noticeable, but rather a persistence in the proprietary **“business with data”**, the parochial thinking mentioned above. It is a highly fragmented industry without a common vision and coordinated voice that is afraid of a worst-case scenario with ever-decreasing visibility and, at the same time, ever-increasing dependence on global corporations.

Perhaps the industry is still doing too well and the old model is still generating enough revenue to have to act. However, the declining traffic on many destination websites speak a different language. Users are less and less accessing these websites

for information and instead directly use the big intermediaries like Tripadvisor, Booking, Holidaycheck and many others. The data flow is more important than the data channel, because it is important for users to get the information - not from whom or through which channel.

What is missing is an awareness of data and the opportunities offered by an Open Digital Data Infrastructure that can provide a cross-industry foundation for innovation and future business models, for **“business with data-driven services”**.

Trust in the underlying data quality will play an increasingly important role, especially for the development of artificial intelligence applications. Will the industry be able to organize itself and develop the required data quality together? Can the transparent and permanently up-to-date provision of important “fundamental tourism data”, such as detailed information on overnight accommodation with current vacancies, places of interest with opening times, admission prices and real-time visitor numbers, cycle paths and hiking trails with information on current closures, and public transport timetable information for an Open Digital Data Infrastructure create a trustworthy data basis for tomorrow's applications?

2. STANDARDIZATION AND DATA QUALITY

Of course, the use of Open Data in tourism also involves technical challenges. Standards for uniform data models and open programming interfaces, so-called Application Programming Interfaces (APIs), which would facilitate the access and use of tourism data, are currently rare. **It is a fragmented situation with different data formats, very diverse levels of detail and often very limited possibilities for data**

use. Harmonisation is difficult, but would make a lot of things easier.

Another issue that comes up is the question of who is responsible for collecting and updating the data? Which stakeholders should take responsibility here? Government authorities, DMOs, service providers such as hotels or restaurants, specialized service providers, distribution through online travel agencies (OTAs) or the community of users and guests themselves, who create and rate content on different platforms (6)? Regardless of who assumes responsibility, it should be a key objective that all stakeholders benefit from better data quality and availability and that added value can be created.

As the quality of data increases, so does their value. To ensure high data quality, the integrity and validity of the data must be ensured, as well as their timeliness and the visibility of the source.

In addition to active data maintenance, real-time data and the inclusion of user ratings, automation and technical procedures based on artificial intelligence can also contribute to improving data quality (7).

Nevertheless, experts agree that achieving high data quality and delivering tourism data through an Open Digital Data Infrastructure is not so much a technical, but rather a major leadership challenge to actively shape digital change. Perhaps, some reasons for not taking action may be very trivial. An important reason why organisations have shown little proactivity and cooperation with regard to data so far, may be that they are not convinced of their own data management and the quality of the data. In addition to a basic understanding of the subject, a better awareness of the importance of data quality and clear responsibilities may also be necessary. Combined with greater

commitment and the provision of financial resources, a shift of attention towards data infrastructure could set things in motion.

3. LEGAL AND POLITICAL FRAMEWORK

It is a great challenge to adapt the legal framework to the rapid digital change (8). Legislators are required to set the framework for an open-data-friendly copyright and to enforce uniform standards for licenses. It turns into an even greater challenge when data, on which existing business models are based, are to be passed on or made publicly accessible. How should the expected lawsuits be dealt with? Does Open Data lead to a distortion of competition here or is an open market and fair competition made possible through it in the first place?

Building an Open Digital Data Infrastructure costs money!

Does the principle of connexity apply, where government authorities that have responsibilities for certain tasks also finance them?

Does it require a pay-as-you-go financing or are other scenarios for operator models conceivable? In terms of organisation and funding, it should be borne in mind that the passing on of costs can quickly create barriers that jeopardise the overall benefits for the industry as a whole (9).

