GDI GOTTLIEB DUTTWEILER INSTITUTE
ECONOMIC AND SOCIAL STUDIES

OUT AND ABOUT WITH SMART ASSISTANTS

A scenario for travelling in the future

By Jakub Samochowiec, Marta Kwiatkowski and Stefan Breit

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Contents

Foreword

Ladies and gentlemen,

"Digitisation"? Again? In some places, people are beginning to feel they've had enough of this topic. But I think that's a big mistake. We've only just set out on our journey into the digital age and have taken only baby steps thus far. But the signs are being recognised in many places. SECO, the State Secretariat for Economic Affairs, has commissioned a comprehensive study entitled "Digitisation in Swiss Tourism: Opportunities, challenges, implications". Digitalisation projects are popping up like mushrooms in tourist destinations, and no conference seems to take place without some reference to the topic.

In many of these initiatives, digitisation is either viewed from too technical an angle, or it's presented as a singular "best case". The Conference of Regional Tourism Directors in Switzerland (RDK), together with the Gottlieb Duttweiler Institute (GDI), has now asked the question: "How will customers experience their journeys in the year 2030?" At the centre of our focus are the travellers themselves, and they are surrounded by intuitive technology. In a future in which digital assistants will be able to make recommendations and make decisions, certain truly fundamental questions will arise. How meaningful can ubiquitous processes be? Will there be a loss of spontaneity in what we choose to do? And what about the spirit of adventure involved in travelling? Despite all our fears and concerns, the world is irreversibly moving into a future in which digitalisation will have even more influence than it does today on our lives as private individuals, as business people and as travellers. This study is intended as a navigation aid for Swiss tourism, sketching out possible scenarios from the customer's perspective and hinting at the implications. It doesn't offer a guide for how a destination might cope with its own, individual needs. But it can support all the different stakeholders in Swiss tourism in finding their own way to a digital future – and can help them to understand it from the viewpoint of the tourists themselves.

Martin Sturzenegger
CEO Zürich Tourism
Member of conference of regional tourism directors in Switzerland (RDK)

Summary

The Internet and smartphones have turned the tourism sector upside down. But where will things go from here? We cannot assume that the digital revolution has come to an end and that everything will now settle down again. We expect smart assistants to have as big an impact on tourism as smartphones. By smart assistants, we mean digital counterparts that understand our normal speech and assist us, just like an advisor or coach. In the following study, we sketch out a picture of what it might be like to go travelling with just such an assistant.

Because such assistants won't just be used for the journey alone but also in all kinds of life situations, they will know a lot about our interests and preferences. This means that for the customer, they will become a personal travel agency, navigator, translator, tour guide and so forth, and they will take on all our administrative tasks – such as buying tickets and checking in. For service providers, digitisation means that services can be personalised and evaluated far more effectively. But service providers will have to make a wide range of information machine-readable so that the digital assistant can register the touristic environment – such as menus, occupancy rates for hotel rooms, tables in restaurants, parking spaces and waiting times for mountain railways. Destination management organisations can help service providers make their information digitally visible.

It seems plausible that the most useful assistants will be those that know everything about us, and that combine all possible data about both us and many other people. But if an assistant collects as much data about as many people as possible in all areas of their lives, this naturally becomes problematical for our personal privacy and from a data protection perspective. So we will discuss ways in which a decentralised assistant might function.

It rtemains unclear whether or not artificial intelligence will ever become as powerful as we describe – and if so, when this might happen. But what is clear is that developments are moving in this direction. We should not wait for a technological breakthrough before engaging with the implications of this paper. If we set about making our destination machine-readable, then we will already become more visible today, and we will be laying the foundations for the future introduction of smart assistants.

But how can we go about digitising our own region? First we have to decide which local factors should be turned into data. This data has to be generated or bought. Apart from procuring the data, it is at least as important to be able to collate it. This is not just about defining standards, but about implementing them as broadly as possible so that it becomes worthwhile for programmers of apps and smart assistants to use them.

Finally, the data in question can be used in three different ways. It can be regarded as a valuable resource and used only via one's own channels – for example, via one's own websites and apps. The second possibility is to distribute the same data via third-party platforms such as Booking.com. The third is to place the data online on open access, available to everyone.

With a view to the emergence of smart assistants, the open-data approach seems to us the most promising. This is because the market for smart assistants has not yet been divided up among just a few big players. It is still unclear who will come out on top, and open data enables us to avoid falling into the hands of the monopolies. Using open data makes a destination visible to all machines. This will provide more of an opportunity for decentralised assistants. And already today, open

data makes it easy to create special applications – such as apps for people with impaired mobility.

In our federal Swiss system, it isn't easy to push through any across-the-board solutions. It's important to understand that using open data means we have to agree on a common language and on common standards (comparable to HTML standards), not on any common end solution such as a website or an app. If we don't do this, then someone is surely still going to impose a standard on us anyway – only we won't have any say in the matter, because that «someone» is likely to be a company from Silicon Valley.

Restaurant
Number of free tables
4

Mountain railway
Cheapest trip
17.15h

Swimming lake
Temperature
19°

Bike rental
Position
46° 56' N 7° 26' E

Double room
113.- CHF

Hiking trail
85% free of snow

Parking space
Utilization
68%

Introduction

All around the world, travelling is becoming more and more popular. This is primarily on account of an increase in prosperity, which in turn has led to people taking more flights. In the last four decades, the number of airline passengers has increased eightfold.[1] From 2016 to 2017 alone, the number of air passengers increased by seven percent.[2] A considerable share of this is accounted for by more and more Chinese citizens getting the travel bug.[3]

Tourism is more than just a social phenomenon. It's one of the important industries of the 21st century. In Europe it makes up ten percent of GDP, and in Greece and Portugal it's almost 20 percent.[4] Switzerland is also a popular tourist destination. Every year, multitudes are drawn to visit our mountains, lakes, cities and everything that goes with them. As a result, tourist accommodation sites in Switzerland chalked up more than 50 million overnight stays in 2017.[5,6]

There are many reasons why people travel. Some want to get away, while others go to relax or to improve relationships, and yet others go for reasons of status or self-realisation. These are just a few of the reasons.[7]

The type of journeys we make is also becoming more varied. So if we only talk about tourists, then we risk failing to get an overall view of the situation. The manner in which business and leisure have merged means that there are more and more travellers who wouldn't describe themselves as tourists in the classical sense. For example, there are digital nomads who can work anywhere in the world as long as they have electricity for their computer and access to the Internet. They're more interested in coworking spaces than in guided city tours. Then there are conference attendees who decided to take a look at the surrounding region after finishing their conference. And of course, hardly anyone wants to call themselves a tourist anyway. Tourists are always the others.[8]

Despite all this variety, most travellers have one thing in common: they are accompanied on their journeys by digital aids. They use map services, book overnight stays through Airbnb, post selfies on Instagram and choose restaurants on the basis of online ratings. It is difficult to imagine travelling without these tools today. And this is despite the fact that smartphones have only been with us for about ten years. If we regard the smartphone as one step in the overall digital revolution, like the personal computer and the Internet, then we have to ask ourselves what future technologies might follow smartphones and the Internet by having a similarly huge impact on our lives and travelling habits.

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1 Schuttenheim, R. (2016). *Take a look at this graph: Global air travel increased 8 fold in 4 decades – and it's an accelerating trend. Yes we have a problem.* [Link: bit.ly/umsa-air – Source: Bitsofscience]

2 *More than 7% increase in Air Travel Compared to Last Year. (2017).* [Link: bit.ly/umsa-iata – Source: IATA]

3 Ledsham, C. (2018). *COTRI publishes Chinese outbound tourist arrival data for H1 2018.* [Link: bit.ly/umsa-china – Source: China Outbound]

4 *Beitrag der Tourismusbranche zum BIP in ausgewählten Ländern* im Jahr 2017.* (2018). [Link: bit.ly/umsa-bip – Source: Statista]

5 Swiss Federal Statistical Office (2018). *The Swiss hotel sector grew closer to its record years in 2017.* [Link: bit.ly/umsa-bfs1 – Source: BFS]

6 Swiss Federal Statistical Office (2018). *In 2017, supplementary accommodation recorded growth in overnight stays of close to 7%.* [Link: bit.ly/umsa-bfs2 – Source: BFS]

7 Pearce, P. L. (2005). *Tourist behaviour: Themes and conceptual schemes.* Channel View Publications.

8 Weber, D. (2018). *«Der Reisende ist nur ein Tourist, der abstreitet, einer zu sein».* [Link: bit.ly/umsa-folio – Source: NZZ Folio]

Expectations of tourism experts with regard to different technologies: Which of the following emerging technologies excites you most?

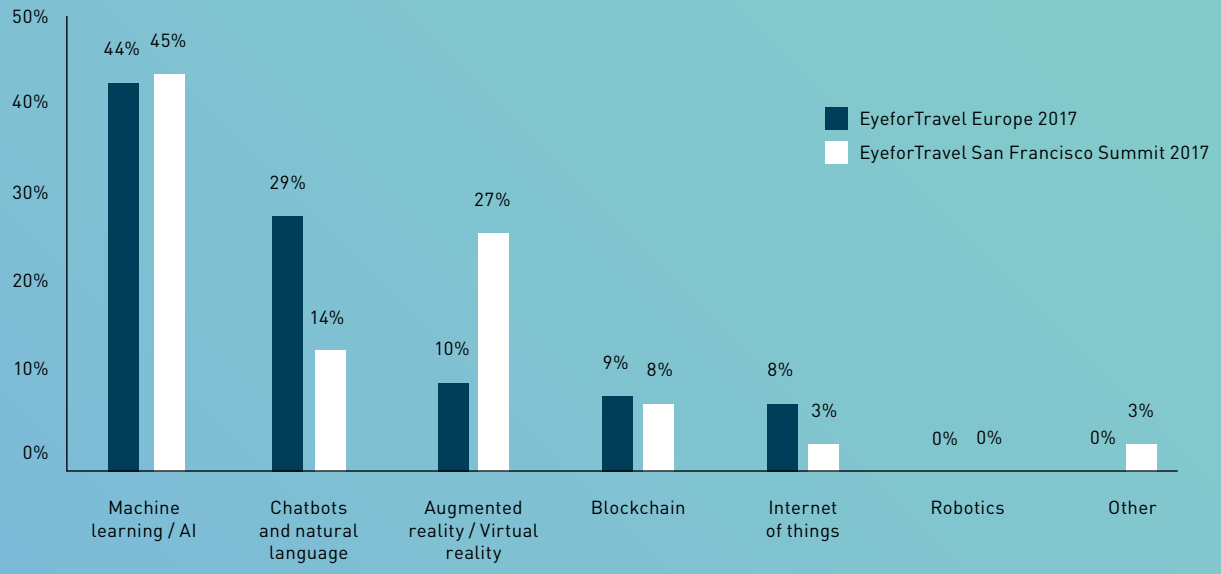


Figure 1 (Source: EyeforTravel 2017)

To this end, the organisation EyeforTravel has asked experts what emerging technologies they regard as the most promising for the future. Two came out on top: machine learning/AI; and chatbots/natural language processing (*see Figure 1*).