Data security and protection against data misuse require great attention and also pose challenges. However, in this context, the task of the state should not be to prevent, but to enable wisely and against the background of a functioning set of rules (10).

4. TOURISM MARKETING CHALLENGES

It will continue to be important for the tourism industry to focus on customers and their needs in the future. For several years now, the question of relevant content has become increasingly important and requires a rethink in marketing. Christian Klingler of the Tirol Werbung sums it up: "The entire domain of tourism marketing has to reinvent itself, towards a recommendation management".

In order to be able to serve the large and often very individual information requirements of the customers, intelligent digital holiday assistants should deliver suitable recommendations in the future. **However, identifying and providing relevant information from the variety of providers and data pools is a great challenge,** especially since users increasingly expect information in real time without delay (11).

„The entire domain of tourism marketing has to reinvent itself, towards a recommendation management“.

Christian Klingler, Tirol Werbung

Data about upcoming events, entrance fees to attractions, accommodation vacancies, the culinary offer of restaurants, condition of recreational trails and current track closures, a tide calendar, snow reports and the latest avalanche threat levels, temperatures and water quality of swimming lakes, opening times of mountain railways, trails and huts, public transport timetables with delays, weather forecasts, or the warning of an upcoming thunderstorm are just a few examples of data streams needed to enable an intelligent digital vacation assistant to

dynamically deliver customized recommendations in the appropriate application context.

Even DMOs quickly reach their limits when it comes to their data needs. In order to cope with such phenomena as over-tourism by applying visitor management technologies, for example based on nudging approaches, real-time traffic flow data from tourism facilities or recreational trails are just as crucial as data about current traffic levels, road closures or congested stopovers. **However, easy access to all these tourism-relevant data in a sufficient level of detail and quality is not possible today.** Even with great efforts, the required information cannot be obtained completely and comprehensively. While, on the one hand, the amount of data is constantly growing, on the other hand, the recognition of relevant data is increasingly difficult due to the lack of transparency, duplicate data and inconsistencies. Unfortunately, many ideas for innovative tourism applications from start-ups and established companies, which could create added value or new business models for the various stakeholders in tourism, cannot be realised Huickly and easily.

Instead of an Open Digital Data Infrastructure, the industry is becoming more and more informed and organized about the channels and applications based on the proprietary data infrastructures of large corporations, which are getting better every day.

Is the swimming pool open tonight, how much does the entrance fee for the family cost, is it well rated and is it busy right now? From the customer's point of view, Google provides the best answers to these questions today, even though the

swimming pool could dynamically feed all relevant information into an Open Digital Data Infrastructure and make it usable for all market players.

5. CROSS-BORDER AND CROSS-INDUSTRY

Tourism does not end at the borders of a municipality or region. Neither does it end at the borders of federal states or countries. Unfortunately, in practice, **there are major challenges in overcoming political or geographical boundaries in people's minds.** In order to achieve an even stronger joint and cross-border European commitment, the boundaries in people's minds must be broken down.

In addition, to meet general information requirements, tourism as a cross-sectoral industry relies on the use of **cross-industry data streams** (e.g. current traffic information, weather forecasts or geodata), which are already recorded and collected through the mCloud (12) metadata catalogue of the Federal Ministry of Transport and Digital Infrastructure (BMVI) in Germany, for example (13). In return, tourism has a responsibility to provide information to other industry sectors. For example, open tourism data on places of interest can provide valuable integrated navigation services in the field of mobility. Up-to-date status information on recreational trails in different tourism application scenarios can contribute to keeping geospatial reference data up-to-date more effectively and efficiently. Establishing **cross-industry networks** of people and data streams requires an overarching understanding and thinking and represents a great challenge in practice.

10 POINTS FOR TAKING ADVANTAGE OF THE OPPORTUNITIES OF OPEN DATA IN TOURISM

In order to address these challenges and focus on exploiting the opportunities of Open Data for tourism, the following

recommendations for action were developed on the basis of the results of the Think Tank:

Recommendations for taking advantage of the opportunities of Open Data in tourism

1. Develop a shared moonshot vision
2. Promote and grow leadership
3. Act across borders and across industry
4. Use open standards
5. Improve data quality
6. Create legal certainty
7. Ensure data security
8. Build networks
9. Explain added values
10. Just do it

1. DEVELOP A SHARED MOONSHOT VISION

The vision of a comprehensive and trusted data base for intelligent digital assistants of the future could be the foundation of a shared mission to build an Open Digital Data Infrastructure in tourism. It should inspire the tourism industry to organise a common strategic path of action that reduces dependencies and strengthens its own innovation capacity. In developing a common vision and strategy for the

industry, it is important to seek dialogue with political institutions and to gain political support and encouragement.

2. PROMOTE AND GROW LEADERSHIP

In order to reduce fears and concerns and change the industry's short-term success-oriented actions into a common path based on a sustainable Open Data strategy for the future, leadership competencies are required above all. People are needed who can inspire and cooperate, who are willing

to take risks and move ahead - not primarily for their own advantage and to chase their own result, but to achieve a higher-level goal, from which the entire industry will ultimately benefit. The implementation of an Open Digital Data Infrastructure in tourism is less a technical problem than a huge leadership task. The tourism industry not only needs more, but also better leadership with digital literacy, and should create a value-based environment where leaders can convey the importance of Open Data, equal access to data, transparency and data democracy.

3. ACT ACROSS BORDER AND ACROSS INDUSTRY

The full potential of Open Data in tourism can be exploited through a joint, comprehensive approach involving municipalities, regions, federal states and countries, as well as institutions at the European level and beyond. Consequently, implementation strategies should not be limited by administrative geographic restrictions. Open Data is not only highly relevant for the tourism industry. It is equally important to seek synergies with transport, geodata, environmental fields and many other neighboring sectors and make them usable through a cooperative approach. Open Data portals and initiatives with different regional boundaries and sectoral focuses should be connected on a national and European level and across all sectors and provide complete geographic coverage (7).

4. USE OPEN STANDARDS

To ensure the interoperability of an Open Digital Data Infrastructure, appropriate standards for uniform data formats and interfaces should be used wherever possible. However, apart from the

standards of the OpenTravel Alliance (OTA) in the field of accommodation and transport, there are hardly any established de facto or de jure standards for many tourism information types. The task here is to define common goals, coordinate corresponding data types and to jointly develop and implement standards that are suitable for the market (6).

5. IMPROVE DATA QUALITY

Although there are different approaches to defining data quality, data quality increases with the relevance that data has to fulfill in context of a particular application purpose. Since there are many different application scenarios with tourism information in tourism and other industries, the aim should be to collect data as detailed and well-structured as possible and to keep it up-to-date. This also includes the specification of metadata that can objectively describe the quality of data in its dimensions. For example, the European Open Data Portal (14) identifies accuracy, consistency, availability, completeness, conformance, credibility, processability, relevance, and timeliness as key criteria for high data quality. A broad awareness of the importance of data quality and the assumption of responsibility to ensure it will be crucial conditions to measurably improve data quality in tourism (15).

6. CREATE LEGAL CERTAINTY

The legal framework for Open Data should be adapted to the needs of digital development and should not be subordinated to existing guidelines. Instead of many partly confusing licenses that sometimes only differ in details, a simple and transparent solution for Open Data licenses should be chosen, which can be used in Europe and beyond. The principle of "Open by default", which is

already anchored in legislation in some countries, will further promote the provision of Open Data in the future. The conditions imposed on users of Open Data, for example with regard to rights of modification or obligations such as naming the source or copyrights, will have a critical impact on the confidence that is created in the quality of the data and how quickly and extensively the data is used in practice (3).