Both machine learning with large amounts of data – sometimes also described as weak artificial intelligence – and an understanding of natural spoken language are already creating a stir today. Together, they provide a foundation for further revolutionary technological innovations: smart assistants. These are digital counterparts that understand natural language and accompany us, just like an advisor or coach. Examples of these today are Siri and Amazon's Alexa. In 2017,[9] the Gottlieb Duttweiler Institute carried out a survey of media and marketing experts, and found that a prevailing majority of them was convinced that smart voice assistants would be embedded in our everyday lives in future (*see Figure 2*).

In what follows, we shall sketch out a future scenario in which smart assistants in the tourism industry are already very powerful, and thus also widely used. By very powerful, we mean here that these smart assistants will understand all our questions and instructions and will have access to sufficient data to be able to respond appropriately. They know opening hours, historical background information, what our interests are etc., and can give us the right information, make bookings, carry out searches, translate languages and propose itineraries. In short: these smart assistants will become a travel agency in our pocket, and their behaviour will be indistinguishable from that of a highly competent human assistant. In the science-fiction film «Her», we find just such an assistant depicted in impressive fashion.

In terms of technology, this is not yet possible to such a large degree. But we can already clearly see the beginnings of it today, and things seem to be

[9] Samochowiec, J., Gürtler, D., & Stieger, K. (2017). *Digital Corporate Publishing.* [Link: gdi.ch/corporatepublishing]

Experts have high expectations of smart assistants

«In ten years, more than 50% of Swiss citizens will use smart voice assistants every day (in the manner of Siri, Google Assistant, Amazon's Alexa).»

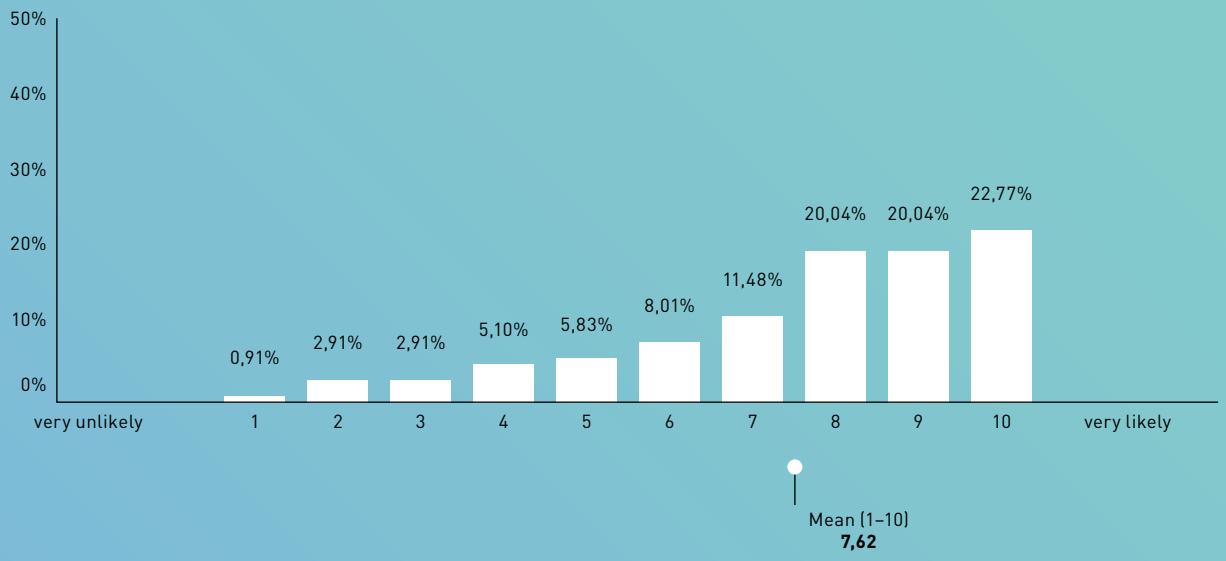


Figure 2 (Source: GDI Study «Digital Corporate Publishing»)

getting clearer all the time. So we want to engage with this scenario and explore what might become our reality in the future. What implications will digital assistants have for the stakeholders of the travel industry, and what new players might find a place in tourism's value chain? What will smart assistants mean for service providers such as restaurants or accommodation providers? What will they mean for tourism organisations? Engaging with a possible future in a concrete fashion can help us to understand today's developments better, and to make tangible the challenges and opportunities that such a future will bring. And it can help us to chart a course today for the tomorrow we would like to see.

«Communication through spoken language instead of text messages has increased massively in importance. Our survey showed that today, 46% of all Swiss citizens communicate with voice messages on WhatsApp.»

Gabriela Kunath, research associate and doctoral student, Faculty of Economics and Management, University of Lucerne.

Even if we see digital assistants as something revolutionary, this revolution will occur through the interaction of slow, gradual developments – through progress in research into artificial intelligence, through the increasing digitisation of our world, and through natural language processing. So we are not going to be taken by surprise with the sudden arrival of digital assistants. But this development will almost certainly take place in a context that brings surprises with it. The collapse of the Soviet Union, the rise of China and Brexit are all examples of unexpected events in the past. And the future, too, will bring us the unexpected. In order to remember that our scenario is not taking place in a vacuum, and that a lot can happen around it, we shall allow for the possibility of several so-called wildcards in what follows here. Some of these wildcards are not very likely, but any of them would bring about huge change to what we understand by travelling today.

Wildcards

In this study we draw a relatively foreseeable picture of the future. However, the future will certainly also produce the unexpected. As a mental stretching exercise, some more or less probable developments that would have a major impact on travel are outlined below.

REALITY GETS BORING

Virtual reality becomes so immersive that events in it are more exciting and more impressive than the real thing ever could be. Why bother taking an expensive train up to the top of the Jungfrau mountain if you can turn into a dragon and fly over the glaciers of distant planets?

«YOUR HOTEL IS ARRIVING IN 1 MINUTE»

Self-driving cars become the prime transport means of choice for tourists. Many tourists sleep in them while they travel from one destination to the next. Expensive hotels and even parking spaces become unnecessary when a car can travel through the night.

OH CHINA!

Economic growth in China comes to a halt, which means the Chinese are exhorted to take their holidays in China again. Whoever holidays abroad gets penalty points in their social credit score. The masses of Chinese tourists that had been predicted do not arrive.

#FLYINGLESS

This hashtag on Instagram isn't just getting more and more followers – people are actually doing what it says. They fly less and less.

DECLINE OF WESTERN CULTURAL DOMINANCE

Up to now, the USA was dominant in matters of popular culture. We listen to American music and watch American films and series. This role now shifts to China, which begins to dominate the worldwide market in film, literature, music and art etc.

THE LEISURE SOCIETY

No one needs to work any more. Robots have created a society of luxury. Travelling becomes the main occupation of many people – not just something they can only do for four weeks in the year.

YOUTH MEETS YOUTH

For purposes of cultural exchange and European cohesion, the EU decides to give every one of its citizens an Interrail ticket on their 18th birthday – not just 12,000 of them as up to now, but all of them! Young people across the continent get connected, they show each other round their home cities and sleep on each other's couches.

GO TO AUSTRIA!

Switzerland Tourism advertises for the Austrian National Tourist Board because we are getting enough tourists ourselves.

PRIVATISED BORDERS

For reasons of efficiency, border controls across the world are taken over by a single company that holds a database about every person who has ever crossed a border.

UNLIMITED ENERGY

We travel as much as we want because we can do so free of charge and without causing any emissions.

THE RISE OF NIGERIA

Just like many people hadn't expected the rise of China, they are also surprised by the sudden economic boom of Nigeria. Within a few decades, the country becomes a major player on the economic and geopolitical scene.

UBER PUBLIC SERVICE

The state takes over the task of linking up individuals, seeing it as a public-service matter for the 21st century. Services such as Uber, Booking.com and Airbnb are now offered by the state, without 20 percent of their turnover flowing into a company in Silicon Valley.

16°
Sun

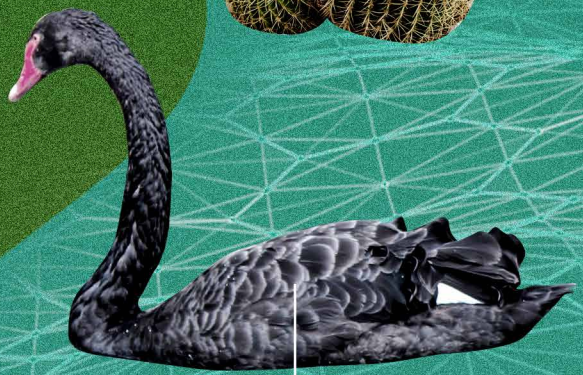
Built in 1827, 28 hectares
over 12000 plant species

Chemin de L'Imperatrice 1
1292 Pregny-Chambésy

Botanical Garden Geneva

Exotic plants from Corsica

Important collection of palm trees



Protected plants, medicinal and useful plants, garden plants and flowers as well as exotic blossoms

Exotic birds →more

Travelling with smart assistants

After this mental exercise with our wildcards, we want to focus on how smart assistants will change the way we travel. To this end, we shall adopt three different perspectives: that of the customer, that of the service providers, and that of destination management organisations (DMOs). Because the customer experience is at the heart of all this, and because service providers and DMOs have to act accordingly, we shall begin with the perspective of the customer.

The customer journey

How will digital assistants change our travel experience? To answer this question, we shall divide up the tourist experience into different phases and shed light on the influence of technology on each of them. In this, we shall orient ourselves on a classification that is also utilised in the study carried out on behalf of the State Secretariat of Economic Affairs (SECO) entitled «Digitalisierung im Schweizer Tourismus: Chancen, Herausforderungen, Implikationen» (Digitisation in Swiss Tourism: Opportunities, challenges, implications). [10] These phases are «Inspiration/information», «Booking», «The journey» and «After the journey». Because we want to use this journey for individual activities during the course of it – such as going to a restaurant – we will not speak of «the journey», but of «the experience». This in turn results in slightly different designations. We shall differentiate between the phases «Inspiration», «Decision», «Experience» and «Follow-up».