7. ENSURE DATA SECURITY

When dealing with Open Data, existing privacy policies must be strictly followed. The necessary acceptance at all levels can only be gained through guaranteed data security. However, since most basic tourism data is not personal data but information about tourism facilities and infrastructures, the aspect of data security is particularly relevant in cases where, for example, guest evaluations and comments or aggregated and anonymised movement profiles of users are to be imported into a digital data infrastructure as Open Data flows and as a possible basis for further analyses and applications. The IT security of interfaces and platforms through which a data exchange of personal data takes place should be checked and, if necessary, certified.

8. BUILD NETWORKS

An elementary component of a successful implementation of Open Data in tourism is the establishment of a large network of stakeholders from all areas with a flat organisation and to dissolve hierarchies wherever they are obstructive. It is important to form “alliances of the willing”, whose participants are ready to play an active role in the implementation and exploitation of the opportunities of Open Data (16).

9. EXPLAIN ADDED VALUES

To enable the various stakeholders in tourism to take advantage of the opportunities offered by Open Data and to promote acceptance of the approach among those involved, it is necessary to explain added value in a transparent, comprehensible and stakeholder-specific way. Why should a hotelier provide the hotel master data and vacancies in an Open Digital Data Infrastructure? What advantages does a transport network association have when they bring in real-time timetable information? Why is it better for the hut warden to not just provide the opening hours and prices of his menu as a link to a PDF document on the Internet? Why is it better for tourism providers in the long run, to not only manage their master data and offers with Google My Business, but instead to use systems that distribute data to different channels and automatically transmit it to or make it accessible for Open Digital Data Infrastructures and Open Data portals? How can the destination benefit when real-time information on the current parking space situation in recreation areas can be used by Smart City or Smart Region initiatives? Why is there also added value for the destination if they publish their own data for free use on an Open Data platform? Clear answers to these questions will help to more quickly recognize the opportunities provided by Open Data and to benefit from them. Due to the highly variable level of previous knowledge, care must be taken to convey explanations in a competence-oriented manner, specifically addressed to different target groups.

10. JUST DO IT

All the experts involved in the Think Tank agreed on one thing: In case of doubt, no one should wait for higher authorities or uniform standards, even if this can lead to Alliances of the Willing initially developing isolated solutions and creating first de facto standards which do not yet have an official character or broad acceptance.

Andreas Feustel, CEO of GEIOS brought it down to the point: ***“Just do it”***, and

Sebastian Moleski from Wikimedia Germany strikingly commented, *“Island solutions are always better than just water”*.

***„Island solutions are always
better than just water“***

Sebastian Moleski, Wikimedia Germany

OPEN DATA INITIATIVES IN TOURISM 2018

In the following section, current developments and initiatives are presented

1. ROUND TABLE OPEN DATA AT THE TOURISMUSCAMP 2018 ON 26 JANUARY 2018 IN BERCHTESGADEN, GERMANY

The aim of the event in the run-up to the Tourismuscamp in Berchtesgaden on 26 January 2018 was to create more transparency about existing industry projects and to promote cooperation and integrative “cooperation” in the field of Open Data. The need for collaboration for the creation of structured data and the development of common standards for data exchange or the construction of interoperable knowledge graphs as linked Open Data was expressed from different perspectives. Since guests do not care much about borders, a collaborative approach instead of isolated solutions is the only way for interoperable and cross-border solutions to emerge. The 5-star model for Open Data by Tim Berners-Lee with Linked Open Data as the highest goal of level 5 serves as guidance (17). If the tourism industry succeeds in organizing itself collectively to build a comprehensive, open and interoperable data infrastructure for tourism, this could promote competition and innovation, enable new business models, and reduce dependencies on a few large corporations. Other voices, however, suspect that this could only increase the dependencies even faster, as the large corporations would probably be the first to gratefully accept a centrally provided data infrastructure and thus only further extend their information advantage. The event did not yet reveal a clear shared opinion on this topic.

that contribute to achieving more transparency for Open Data in tourism.

2. WORKSHOP OPEN DATA AT THE DESTINATION CAMP 2018 ON 26 MAY 2018 IN HAMBURG, GERMANY

The event dealt with the two core questions, which tourism data can the industry stakeholders make available to others and which data are needed from other sources. It turned out that a number of relevant real-time data streams, such as traffic information or weather forecasts, can currently neither be offered by the destination, nor by the major travel portals. Ideas were discussed as to whether an open tourism database or an open database for the storage and administration of customer profiles should provide mechanisms for the selective sharing of data with certain users and to what extent the blockchain technology could support the implementation of such a solution. However, whether an approach with appropriate selective control options for usage corresponds to the idea of Open Data and which legal restrictions this would result in, should be critically questioned.

3. ALPINE BITS DESTINATION DATA INITIATIVE ON 12 JULY 2018 IN BOLZANO, ITALY

In a meeting on 12 July 2018, the association of, so far mostly South Tyrolean companies and organizations, announced to start a standardization process for “Destination Data” in addition to already established OTA-based standards in the

field of accommodation establishments. The initial focus will be on finding an agreement on an Open Data standard for “events” and “ski resorts and snow reports”. It was planned to start the process with a group of interested members in autumn 2018.

4. “INNSBRUCKER RUNDE” (DACH-KG) ON LINKED OPEN DATA IN TOURISM ON 18 JULY 2018 IN INNSBRUCK, AUSTRIA

At a meeting organised by Tourismus Zukunft and the Semantic Technology Institute (STI) in Innsbruck with representatives of destinations active in the field of Linked Open Data, the potential of knowledge graphs was discussed. Based on the de facto standard schema.org (18), extensions with additional annotations could be developed to find a common vocabulary to describe relevant tourism information. In a Linked Open Data Cloud, the corresponding links could then be connected. The selected group of destinations will continue the process in further meetings with the aim of establishing a coordinated tourism knowledge graph as a de facto standard.

5. PROJECT “BAYERNCLOUD IM TOURISMUS” FUNDED BY THE BAVARIAN MINISTRY OF ECONOMIC AFFAIRS, ENERGY AND TECHNOLOGY SINCE 01 MAY 2018

The aim of the „BayernCloud im Tourismus“ project, which has been funded by the Bavarian Ministry of Economics, Energy and Technology since May 2018, is to demonstrate the opportunities of the digital transformation for different players

in tourism in the pilot region Allgäu based on tangible examples, and to set the course for more innovation and better service quality through networked data flows in tourism. For the development of an Open Digital Data Infrastructure, the BayernCloud is to become the technological basis for a digital data hub, through which all players in tourism can easily provide and exchange up-to-date tourism information. Data on events, accommodation vacancies, culinary offers of restaurants, open hiking trails, public transport timetables, snow reports and current opening times of mountain railways, cross-country ski runs and mountain huts, admission prices of sights, as well as weather information and temperatures of swimming lakes will be collected in the BayernCloud in the future and made centrally accessible for retrieval by everyone for further processing for different use cases. The findings from the project will later be applied throughout Bavaria and across industries.

6. OPEN DATA AS PART OF THE TOURISM STRATEGIES OF THE FEDERAL STATES OF THURINGIA AND BRANDENBURG (DE), TYROL AND VORARLBERG (AT) AND SOUTH TYROL (IT)

Based on the “Open-by-Default” legislation, an Open Data Hub (19) will be developed in South Tyrol, Italy, which will provide tourism data of different sources via standardized formats and interfaces for all of South Tyrol.

Neighboring countries are also working on building up central databases with tourism information. In Vorarlberg in Austria, geodata are available as Open Data and are used in tourism, for example, to build up the GeoWeb database, a structured

collection of tourism content in the state. In Tyrol, Open Data is also an important starting point for current strategic considerations to improve the quality and distribution of tourism content in the future and to promote innovation.