INSPIRATION

When we move through the Internet or in the analogue world, we leave behind us a large data footprint. Experts anticipate that by the year 2020, 1.7 megabytes per second will be produced for every individual on our planet.[11] Most of this data, however, is not created by us. It's data about us, and most of it belongs to the big software companies.

This data is spread today across many different services. Facebook, Google, our banks, even the supermarket for which we have a loyalty card – they all know something about us. But they don't know what the others know. If a digital assistant becomes an interface – a middleman for online services – then we will be getting it to answer our timetable enquiries and to make our bank transfers. So the assistant will collect data about us from different domains, and it will thus also know what journeys could inspire us.

The inspiration for a journey often comes to us through the media. We might see a documentary film about the fauna of the Alps, for example, or a netflix series with beautiful landscapes, or holiday photos of our friends on social media that we like, comment or repost, or we might get our assistant to read us an article about an exciting artist whose exhibition we may want to visit in future. If our

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[10] Laesser, Ch., Schegg, R., Bandi Tanner, M., Liebrich, A., Lehmann Friedli, T., Fux, M., Stämpfli, A. (2018). *Digitalisierung im Schweizer Tourismus: Chancen, Herausforderungen, Implikationen.* Report commissioned by the State Secretariat of Economic Affairs SECO, Bern: SECO. In German, with an English summary on p. 47.

[11] *Everyone on the same page, all the time.* (2018). [Link: bit.ly/umsa-domo – Source: Domo]

assistant knows exactly what we're watching or listening to, that can be immediately helpful to us as users because we can ask questions about the content. We might ask about the shooting location while watching a film, or in the case of the abovementioned article on an artist, we might ask questions about her that aren't answered by the article.

Registering our media consumption and answering our questions can in the long-term lead to our assistant getting to know us better and better – as is also the case if we answer questions that our assistant poses to us (such as «would you like to travel there?»). This means it can offer us better recommendations for further media content, and also suggest travel destinations.

New media bring new possibilities for inspiration. In virtual reality (VR), it's possible to fly like a bird through the Swiss Alps. Tourism organisations could pay game developers to incorporate their landscapes in games – as a kind of product placement – and they could provide the data for the landscapes in question too. Our assistant would also register what landscapes we prefer in our VR worlds, even if in our role as a bird we are not even aware that we are flying through the Lauterbrunnen valley.

DECISION

If we now tell our assistant that we would like to go on holiday in the coming autumn, then it will make suggestions based on our registered interests. For example, it might suggest a hiking holiday in the Swiss Alps to go and watch the groundhogs we've seen in a documentary film, or a beach holiday like the holiday snaps we liked, or a trip to a city where works by the aforementioned artist are being exhibited. If several people want to travel together, their assistants can join forces to find a common denominator. Of course, the assistant can also ask questions. Do we want to just relax, or also experience something interesting? Do we want luxury, or something more down to earth and authentic?

Because the assistant has access to our calendar data, it can also make spontaneous suggestions. If we've got nothing on next weekend and it's going to rain, it can suggest a weekend excursion. Perhaps to a place where tickets are especially cheap at the moment, where the weather is better and where a band we recently discovered is giving a concert.

Once the decision is made regarding the dates and the most important criteria, the assistant can make all the necessary follow-up decisions on a provisional basis – all the overnight stays, restaurant meals, museum tickets etc., and also see to all the associated administrative tasks. In order not to disclose the customer's data to all possible hotels and restaurants – especially in case our travels plans should still change several times – the assistant will reserve everything in its own name and use a virtual credit card such as we can already generate today through services like Privacy.com.

Of course, we don't have to let our assistant dictate our travel plans. Whoever wants to check all the alternatives themselves can do so at every stage. If we're not happy about a restaurant suggestion, or if we're simply curious to know what alternatives there are, then we can swipe through these just like on Tinder until we find something more to our liking. It's easier to change individual stages than to put together a journey from scratch.

We can be inspired to do many activities during our actual journey itself. Perhaps a different route might look more interesting than the one chosen by our assistant. If the assistant tells us something about a medieval castle, and mentions that there are several such castles in the area, then perhaps we'll want to see them too. If we're standing at a good vantage point, the assistant could use augmented reality (AR) to show us interesting places or restaurants that we might want to visit. If we see that a restaurant is just around the corner, then we can get our assistant to read us the menu or several reviews of it. Since the restaurant provides its own data in real time, we can also find out if there's a table free, and if we want, we can reserve it. Thanks to sensors in car parks, our assistant will then show us the route to the next free parking space.

Travellers can diverge from their planned itinerary without any problems. Because it's really only a suggestion, nothing compulsory. If we leave our planned route spontaneously, or if the weather changes unexpectedly, then the rest of our itinerary will be adapted dynamically, just as is the case with a GPS navigator. This is why customers will prefer hotels, restaurants and tickets that can be cancelled at the last minute. Depending on their personal risk preferences, they might even be willing to pay a small amount for this option.

«We have observed that our users tended to deviate from a predefined recommendation list established in advance. If, however, the virtual assistant was asked on the spot at short notice, this had a much greater effect. That's why we focus more on conversation than on guidelines.»

Wilhelm Rahn, Brand Creator and UX / UI Designer, Localixo Travel Assistant

EXPERIENCE

The journey itself will be shaped by the assistant in all kinds of ways. Already today, it is inconceivable to most of us that people used to go on holiday without GPS or a smartphone map. A smart assistant will know far more detail about where we want to go (or where we're supposed to be going), without our having to enter the travel destination every time. After all, it already drew up our itinerary for us. It knows the timetables and knows about any delays of busses or trains; it knows when museums or other sights are experiencing a high number of visitors, and it can adapt our itinerary so that waiting times are minimised. Waiting is an expression of bad planning. Buying tickets or checking in and out of hotels becomes superfluous, because the assistant has taken over all administrative tasks. Foreign languages are translated automatically and in real time, whether written or spoken. Whoever prefers to hear the original version of a language, like in the cinema, can have their smartphone show subtitles on its screen, instead of hearing the translation via headphones.

Thanks to its access to huge amounts of online information, an assistant can also act as a tour guide and provide the customer with interesting information – about places worth seeing, for example, or about the typical local meal on the table in front of them in a restaurant. Unlike a human tour guide, our assistant will only tell us what really interests us – and only as much as we actually want to know, whether about the local flora or historical anecdotes.

In computer games, you get rewards once you've got through certain challenges, such as finding all the treasure chests. Some tourist regions have started applying this gamification principle too. Whoever has skied down all the black pistes in a single day will get a virtual medal. A digital assistant is ideally placed to check whether a challenge really has been overcome, and it would allow for challenges that are more difficult to monitor than is the case today. The assistant can also make us aware of these challenges in the first place – for example, if we've got halfway to a particular goal without even having noticed it.

FOLLOW-UP

After a journey, the assistant will ask questions and check our ratings to find out just how well its recommendations have suited us, and what it can do to improve next time. This feedback enables the assistant to adapt even better to the desires and needs of the customer. The more questions we answer, the better we can train our assistant, and the better its future recommendations are going to be.

An assistant will also keep a kind of travel diary or logbook so that we can remember our holidays better afterwards. Today, apps already exist that can produce a time-lapse film from the selfies we've taken every day. At «Your Timeline» on Google Maps, you can see where you've been every day. EasyJet sent its customers personal reminiscences of all their journeys to commemorate its 20th company anniversary.[12] Whoever so desires can get their assistant to ask them every day for a brief description of the most important events, and the assistant will use the videos and photos we've taken to generate a video diary. The photos will either be those we've taken ourselves, or they'll be made by a mini-drone that constantly accompanies us and regularly takes photos.[13]

The best photos, naturally, are shared on social media. Already today, our camera software optimises them automatically using different filters. Our assistant knows which photos get the most likes, takes on the task of post-processing them, and also orchestrates matters such as ideally positioning the drone's camera, deciding when to upload the post and adding the right hashtags.

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[12] *How Easy Jet transformed customer data into emotional anniversary stories* (2017). [Link: bit.ly/umsa-easy – Source: And-Think]

[13] Hover (2016). *Hover Camera Passport – Self-Flying Camera On Sale Now* [Video]. [Link: bit.ly/umsa-hover – Source: YouTube]

Customer Journey Olivia and Valeria

Olivia and Valeria live in Hamburg together and plan to discover a new city every year.

DAY 2, LUNCH

INSPIRATION

Since they're already hungry, they skip the gallery visit planned for them and ask their assistant to recommend a restaurant.

DAY 4, HIKE

INSPIRATION

Based on recommendations by locals, they decide spontaneously to do a hiking trip one morning. They're still in bed when they ask their assistant for suggestions.

OVERALL JOURNEY

INSPIRATION

- Train prices
- Hitherto holiday destinations
- Preferences (taking the train, food festivals)
- Calendar dates for the two travellers

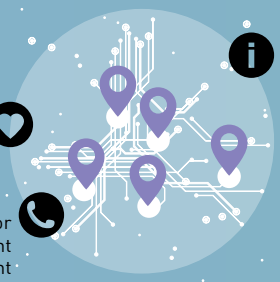
Their smart assistants are linked to form a single assistant. It notices that they are both still free in the second week of April and proposes that they should visit Zurich then. They have never been there yet, the train tickets are cheap in that week, and there's also a street food festival at that time.

DECISION

- Preferences for restaurants, hotel location, activities etc.
- Contact data for the hotel's assistant

Based on their interests, itineraries are drawn up for the whole week, along with booking a hotel and recommendations for museums, the street food festival and restaurants. After they agree, the assistant books both the hotel and the journey, though it chooses a hotel for which they can cancel their stay at any time without charge.

DECISION



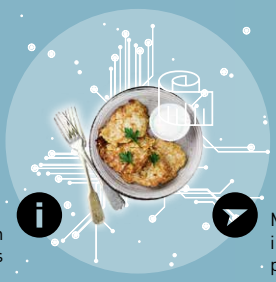
Their preferences (cuisine, budget, vegetarian options etc.)

Contact data for the restaurant assistant

List of restaurants with their locations, pictures, menus, ratings, price categories

Their assistant shows them nearby restaurants that correspond to their preferences. After choosing, the assistant then automatically books a table for them at the time they expect to be there.

EXPERIENCE



Information on dishes

Maps and information on public transport

Their assistant shows them the way and gives tips and information about different menu items (health information and anecdotes).