In Germany the development of a central semantic database structure with open interfaces is an important goal of the tourism strategy 2025 of the federal state Thuringia (20) and the topic of Open Data is also discussed in tourism organisations in Rhineland-Palatinate, Baden-Wuerttemberg and Brandenburg. Even though there are as yet no ready-made technical solutions for implementing an Open Digital Data Infrastructure in tourism, these are to be developed and subsequently implemented and used in the near future.

7. THINK TANK “LINKED OPEN DATA IN TOURISM” ON 18 SEPTEMBER 2018 IN IMMENSTADT, GERMANY

The aim of the Think Tank planned for 18 September 2018 is to find out what contribution a Linked Open Data approach can make for the realisation of an Open Digital Data Infrastructure in tourism and how such an initiative can be ideally coordinated with existing Open Data platforms. The basis for this objective are the results of the first Think Tank on Open Data in Tourism from the previous year, as well as findings from the current developments described above. The event will deliberately seek an exchange between tourism professionals and experts with technical expertise in Linked Data.

8. DATATOURISM INITIATIVE OF THE DIRECTION GÉNÉRALE DES ENTREPRISES (DGE) IN FRANCE

The DATAtourism (21) initiative, jointly promoted since 2015 by the Direction Générale des Entreprises (DGE), an organisation of the French Ministry of Economy and Finance, and Tourisme & Territoires, the association of the French tourism regions, has the objective of providing all relevant tourism information in France on a national level through a central Open Data platform on the basis of Linked Open Data. The platform was officially launched on 12 December 2017, and since April 2018 has also provided data access APIs under the French Etalab Open Data license.

9. CREATION OF A DESTINATION DATA SPACE IN SWITZERLAND

In Switzerland, data policy is seen as infrastructure policy and an important basis for innovation (22). In his role as board member of the Swiss Data Alliance, André Golliez, with the support of Prof. Dr. med. Liebrich from the University of Lucerne consequently pursue the vision of establishing a national data infrastructure for Swiss tourism. Under the working title Destination Data Space (23), pilot projects with the relevant stakeholders will first determine what purposes a cooperative national data infrastructure for tourism should fulfil, what data is required for this purpose, what rights and obligations of data use must be considered and how it could be financed. In the process, it will also be examined which data silos in tourism could be opened and linked together to generate new added value. Subsequently, the findings will be transferred to other regions and finally to the whole of Switzerland.

**10. OPEN DATA PANEL AT THE 2ND
UNWTO WORLD CONFERENCE
ON SMART DESTINATIONS ON
27 JUNE 2018 IN OVIEDO, SPAIN**

During the 2nd UNWTO World Conference on Smart Destinations organized by the World Tourism Organization, an Open Data Panel took place on 27 June 2018. Juanjo Hierro, Chief Technology Officer (CTO) of the FIWARE Foundation, an organization founded by the EU to develop an Open Source technology platform for the

development of intelligent applications, emphasized the importance of Open Data for the digital networking of “smart” destinations. In his view, there are three key aspects: dynamic real-time data, uniform data models and interfaces, and the support and creation of incentives for data providers to open their data. He believes that the United Nations worldwide and the European Commission in Europe have a responsibility to set up programmes that provide incentives for the initiation and implementation of such project

SUMMARY

During the first Think Tank on Open Data in Tourism on 26 September 2017, the participants developed a shared vision of an Open Digital Data Infrastructure for tourism. One year later, this idea begins to establish itself in the destinations of the Alpine region. First projects are underway and groups of stakeholders are already forming to move the topic forward and develop common data standards. It is a great opportunity for something to emerge here that will enable tourism in Europe to play an international pioneering role in the digital transformation of tourism over the next few years. With the coordinated development of an Open Digital Data Infrastructure, the conditions for less dependencies on the major global platforms and the prospect for more digital innovation in Europe will be created. However, in order for a shared vision of an Open Digital Data Infrastructure in tourism to prevail based on and in the spirit of the European Digital Single Market Strategy (24), the leadership of the European Commission and the responsible national organisations is also essential to prevent isolated solutions. It can serve as a catalyst for the initiatives launched and accelerate the digital innovation process. Nonetheless, the most important first step seems to be the networking of people who can and want to assume leadership responsibility and act consistently according to the motto “Just do it”.

The fact that politics can make a significant contribution to making a difference and exploiting the opportunities of Open Data in tourism has been demonstrated by the current example of support for the BayernCloud in Tourism project by the Bavarian State Ministry for Economic Affairs, Energy and Technology since May 2018. Under the direction of the University

of Applied Sciences in Kempten, an Open Digital Data Infrastructure will be set up together with stakeholders in the Allgaeu pilot region by 2020. It will make relevant data streams for tourism application scenarios freely available for general use. As stated in the official press release (25), through the provision of easy access to data, startups will be able to develop new tourism applications in the future, for example for language assistants such as Amazon Alexa or to better plan mobility service offers and capacities for events. *“The innovative strength of the BayernCloud will be demonstrated by a broad spectrum of innovative services, new research and applications based on tourism data and it will lead to significant added value for guests and tourism service providers in the region and hopefully beyond in the future”*, says Dr. Matthias Pfaff, project partner of the Fortiss GmbH and participant in the Think Tank Open Data in Tourism.

In addition to the financial support for the project, the clear commitment to an Open Data flow based on a digital data infrastructure has to be emphasized. However, for the success of the application-oriented research project it will be critical whether politics, science and industry really do get involved hands-on. Emeritus Prof. Dr.-Ing. Matthäus Schilcher of the Technical University of Munich, who supported the participating organizations in consultation with the Center for Digitisation Bavaria (ZD.B), summarizes it appropriately:

“Of course there is also a need for research, but what is even more important right now is that, in order for the potential of the digital transformation in tourism to be exploitable in practice in a timely manner, cross-border thinking and action is

required. This concerns geographical borders as well as sector boundaries and requires a coordinated interaction between politics and business. It includes active cooperation and extensive, long-term investments in the establishment of a joint Open Digital Data Infrastructure for the industry.”

With the second Think Tank on “Linked Open Data in Tourism”, which the University of Applied Sciences Kempten will host under the direction of Prof. Dr. Sommer on 18 September 2018 in Immenstadt im Allgäu, the joint strategic path for more cooperation and transparency in Open Data initiatives in tourism will be consistently contin.