FOLLOW-UP

Personal information they place on open access

They rate the restaurant on the rating blockchain of Swiss restaurants. They particularly liked the rösti, so they get their assistant to save the recipe.

DECISION

Photos, ratings and topographic profiles of the hiking routes

Possibilities for buying local products

Snow situation

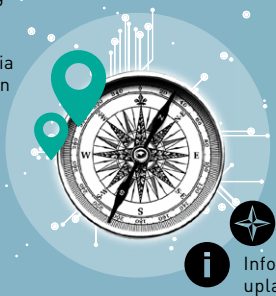
Public transport timetables

Weather data

Preferences for hiking routes (circa 4 hours, and not too steep downhill because Olivia otherwise gets pains in her knees)

Their assistant shows them hiking routes, that can be reached in reasonable time from Zurich, where the sun is shining, and there's no more snow. They choose the route with the best panorama views.

EXPERIENCE



Hiking coordinates

Information on the upland moors

During their hike, their assistant shows them their route and tells them how the upland moors they are traversing were created in the last Ice Age.

FOLLOW-UP

At the end of their hike, their assistant suggests which photos they should post on Instagram, depending on which photos the Instagram bot predicts will get the most responses.

EXPERIENCE

Programme points carried out the day before

Every day, the assistant offers them a new daily programme, and they follow it relatively faithfully for the first day. From the second day onwards, they diverge increasingly from the assistant's plan, and the assistant adapts its suggestions dynamically in accordance with what they decide.

FOLLOW-UP

After they return, their assistant creates a joint photo album and enters the places they've visited on a map.

... Possible data basis

Customer Journey Chen

Chen is a self-employed software developer and a passionate sportsman. After a forthcoming project in Frankfurt, he wants to work for two months amidst nature.

DAYS 22–24, JOURNEY TO MILAN

INSPIRATION

Personal preferences (opera)

Since Chen is interested in opera, his assistant makes him aware that a temporary travel group of Chinese is being formed that wants to travel from Zurich to Milan to go to the opera.

OVERALL JOURNEY

INSPIRATION

- Distance from Frankfurt
- Sporting activities
- Offers for co-working hubs
- Offers for accommodation

Chen's assistant shows him several destinations where co-working in nature is possible, and that offer sports opportunities. It shows him the rough prices for the journey and different accommodation possibilities.

DECISION

- Apartment preferences
- Timetable and cost of the train connection
- Contact with the apartment owner's assistant

Out of the different places on offer, Chen decides on Laax and lets his assistant book his trip immediately, along with a mid-price apartment.

DECISION

He agrees to go on the trip, if he has time on the days in question and if there is an opera performance planned during this time for which he can still buy tickets. His assistant coordinates his dates with the other interested parties and pays his part of the travel costs to the bus company that the group is using for their journey.

EXPERIENCE

Taking the size of the group into consideration, the assistant helps to find restaurants that have space for them all. The participants are flexible during the day, because their assistants know who is where, and also remind individual participants to be at the opera in good time.

FOLLOW-UP

Every member of the group is rated by the others afterwards. This rating helps to determine whether they'll be considered for other attractive trips in future.

EXPERIENCE

On the basis of his fitness values, Chen's assistant puts together a sports and health programme for him. According to the weather, it plans either mountain biking or a fitness programme in a nearby hotel. Chen's state of fitness is communicated by his smart assistant to the service provider on the spot so that the ideal bike is ready for him, and the coaches and physio at the hotel already know his level.

FOLLOW-UP

At the end of his stay, his assistant provides an overview of the work targets he's reached, about his state of fitness and his dietary goals. It sells this data to the hotel along with ratings and personal information.

Possible data basis

Service providers

Smart assistants will change not just the travel experience of their customers, but also the everyday lives of tourism service providers such as restaurants and museums.

SIMPLE MARKET ACCESS

Smart assistants will enable a broad mass of people to become tourism service providers, for example. Whoever has a resource such as an apartment, a car or good local knowledge will be able to offer this resource online. Digital platforms such as getyourguide.ch or Airbnb already take on a large proportion of the administrative and coordination work and lower the barriers to entering the market. Smart assistants will lower these barriers even further.

These low entry barriers mean customers can also become service providers. If we drive a car from A to B and it has empty seats, then the assistant will inform us that these can be sold (as is the case with BlaBlaCar). Searching, agreeing the price and coordinating everything will be organised by our smart assistant in collaboration with the assistants of our possible passengers (who might not even know that they could soon be travelling with us). We won't even have to log onto Uber. Unused rooms in a chalet we've rented could be sublet in the same way. And whoever is a good skier can give skiing lessons even if they're on a skiing holiday themselves. Art historians can offer guided tours of museums. Low-threshold market access such as with «Airbnb Activities» will stimulate the competition and thereby enrich the more conservative offerings from established players. Smart assistants will make the threshold even lower. A city tour, for example, could also be offered by a slam poet or a stand-up comedian. This kind of exchange doesn't necessarily have to be money-based, but could also proceed as a kind of swap (for example: you get a city tour in return for giving a language lesson) or as a gift (as with couchsurfing.com or certain showaround.com offerings).

OPTIMISING SERVICES THROUGH PERSONALISATION

Smart assistants can also enable service providers to adapt their offerings better to the market. For example, an assistant will ask how good the food was in a restaurant. This information won't just be posted as a rating, but forwarded to the restaurant along with details of the precise order, on the people involved and on the seat and table occupied; these particulars could even be sold to the restaurant. Only, of course, if the customer is happy for the information to be used like this. Smart assistants owned by the restaurant would then comb through all their data to look for patterns. If the ratings are always more negative from customers who sit next to the toilets compared to other parts of the restaurant, it might even be worthwhile to remove this table altogether.

If the restaurant offers free amuse-bouches, their impact on the overall rating can be quantified and optimised accordingly. Where more comprehensive services are on offer – such as in a hotel – those in charge can calculate which services had the biggest impact on the overall rating. This means that the hotel can invest in those areas that have the biggest influence on customer satisfaction.

Just how important each service is depends on the customer. Some place great emphasis on personal service, while others prefer anonymity. Customers' assistants know about their preferences and can be asked about them too. This enables customer service to be personalised, with customers' desires fulfilled before they've even expressed them (because their assistant has already expressed them).

PERSONALISED PRICES

Personalisation can also take place via the price. Different customers are willing to pay different prices for a particular service. Service providers could thus demand different prices from different customers if they knew who was prepared to pay what. Uber today uses machine-learning algorithms to find out how much customers are willing to pay according to the time of day, the day of the week or their destination.[14] Whoever wants to travel to a wealthy suburb in the middle of the night will be ready to pay more than someone who travels to a less affluent part of town during the day.

But these prices are not really personalised. With Uber, initially all passengers seem to have to pay the same amount for travelling the same distance at the same time. It is conceivable that someone who regularly travels to wealthy suburbs, or whose phone battery is almost dead, will pay more than others, regardless of the distance.

Determining an individual's willingness to pay is easier the more data you have about them. A travel assistant that is run by a big platform such as Google can combine a lot of data points about the users and determine how much they'd be willing to pay. The extra money collected will most likely never reach the actual service providers, but is siphoned off by the platform itself. But if an assistant functions in a decentralised manner – perhaps locally, on the user's machine – then it will know how much that customer is willing to pay. However, it's still unclear why it would want to communicate this to the service provider. Using virtual credit cards such as Privacy.com, even the identity of the customer making the booking remains unclear. In order to get the best deal, an assistant could even pretend – out of customer loyalty – that its user cannot afford to pay a lot. This would lead to a metaphorical arms race between the assistants of customers and service providers (or, rather, between their respective algorithms). The one side would try to communicate the lowest possible willingness to pay, while the other side would use its total enquiries to try and determine just what the customer was actually willing to pay.

Besides the matter of how the technology for this might be realised, we remain uncertain about the social acceptance of personalised prices. A few years ago there was a storm of outrage when certain airlines were suspected of increasing their prices depending on how often people visited their websites. At the same time, flexible prices theoretically enable people with less money to get access to certain services.

OPTIMISING SERVICE OFFERINGS BY PREDICTING DEMAND

Another form of adapting to the market is by predicting demand more accurately. Smart assistants of service providers can learn to predict demand based on data for factors such as the weather, the time of year, the day of the week, holiday calendars, visits to the website, the volume of demand from the day before, and much other data. This enables them to plan the necessary capacity better – such as the number of service personnel that will be needed.

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[14] *Newcomer, E. (2017). Uber Starts Charging What It Thinks You're Willing to Pay.* [Link: bit.ly/umsa-wtp – Source: Bloomberg]

Predicting demand can also help determine pricing. Assistants can adapt prices automatically to the market situation. Out of season, rooms automatically become cheaper, and meals are offered cheaper outside the busiest restaurant hours. Drinking a cola in the shade will cost less than in a sunny spot on the terrace of a café. Besides demand, the competitive situation is also decisive. Comparing prices with the competition could even lead to service providers engaging in a kind of auction out of season, undercutting their competitors' prices in an effort to attract customers. By contrast, when there is excessive demand in the high season, the tables would be turned and customers (or, rather, their assistants) would be outbidding each other for the best services.

CREATING A DIGITAL IMAGE OF SERVICE OFFERINGS

The possibilities offered by digital assistants will also demand a lot from service providers. In order for a machine to find its bearings in the real world, it has to have access to a digital image of the analogue world. When machines make bookings with machines, all offerings have to be machine-readable.

«Tourism service providers have to ensure that the data they feed into databases complies with the right data-processing laws. They have to have the right to bring data into this new world.»

Florian Bauhuber, CEO, Tourismuszukunft

To ensure that service providers are not invisible to digital assistants, they have to create a digital image of their offerings. The menu, the occupancy rate for hotel rooms, restaurant tables and parking spaces, and even the waiting times at mountain railway stations. These are just a few examples of the data that has to be gathered in a real-time data pool and made easily accessible to all interested parties, whether people or their digital assistants. This data has to be combined with data from customers, who could even be rewarded for precise feedback by being given a discount – or perhaps a smoothie at the bar.

Touristic offerings have to be made machine-readable in order for smart assistants to perceive them and recommend them.