REFERENCES

1. *Open Data Barometer – Third edition*. s.l. : The World Wide Web Foundation, 2016. Creative Commons Attribution 4.0 Unported license (<https://creativecommons.org/licenses/by/4.0/>).
2. *SMART 2013/0063 European Data Market. Final Report*. European Commission. s.l. : European Commission, 2017.
3. Dapp, Marcus M., et al. *Open Data. The Benefits: Das volkswirtschaftliche Potential für Deutschland*. Konrad Adenauer Stiftung. s.l. : Pencho Kuzev, 2016. Creative Commons Namensnennung-Weitergabe unter gleichen Bedingungen 3.0 Deutschland", CC BY-SA 3.0 DE (<http://creativecommons.org/licenses/by-sa/3.0/de/>).
4. Coletta, Michael. Most voice assistants "unskilled" for travel planning and booking. *PhocusWire*. [Online] 20. July 2018. <https://www.phocuswire.com/Phocuswright-voice-assistants-travel-planning>.
5. Carrara, Wendy, et al. *Analytical Report 1: Digital Transformation and Open Data*. 2015.
6. Soualah-Alila, F., et al. DataTourism: Designing an Architecture to Process Tourism Data. [Buchverf.] A. Inversini und R. Schegg. *Information and Communication Technologies in Tourism 2016*. Cham : Springer International Publishing, 2016, S. 751–763.
7. *Utilizing Open Data in tourism*. Pesonen, J. 2016.
8. *Eigentumsordnung für Mobilitätsdaten des BMVI*. Bundesministerium für Verkehr und digitale Infrastruktur (BMVI). Berlin : s.n., 2017.
9. Kapoor, K., Weerakkody, V. und Sivarajah, U. Open Data Platforms and Their Usability: Proposing a Framework for Evaluating Citizen Intentions. [Buchverf.] M. Janssen, M. Mäntymäki und J. Hidders. *Lecture Notes in Computer Science. Open and Big Data Management and Innovation: 14th IFIP WG 6.11 Conference on e-Business, e-Services, and e-Society, I3E 2015, Delft, The Netherlands, October 13-15, 2015, Proceedings*. 1st. 2015, S. 261-274.
10. Ksoll, Wolfgang, Schildhauer, Thomas und Beck, Annalies. *Open Data – Wertschöpfung im digitalen Zeitalter*. Bertelsmann Stiftung. s.l. : Bertelsmann Stiftung, 2017.
11. Barnickel, N. und Klessmann, J. Open Data - Am Beispiel von Informationen des öffentlichen Sektors. [Buchverf.] U. Herb. *Saarbrücker Schriften zur Informationswissenschaft. Open initiatives: Offenheit in der digitalen Welt und Wissenschaft*. Saarbrücken : Universität des Saarlandes, 2012, S. 127–158.
12. Was ist die mCloud? [Online] Bundesministerium für Verkehr und digitale Infrastruktur (BMVI) , 2018. URL. <https://www.mcloud.de/informationen>.
13. Positionspapier Open Data des BMVI. s.l. : Bundesministerium für Verkehr und digitale Infrastruktur (BMVI)., 2017.
14. Dekkers, M., et al. *Die Qualität von offenen Daten & Metadaten*. [Slides] 2013.
15. Hensen, H., & Deutsches Forschungszentrum für Künstliche Intelligenz GmbH. Qualität von Open Data sicherstellen. [Hrsg.] Smart-Data-Begleitforschung FZI Forschungszentrum Informatik. *Open Data in Deutschland: Sieben Forderungen der Fachgruppe „Wirtschaftliche Potenziale und gesellschaftliche Akzeptanz“ der Smart-Data-Begleitforschung*. 2016, S. 18-19.

16. Longhi, C., Titz, J.-B. und Viallis, L. Open Data: Challenges and Opportunities for the Tourism Industry. [Buchverf.] C. Longhi, et al. *Tourism management, marketing, and development*. New York City, NY: Palgrave Macmillan. : s.n., 2014, S. 57-76.
17. Berners-Lee T. 5 * Open Data. [Online] 2012. <https://5stardata.info/>.
18. Schema.org. [Online] <https://schema.org/>.
19. IDM Südtirol - Alto Adige. Open Data Hub. [Online] <https://opendatahub.bz.it/>.
20. Berndt, M., Deckert, M. und Feige, M. *Tourismusstrategie Thüringen 2025*. Thüringer Ministerium für Wirtschaft, Wissenschaft und Digitale Gesellschaft. 2017.
21. Datatourisme. [Online] <http://www.datatourisme.fr/>.
22. Golliez, A. und Neuron, A. Open Data als erster Schritt zum Aufbau einer nationalen Dateninfrastruktur. *eGov Präsenz*. 2016, 1/2016.
23. Golliez, A. *Destination Data Space - Eine nationale Dateninfrastruktur für Digitalisierung und Innovation im Schweizer Tourismus - Projektbeschreibung (nicht veröffentlicht)*. 2018.
24. Digital Single Market. Shaping the Single Digital Market. [Online] 17. 08 2018. <https://ec.europa.eu/digital-single-market/en/policies/shaping-digital-single-market>.
25. Zehnpfennig, S. Das Allgaeu führt Digitalisierung im Tourismus an (Pressemitteilung). . [Online] 10. 08 2018. <https://presse.allgaeu.de/das-allgaeu-fuehrt-digitalisierung-im-tourismus-an-3>.

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