Destination management organisations (DMOs)/ Tourism organisations

As more data becomes accessible online, the resolution of the digital image created of our reality will improve; and this in turn means that digital assistants will be better able to support customers on their travels. Customers don't have to guess the quality of a service on the basis of two or three photos and the price. As much data as possible has to be accessible online in real time, from photos to menus to the current availability of parking spaces. It also has to be in a comprehensible format and properly interconnected. In technological terms, more and more is becoming feasible. Algorithms are recognising objects, faces and speech. Sensors are calculating the filling level of beer kegs, how many parking spaces are occupied and the current weather situation. However, many service providers find themselves overwhelmed by the amount of data involved. DMOs can help service providers to become digitally visible. There are two challenges involved in this. On the one hand, content has to be generated, but on the other hand, this data has to be made accessible online.

GENERATING CONTENT

In order to be able to generate this data in the first place, DMOs can distribute sensors. An indoor swimming pool can count the number of people entering and exiting, and thus track the utilisation rate of the pool. Cameras can count the number of skiers on a piste. GPS transmitters know where rented bikes are, and have information about local bus services. The so-called Internet of things means that more and more devices are being equipped with sensors, and these are sharing their information on the Internet. It is not easy to determine in advance just what data is important and what isn't. This is why many data-oriented companies collect all the data they can, just in hopes that it might one day prove useful. If we use deep-learning algorithms it's in any case unclear what data the algorithm is actually using. This is why the motto here is: The more data, the better.

«How do you get people involved who live in the region? They could perhaps figure as AI trainers by answering questions, which in turn could help to derive touristic suggestions for others.»

Prof. Dr Andreas Liebrich, Institute of Tourism, Lucerne University of Applied Sciences and Arts

Thanks to Swisscom's Low Power Network – a wireless network for the Internet of things – data can be transmitted using very little energy. In other words, sensors can function without being

Content is more than just photos and videos.

Only by being linked can data acquire relevance.

physically connected to the power grid or to the Internet. A sensor embedded in the ground of a parking space can transmit information on its use for seven years before the battery has to be changed. A DMO can support this form of digitising analogue information by offering sensors and advice to service providers on how to use them.

Creating audio-visual material is another aspect of content generation. Small, independent service providers in particular hardly have the resources necessary to generate good images or videos. Customers who take such photos or videos themselves often post them on proprietary sites such as Facebook or TripAdvisor, which can mean that they assign the rights to them to these same platforms. DMOs could lend out the necessary equipment and offer courses to explain how to create high-quality audio-visual media; they could also recruit professional photographers to shoot the photos, or help service providers to buy good photos and videos from third parties.

Gamification tasks are another form of content that DMOs can provide. DMOs could offer badges for climbing all the local mountains in a certain space of time, for engaging in small talk with at least ten locals, or for covering a certain distance on cross-country skis. The more information is captured digitally, the more varied and subtle these achievements can become. People will be informed once they've succeeded in such a challenge, even if they were unaware of the challenge at the outset. These challenges could include eating fondue without losing your bread in it, avoiding the word «hipster» when visiting Zurich, or managing to sleep through the night in an alpine hut despite the snoring of your neighbours.

If digital assistants listen to our every conversation, such achievements could also comprise telling ten people about our holidays afterwards. And instead of handing out badges, people who talk about a region or a product could simply get paid. This could give rise to a gig economy for advertising which carries the trading of attention into our personal relationships.

GETTING CONNECTED

It doesn't matter how good the content is – whether it's photos of historic buildings, the water temperature of lakes or visitor statistics for museums – it is of little use unless it's noticed. With our focus on digital assistants, this means that the content in question first has to be perceived by the assistant, and only then does the assistant decide whether or not it's relevant for its user.

With today's assistants – like Amazon's Alexa – there is a simple way of getting your own content across. You program them with a certain skill, the voice assistant counterpart to the app (with Google Assistant, these skills are called Actions). For example, the skill «bus services Aachen», as the

name suggests, will offer information on busses in the city in question. If I want to ask about a particular route, first I have to find the relevant skill in a library, just like with an app, then install it and start it up – such as by saying: «Alexa, open bus services Aachen.» But this isn't truly convenient.

Better algorithms will mean that these intermediate steps fall away, and all these skills, apps and websites will suffer the same fate as all other intermediaries before them, whether newspapers, music albums or encyclopaedias. Smart assistants will understand our questions and get the necessary information without the help of installed apps and skills. If assistants possess such powerful artificial intelligence as described in our customer journey above, they will search the web independently for information relevant to us, just like a person would. If a bus timetable is available only as a photo, then it won't be a problem because our assistants will understand the text and know how to read a timetable. The more interconnected the data, and the simpler it is to read, the better it will be for us.

LINKED OPEN DATA – THE WWW FOR DATA

Until artificial intelligence can understand the world as well as a person can, we're going to have to give it a helping hand. To this end it's important to link up data so that data on hotels, train connections and opening hours of attractions isn't just present on their respective websites without any connections, but instead can form a holistic destination network. This data in turn has to be linked to other data in the Net, such as Wikipedia articles on trains, geographic information and so on. This means that machines will understand the context of data. In order to achieve this, Sir Tim Berners-Lee introduced the concept of Linked Open Data. Just like the World Wide Web, which is a network of websites that are linked to each other, Linked Open Data is intended to make possible a large network of data. It will contextualise all possible information and make it comprehensible to machines.

«What is decisive is that the data is accessible as Linked Open Data, not just as data in a relational database controlled through an XML interface.»

Florian Bauhuber, CEO, Tourismuszukunft

It is important that standards are implemented – such as those defined on schema.org, for example – and that the data is openly accessible. We can already find tourism-specific standards at schema.org, such as standards for opening hours or languages spoken at certain places.[15] DMOs can ensure that data is kept up to date and complete, and that it is shared in accordance with the respective standards. And by joining forces with other DMOs, they can promote the implementation of further standards and get data linked up on a large scale. This is the goal, for example, of the «Knowledge Graph DACH».[16]

If comprehensive data about a destination is freely accessible and of a consistently high quality, this enables everyone to use it. Creative service providers can then build on it to promote the attractiveness of the destination in question. For example, someone might program a guide for vegan restaurants. The open nature of the data and its high degree of connectedness also reduces our dependence on monopolies like Google or Booking.com that up to now have been the sole owners of such well-structured data. This means that alternative, smaller players get access to the market.

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[15] schema.org/TouristAttraction

[16] Bauhuber, F. (2018). *DACH-KG: auf dem Weg zum touristischen Knowledge Graph!* [Link: bit.ly/umsa-dach – Source: Tourismuszukunft]

When data is made open, legal issues inevitably arise in which DMOs can also help service providers.

«We need a common standard to be able to work with the big players, but at the same time to be able to work against them. Only data on an open basis also offers an opportunity for small start-ups, alternative platforms and other tourism actors to create alternative applications alongside the big players.»

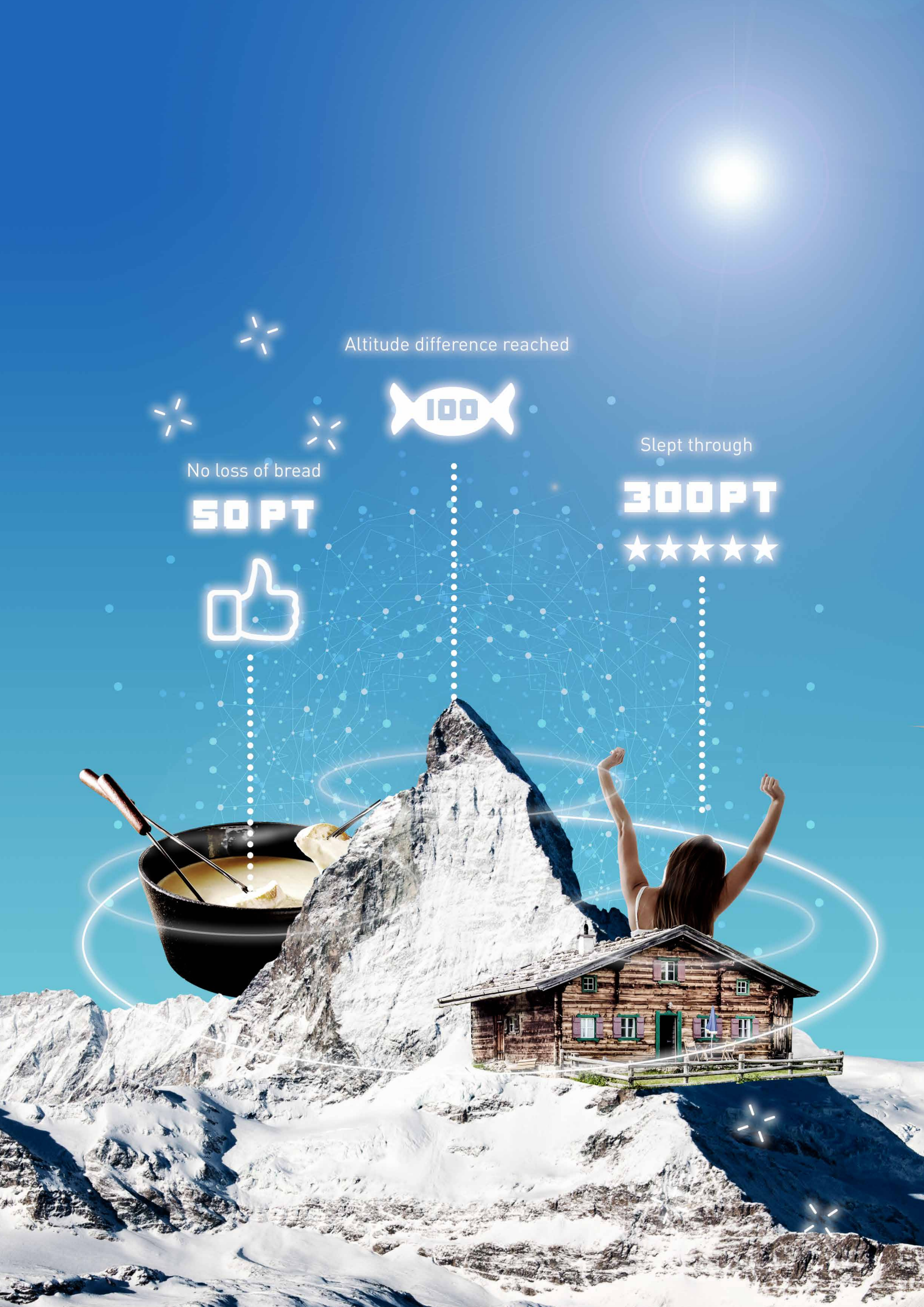
Florian Bauhuber, CEO, Tourismuszukunft

DMOS FOR ADVICE AND SUPPORT

When it's a matter of service providers making data accessible to others, DMOs can play an important role, offering advice and support. How should service providers prepare their data? What data should they share? Service providers can share their data easily if application programming interfaces (APIs) exist for the software they use. Thus data that is already in existence can simply be linked up with a database of the DMO. Or DMOs can come together to develop new software for hotels, restaurants, museums etc. in which the interface is integrated from the outset. Then they can share this software for free.

And how can service providers use accessible data for themselves? If every service provider knows the prices and occupancy rates of the competition, then prices become more dynamic, and this in turn means customers can be steered better.

But such advice doesn't have to be purely technological in nature. For example, DMOs can urge service providers to incorporate the brand personality of their destination in their offerings and in their digital presence. When data is made openly accessible, legal issues inevitably arise, and DMOs can also help service providers with this. At the same time, data protection issues can also be circumvented using open data if third parties take on the task of coordinating data about the region with customer data.


Altitude difference reached
100
No loss of bread
50PT
Slept through
300PT

Any questions? The uncertainties of a smart future

We've sketched out what travelling with a digital assistant might look like in future. But some uncertainties remain regarding the technological development of these smart assistants, and the user behaviour customers will actually display. We shall deal with some of these uncertainties below.

Monopolistic life-assistants versus decentralised travel assistants

Up to now, we have often spoken of smart travel assistants. Examples of these are already in development today, such as the travel assistant Localixo.[17] But will we really want to consult a second, different assistant when we're cooking, and then a third assistant when choosing a film to watch? Shouldn't we rather have a single assistant to support us in all aspects of life, including travelling (assuming, of course, that we'll be using such assistants at all)?

In this regard, what does it mean to have a single assistant as opposed to several? Since assistants (at least today) are becoming more human, then from the user's point of view, having a sole assistant might mean having a single virtual person with a characteristic voice and personality. Just what this might look like is depicted in the film «Her», in which the protagonist even falls in love with his digital assistant.

«We developed Localixo as a system that simulates a friend who has known you for a long time and can suggest things to you that you wouldn't have considered in the first place.»

Wilhelm Rahn, Brand Creator and UX/UI Designer, Localixo Travel Assistant

Does an assistant have to create so much intimacy that we are willing to grant it insights into all spheres of our lives, even looking on it as a kind of friend? Or perhaps users would prefer to interact with different personalities depending on their requirements at any one time. This might alleviate any feelings they have that Big Brother is watching them. What's more, getting support in different domains can seem more authentic if it comes from different personalities. Should the assistant that helps me to cook pasta sound more like an Italian mamma, instead of having the same voice as my virtual tax advisor?

«Potentially, an assistant can embody different personalities. A brand thus has the opportunity to develop a voice that projects its brand image out into the world. This can help it to build up a more personal relationship with the user.»

Gabriela Kunath, research associate and doctoral student, Faculty of Economics and Management, University of Lucerne

In technological terms, the number of personalities an assistant might have is irrelevant to whether or not we use one or more assistants. What matters is whether these are controlled in a single place where all the data comes together. This can be on a device, or on server such as Google's.

If an assistant is supposed to offer us the best recommendations, then it makes sense for it to know us very well and for it to accompany us in many different areas of our lives, not just when we're travelling. After all, our assistant has to register our media consumption in order to help make travel recommendations.

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[17] localixo.com/en

If our assistant is registering our daily activities, our movements, our media consumption and our shopping purchases, then all this data converges in a single spot. It is clear that such a smart assistant is more than just another interface with the Internet like browsers and apps. We also cannot regard such assistants as if they were ordinary platforms like Google or Facebook.

ASSISTANTS AND PLATFORMS

Online services like Google, Facebook, Booking.com etc. are platforms with huge amounts of content (videos, hotel information, news etc.). Their services are not just focussed on making this content accessible in one place, but primarily about making it accessible in line with our personal interests. This means everyone sees only what appears most relevant to them. The more users a platform has, and the more the platform is used by them, the better and more user-oriented that platform becomes. And the more useful it becomes, the better it can select its content for individual users, which in turn means they will use it more. This virtuous circle ultimately enables these platforms to become monopolies. Every click makes Google better and thus makes it more difficult for other search engines to compete with it.

Most offerings, however, are restricted to specific domains. As long as we use different services, these don't know our data footprint with other services (Google doesn't know everything that Facebook knows about us, and vice versa). A smart assistant, however, would be an interface for all our digital interactions. We would use it to access both Booking.com and our Facebook content (and much more besides, of course). This means that all this data would converge in a single place. Registering all our digital movements enables our assistant to select the best content for us across all platforms.

So platforms have access to the data of many users, but only within their own sphere of jurisdiction. Assistants, on the other hand, would possess data from many platforms, but initially only of one user (*see Figure 3*):

But recommendations are based on the preferences of other people with a similar profile to ours («Customers who bought this are also interested in …»). Recommendation and prediction systems thus profit from combining the data of as many people as possible. The reason that Siri and Co. do not understand Swiss dialects very well is that these dialects are spoken by relatively small numbers of people, and so these assistants have not been able to acquire much learning experience.[18]

«The biggest hurdle to artificial intelligence is having enough data.»

Boris Paskalev, Co-founder and CEO, DeepCode

«Already today, assistants are helping us to process all the information that surrounds us. As information becomes increasingly accessible, we can't process it all ourselves, nor do we want to, because we want to use our time for other things. Thus we're happy if we can delegate certain tasks to our assistants. I am completely convinced that this will become increasingly the case over time.»

Gabriela Kunath, research associate and doctoral student, Faculty of Economics and Management, University of Lucerne

[18] Wittwer, J. (2018). *«Noch keine Spracherkennung für Schweizerdeutsch».* [Link: bit.ly/umsa-dialekt – Source: Tagesanzeiger]

The data jurisdiction of different platforms (light blue) and of decentralised assistants (dark blue) and centralised assistants (all cells)

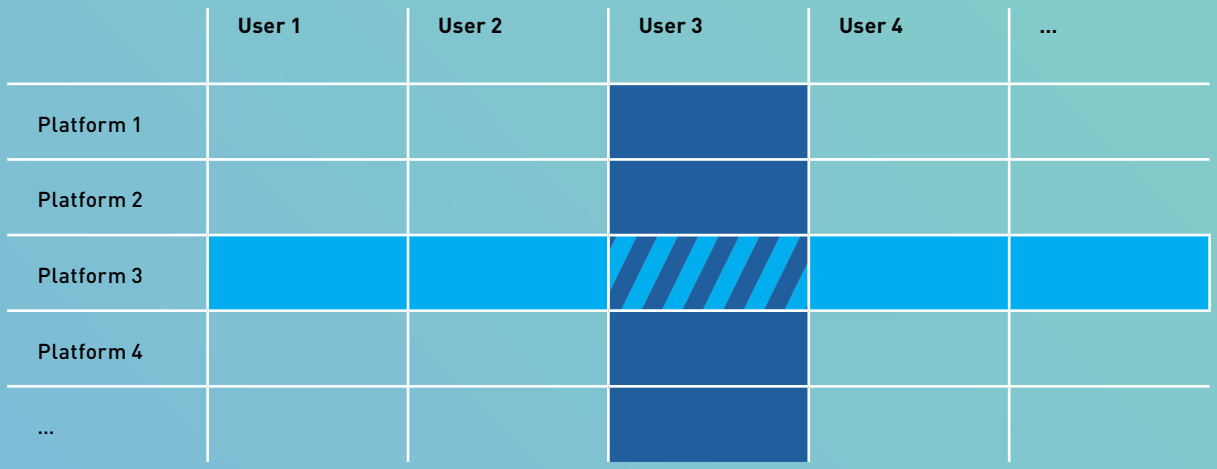

Figure 3

In order to understand user commands and to choose the most relevant information for everyone – in other words, to become a truly useful tool – it seems imperative that assistants should be able to share information among themselves. The logical consequence of this is that all data of all users of all platforms would converge in a single place. This would put even today's information giants like Google and WeChat in the shade, and would raise concerns about our privacy and the potential misuse of such data.

IS THERE NO ALTERNATIVE TO MONOPOLIES?

There are many reasons to believe that monopolies such as Google or Facebook will only be strengthened by the use of smart assistants. But there are also alternative ideas about how the big players might be forced to give up their power.

Snips.ai is an example of a decentralised assistant. On its website, the company promises that everything will only run locally on your device, which is why your own voice recordings will never leave it. All the same, the algorithms of Snips.ai have to learn the different ways in which we might ask our assistant to turn on the light (for example), or ask about a bus connection. It is highly inefficient to have to learn this anew for ever individual user, and it's also frustrating to the users. Snips.ai solves this problem by getting people to train the AI and by paying them in a Snips cryptocurrency (similar to Bitcoin).

«Devices are becoming very powerful. This is promoting a trend towards local processing, which means that AI applications could take place on a device directly, without access to the cloud. This means we would have better control over our data.»

André Golliez, Managing Partner, Zetamind

Snips also uses so-called federated learning.[19] This means that deep-learning models – i.e. AI pattern recognition abilities – are downloaded onto the device where they can learn things locally and adapt themselves accordingly. After this, the adapted model – the improved ability – is uploaded again and is aggregated with other models that have undergone minor local modifications. This means that it's not personal data that is stored centrally (such as audio recordings of questions), but only the ability to recognise certain things (such as place names). These abilities are all very specific, but can be made openly accessible to everyone as a kind of Wikipedia of AI abilities.

Just what a decentralised collection of AI abilities might look like – one that could make a centralised assistant unnecessary – is demonstrated by the SingularityNET Foundation.[20] It assumes that there will soon be many powerful, so-called weak artificial intelligences (or that these in fact already exist). These are AIs that can complete precisely defined single tasks, such as offering personalised restaurant recommendations in Geneva, but they are not intelligent in the normal sense of the word. Some of these algorithms might even be accessible on coding platforms such as GitHub, though they are difficult to access for users without any programming experience. SingularityNET wants to set up a marketplace for all these AIs, comparable to an app store. This platform would enable everyone (including AIs) to draw on services from AIs or to offer AIs themselves for specific tasks.

In the long term, the platform would become a general AI that achieves human intelligence or even exceeds it. Just like an app store offers more than a single company alone could ever produce, so a SingularityNET platform would offer more than all the AIs that Google and Apple could themselves create. Since the platform runs on a blockchain, it doesn't belong to the SingularityNET Foundation, but exists as an independent organism in the Internet.

Tourism organisations could offer assistants for their regions free of charge on the SingularityNET platform. It's possible that such assistants could have a personality and a characteristic voice that would then embody the brand personality. A personal smart assistant that might even be running locally on a user's device, or on his or her personal cloud, could get access to the abilities of a region's local tourism assistant via a platform like SingularityNET. This assistant from the destination region could learn abilities on the local device according to the federated learning process, and then channel what it has learned back into its own algorithm, without ever having received the user's actual data.

Perhaps certain data could also be bought from users, because data can be traded via a platform like SingularityNET just as AI abilities could be. The Swiss company bitsabout.me is pursuing this idea and is setting up a data marketplace for it. It wants to make it possible for users to exchange specific data and get money or certain services in return (such as good tourist advice). Smart, decentralised assistants could even become independent economic players, using guidelines we have determined in advance to trade our data with each other and acquire services for us.

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[19] Konečný, J., McMahan, H. B., Yu, F. X., Richtárik, P., Suresh, A. T., & Bacon, D. (2016). *Federated learning: Strategies for improving communication efficiency.*

[20] singularitynet.io

«It's extremely important that citizens and users take back control over their data. Decentralised functions using blockchain technology will enable us to exercise our right to privacy and can protect information from being misused.»

Christian Di Giorgio, Crypto Valley Labs, author of «Live from Crypto Valley»

The idea of a data tax is also being mooted as a possible means of breaking up the monopolies.[21] Big companies that overstep boundaries for a specific share of a specific market would then be compelled by law to place a portion of their aggregate data on public access. The bigger their share of the market, the bigger the amount of data they would be forced to share.

IS MORE ALWAYS BETTER?

But is more data always better? Even if there is no such thing as too much data, there is perhaps a point where there is enough, after which additional data doesn't offer any further advantage. It was possible to investigate this assumption empirically after the EU issued a directive in 2008 that stipulated shorter retention periods for the search logs of search engines. Google did not pay much attention to the directive, but its competitors Bing and Yahoo! kept to it. They hoped that this could offer them a distinguishing feature compared to Google. Yahoo! reduced its retention period from 13 to three months, while Bing reduced it from 18 to six months. A study on the quality of search results was unable to find any loss in quality caused by the reduction in data volume.[22]

ARE TRAVELLERS INDIVIDUALISTIC?

Whether or not a travel assistant can be assigned a specific task via a platform, and can still produce a satisfactory result with little data, is something that depends on the degree of individualisation required by the traveller. Do we really need as much data as possible in order to recommend a tourist activity? Social psychologists and behavioural economists suggest that we are very much dictated by the situation in which we find ourselves. Most people who are in Paris for the first time want to go to the Eiffel Tower and take a selfie with the Mona Lisa.

«With a few questions we can learn something about the person. But it is important not to neglect the situation or context. Someone can be on a business trip in one city and visit friends in a second city, where they have completely different priorities.»

Wilhelm Rahn, Brand Creator and UX / UI Designer, Localixo Travel Assistant

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[21] Graef, I., & Prufer, J. (2018). *Mandated data sharing is a necessity in specific sectors.*

[22] Chiou, L., & Tucker, C. (2017). *Search engines and data retention: Implications for privacy and antitrust (No. w23815).* National Bureau of Economic Research.

This is why it is perhaps not absolutely necessary to know about our intestinal flora and all online searches of the past ten years in order to recommend a restaurant. The very fact that restaurants are given a rating on GoogleMaps and TripAdvisor, whereas songs on Spotify don't get them, means that many people are of one opinion about what makes for a good restaurant. But to know what makes a song good needs far more personal information.

So we don't necessarily need a combination of thousands of data points in order to recommend a good restaurant. Just dividing up customers into a few clusters could perhaps suffice. Customer preferences differ in matters of child-friendliness, the type of cuisine, the price category, and so on. This information only has to be conveyed once to the assistant. Recommendations for these clusters could then be defined by local tourism organisations.

Individual differences are less important when we're in an unfamiliar country. Just like Chinese tourists want to see the Eiffel Tower and the Mona Lisa, Europeans in China want to visit the Great Wall. Pearce has postulated a travel career ladder for tourists that is similar to Maslow's pyramid of needs (*see Figure 4*).[23] Basic needs here include stimulation and relaxation. Physiological needs are then added to them. It's only with a certain degree of experience in a cultural space that the personality of an individual traveller comes to the fore and desires become more individual. Issues such as the need for status or self-development play a bigger role.

From this we can conclude that experienced tourists who would expect highly individual recommendations would also tend to use a digital assistant less often, or in a more specific manner, than inexperienced tourists. With today's increase in long-haul travel, there is an increasing number of tourists lacking experience in specific cultures – people who are travelling to Paris or Beijing for the first time. A digital assistant doesn't need much data to help these tourists on their trips.

«Bucket-list tourists don't need special recommendations. Unless they happen to be in a wheelchair, for example.»

Prof. Dr Andreas Liebrich, Institute of Tourism, Lucerne University of Applied Sciences and Arts

[23] Pearce, P. L. (2005). *Tourist behaviour: Themes and conceptual schemes.* Channel View Publications.

Pearce's «Travel Career Ladder»

People tend to ascend the ladder with travel experience

Overall pattern of motives is the important feature

FULFILLMENT NEEDS

Need for self-actualization
Need for flow experiences

SELF ESTEEM/DEVELOPMENT NEEDS

Other directed	Self-directed
Need for status	Need for self-development
Need for respect, recognition	Need for growth
Need for achievement	Need for curiosity/mental stimulation
	Need for mastery, control, competence
	Need for self-efficacy
	Need to repeat intrinsically satisfying behaviors

RELATIONSHIP NEEDS

Other directed	Self-directed
Need to reduce anxiety about others	Need to give love, affection
Need to affiliate	

SAFETY/SECURITY

Other directed	Self-directed
Need to reduce anxiety	Need for security
Need to predict and explain the world	

PHYSIOLOGICAL NEEDS

Other directed	Self-directed
Need for escape, excitement, curiosity	Need for sex, eating, drinking
Need for arousal, external excitement, stimulation	Need for relaxation (manage arousal/ stimulation level)

Higher level motives include lower level motives. One motive at a time tends to be dominant.

Overall pattern of motives is the important feature

Figure 4 (Source: Pearce, 2005)

Human versus machine

If a smart assistant is as intelligent as a human being, then it can take over many human tasks. In the scenarios sketched out above, for example, we mentioned the possibility of an assistant taking on the job of a tour guide. It can provide historical facts and anecdotes, drawing on a treasure trove of knowledge far greater than any single human being could muster, and is also far better equipped to take account of the personal interests of travellers. For some, historical information is important, while others are more interested in architectural aspects. Since this service would be free of charge – or at least already included in a subscription to an assistant – it is even cheaper to let oneself be informed by one's assistant than to pay a person to do it.

Does this necessarily mean that all human services are going to be replaced by machines? No more tour guides, only automated checking into hotels, no need to give a waiter your order in a restaurant, no more information desks at railway stations? It seems plausible that some of these services will be rationalised and jobs scrapped if the services in question are simply cheaper when rendered by a machine. It would theoretically be possible to have a touristic experience without any human contact at all.

But where machines are going to predominate, and where not, also depends on our destination. If a destination aims to attract mass tourism, then more jobs there will be done by machines than in a place devoted more to exclusivity as its selling point. Contact with other people is for many of us much more valuable than getting the same service from a machine. People pay money to attend a live football match, even if they could actually get a better view of it on their TV at home. You can listen to most good speakers on YouTube, but people still pay good money to be able to hear them live.

The people who will really suffer from automation are the speakers who aren't so good. The best tour guides and the most attentive waiters in the best restaurants aren't going to be replaced by machines. Those who are just OK will feel the impact of automation and can expect to be replaced by machines, or they will have to reduce their financial expectations considerably in order to compete with them. Because it's not profitable to automate low-paid jobs. And the tourism industry is full of them.

For many people, however, having contact with other people is what is most memorable about their travels. It's also the very thing that puts a face to a destination, and gives it an identity. Even when it's cheaper to have people looked after by machines, and even if customers say they prefer it, it can still be worthwhile to employ human beings in certain places as a means of communicating a brand.

«Contact with people, with the local character of the Valais population, is one of the most important, most memorable experiences our customers enjoy.»

Damian Constantin, Director, Valais/Wallis Promotion

Convenience versus adventure

In our discussion of digital assistants thus far, customer convenience has been the core motive. Even the smart travel assistant Localixo talks up its services by emphasising that we'll waste less time searching for activities and thus have more time to actually enjoy our journey. This corresponds to the convenience logic that is an important driver of digitisation. Evan Williams, one of the co-founders of Twitter, calls the Internet a giant engine of convenience that can «solve basic human problems with greater speed and simplicity».[24] Social psychologists and behavioural economists have proven that simplicity of behaviour is often more important than financial factors or our own attitudes to this behaviour. It is also confirmed by everyday experience. Customers prefer to buy music from iTunes than to download it free of charge from a peer-to-peer platform, simply because the latter is more complicated. If the degree of convenience is high enough, we even tend to throw caution to the winds when our privacy is at stake.[25]

But do people really want maximum convenience? Or is there such a thing as too convenient?

THE PATH AND THE GOAL

The concept of convenience implies a clear distinction between our destination and the road we take to get there. The road is circuitous and bothersome, so the easier we can make it, the less time people have to «waste» in getting to their goal. Why waste time planning our holidays if someone else can do it better for us? Why should we meditate for years if we can change our consciousness immediately using LSD? Instant soups are marketed as saving us time, leaving more time for the important things. Perhaps even practising an instrument will one day become superfluous if we can simply upload the motor information into our brain that will let us all become ready-made virtuosos on the piano.

PROCEDURAL UTILITY

This hacker ideology that divides the road from the destination can lead us to neglect the value of the road itself. Even if it seems a cliché, the phrase «it's not the destination, it's the journey» has its own justification. Economists speak about «procedural utility».[26] People are not just interested in outcomes, but also in how they are achieved. The psychological state of flow does not arise through reaching your goal, but by constantly getting closer to it – in other words, by constantly clearing hurdles. If you use a cheat code in a computer game, the game soon loses its charm.

«The insider tip doesn't come from a machine. It is and remains something hidden.»

Prof. Dr Andreas Liebrich, Institute of Tourism, Lucerne University of Applied Sciences and Arts

If we climb a mountain, we enjoy the view more from the top than if we've taken the cable car to get there. If we happen to discover a lovely restaurant in an isolated village or in a backstreet, this discovery of our own is more valuable than if our assistant had sent us there. And if we have to communicate in that restaurant with gestures and signs and get served a delicious meal whose ingredients remain something of a mystery to us, then we have a more exciting tale to tell than if a digital assistant translates everything for us in real time and ultimately also decides what we're going to eat.

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[24] Tate, R. (2013). *Twitter founder reveals secret formula for getting rich online.* [Link: bit.ly/umsa-rich – Source: Wired]

[25] Wong, M. (2017). *We will give up privacy for convenience (or free pizza).* [Link: bit.ly/umsa-pizza – Source: Futurity]

[26] Frey, B. S., Benz, M., & Stutzer, A. (2004). *Introducing procedural utility: Not only what, but also how matters.* Journal of Institutional and Theoretical Economics JITE, 160(3), 377-401.

BAD CHOICES, GOOD STORIES?

A good story helps us to remember experiences and to communicate them afterwards.[27] What's more, it generates an emotional attachment to a destination[28] and inspires others to visit it. But what makes for a good story? Aristoteles described a good story as a problem whose intensity factor increases until it ends in catharsis. Campbell investigated myths from different cultures and found that they possess a basic structure: the so-called hero's journey.[29] Here, too, a problem and its solution are the crucial aspects. Often, solving the problem means a personal transformation on the part of the hero. For Aristoteles, problems are particularly interesting when they arise through bad decisions and mistakes on the part of the protagonist himself.[30] The tourism researchers McCabe and Foster also believe that personal aspects are highly relevant, and they see a narrative as an essential facet of identity construction.[31] What stories can be told if digital assistants clear all hurdles from our path, if no mistakes are made, no bad decisions taken, the personality of the protagonists plays no role and they do not have to undergo any development? One could even go so far as to ask what it means to be a human being if our paths are utterly free of challenges.[32]

A CURSE OR A BLESSING?

Convenience is thus on the one hand a guarantor of success. Whoever succeeds in clearing hurdles from our path will succeed on the market. On the other hand, however, it is precisely through independently overcoming problems and meeting challenges that human beings can find fulfilment and become empowered to construct their identity. These two facts would seem to stand in contradiction to each other. Can anything truly be successful if it deprives us of the chance of fulfilment, a sense of achievement and the opportunity to construct an identity for ourselves?

THERE'S ALWAYS SOMETHING TO BE DONE

One could argue that this state of affairs would never come about – that people will never in fact lack challenges, even if we have an assistant to master some of them for us. Whoever gets an assistant to translate from a foreign language still faces the challenge of how to hold an interesting conversation. Perhaps the challenge in this case is all the greater as soon as we can understand each other. If our assistant proposes a hiking route, we still have to walk it ourselves. Artificial intelligence cannot take on all our tasks, but could instead place more interesting challenges before us while freeing us of having to deal with minor technological matters.

But will we really make any independent decisions if the artificial intelligence of digital assistants can one day better predict our preferences and reactions to experiences than we can ourselves? Or is this scenario not likely to materialise because our reaction is most positive to those experiences that we think we have chosen ourselves?

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27 Atkinson, R. C., & Shiffrin, R. M. (1968). *Human memory: A proposed system and its control processes.* Psychology of learning and motivation, 2, 89-195.

28 Laesser, Ch., Schegg, R., Bandi Tanner, M., Liebrich, A., Lehmann Friedli, T., Fux, M., Stämpfli, A. (2018). *Digitalisierung im Schweizer Tourismus: Chancen, Herausforderungen, Implikationen. Report commissioned by the State Secretariat of Economic Affairs SECO, Bern: SECO.*

29 en.wikipedia.org/wiki/Hero%27s_journey

30 en.wikipedia.org/wiki/Hamartia

31 McCabe, S., & Foster, C. (2006). *The role and function of narrative in tourist interaction.* Journal of Tourism and Cultural Change, 4(3), 194-215.

32 Wu, T. (2018). *The tyranny of convenience.* [Link: bit.ly/umsa-wu – Source: New York Times]

In this case, assistants could simply offer us a few options from which to choose so that we have a sense of autonomy, even if our assistants know in advance that option No. 2 is the one we're going to pick.

NO ONE IS BEING COMPELLED

On the other hand, one can claim that no one is compelled to accept being told what to do by a digital assistant. It's up to us as consumers to decide how much convenience we want to accept from digital assistants, and how many challenges they should leave us to face. If autonomy and a sense of having mastered difficulties is important to a consumer, then their assistant will adapt accordingly to what they want. Consumers aren't going to choose something that makes them unhappy. Hobbies are the best example of people consciously confronting themselves with challenges and difficulties. We spend a lot of time building a ship and getting it into a bottle or making pasta ourselves, even though in each case we could simply buy the finished product. Outdoor holidays are very popular because they allow us to forgo convenience in a controlled environment. Holidays are opportunities for us to devote ourselves to our hobbies. And this is why it's unlikely that we would want to delegate all problem-solving on our holidays to a digital assistant.

IS THE CUSTOMER ALWAYS RIGHT?

To argue that we wouldn't use a tool that makes us unhappy is based on the dual assumption that we already know what will make us happy, and that our decisions are consistently conscious and rational. But this isn't always the case. If we have to wait for a product we've bought, we are all the happier about it than if we get it straightaway. Products that we can't hand back make us happier than those with a return option.[33] All the same, we usually want to get things straightaway and have the right to send them back if we want. Those digital offerings that provide for this are the ones that come out on top, even though they might not make us quite as content. Looking forward to our holidays often fills us with greater joy than the pleasure we actually experience once we're there.[34] If all our planning is delegated to a machine so that we can focus on what's supposedly more important, then we can actually end up losing this aspect that is in itself a highlight of going on holiday: the excitement of looking for destinations, hotels, activities and travel routes. But will we still want to plan things if we know that a machine can do the work for us, and might even make better decisions than we could ourselves?

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[33] Wilson, T. D., & Gilbert, D. T. (2005). *Affective forecasting: Knowing what to want.* Current Directions in Psychological Science, 14(3), 131–134.

[34] Mitchell, T. R., Thompson, L., Peterson, E., & Cronk, R. (1997). *Temporal adjustments in the evaluation of events: The «rosy view».* Journal of experimental social psychology, 33(4), 421–448.

Even if we know what makes us happy, this does not mean that we're going to behave accordingly. Most people know that regular exercise in the fresh air makes us happy, but many still prefer to stay inside, lounge on the sofa, eat potato chips and watch Netflix. If we could take a train up every mountain, we'd prefer to take it even if we know we'd be happier to have gone on foot. An assistant that solves all our problems is like having a train to go up every mountain. If it's always at hand, we'll turn to it at the slightest difficulty because our perseverance and our frustration threshold become greatly reduced just by having the assistant.

EXPERIENCE VERSUS NARRATION

The dilemma between what we want and what will make us happy afterwards also arises because we have to distinguish between two types of being. On the one hand, our self is our direct stream of consciousness – happiness, desire or pain. But on the other hand, our self is also a story that we tell ourselves afterwards. Ideals play a greater role in this latter aspect. We can enjoy something in the moment and hate ourselves afterwards for having done so – as is the case, for example, when we are addicted to something. The contentment that arises from overcoming a problem often only emerges after the fact, once we've packaged the experience into a story.

Convenience tends to be oriented towards experiences in the moment instead of subsequently assigning meaning to our behaviour. But perhaps it makes sense if we don't give in to every whim immediately, just as it makes sense not to have a bar of chocolate alongside us all the time, and just as it makes sense not to check the solution to a crossword puzzle, even if this too is convenient.

But is the subsequent contentment that we get from a good story always the ultima ratio, even if the journey there was painful? Moreese Bickham spent 37 years in prison despite being innocent, but afterwards claimed that he regretted not a minute of it, and that it had been a «glorious experience».[35] Pete Best was thrown out of the Beatles before they hit the big time, but he claims today to be happier than he would have been, had he stayed in the band.[36] Would you leave the Beatles or spend 37 years in prison if an assistant guaranteed that you'd be truly happy afterwards?

[35] en.wikipedia.org/wiki/Moreese_Bickham

[36] *The Pete Best interview* (1994). [Link: bit.ly/umsa-best – Source: RickResource]

A SERIOUS MISTAKE?

Are there examples of technologies that have made us less happy? The historian and best-selling author Yuval Harari suggests that agriculture fits the bill. Before we invented agriculture, we led a healthier, more varied life. We had a more varied diet, got more exercise, had less backache from ploughing, and suffered from fewer diseases because we did not live close together with animals and other people. There were fewer social differences because these only arose when sedentariness and the division of work resulted in our getting different societal roles. There were fewer wars because we owned less and so had less to argue about.[37] But once agriculture prevailed, those societies that used it were far more productive and displaced the hunters and gatherers, even if individuals among the latter groups might have led happier lives.

We cannot exclude the possibility that artificial intelligence could have a similar impact. We might become more efficient and more productive, but perhaps we'll be less happy. Using such technologies would thus be a serious mistake for our species. But paradoxically, no one can afford not to make it.

[37] Harari, Y. N. (2014). *Sapiens: A brief history of humankind*. Random House.

10.00-12.00

★★★★★

Art museum

Average length of stay 2h

Buy a ticket | **Exhibitions**

12.00-13.30

★★★★☆

Popular dish

Rösti with mushrooms 24 CHF

Expected utilization 90%

Book a table

13.30-15.00

★★★★★

Münster Highlights

Fresco from the 15th century

View from the tower

Background information

Shaping the future

This paper is not just intended to offer us an idea of how smart assistants might change travelling, but also aims to help pave the way for such a future. We can start today.

General artificial intelligence as an orientation point

We have here sketched out a possible future in which smart assistants become as important for tourism as the Internet and smartphones are today. To this end, we have assumed that smart assistants will be very intelligent. Just what such an assistant might look like is depicted in the film «Her». The assistant in that film is so human-like that the protagonist even falls in love with her. So we are here speaking of a general form of artificial intelligence (AI) that has not just mastered a single ability, such as recognising photos, but is equal to humans in all cognitive fields, or even superior to us. It is obvious that this kind of AI does not exist as yet. Some experts expect it to emerge in five to ten years. Others are sceptical whether we will in fact see the emergence of any general AI in this century.

«General AI is a long-term vision that will not be created in the near future. But it serves as a point of reference that we can approach in innumerable incremental steps.»
Boris Paskalev, Co-founder and CEO, DeepCode

We should not wait for a technological breakthrough before engaging with the implications of this paper just because what we postulate might in any case only occur towards the end of our century. Many ideas we have considered here are derived from just such an extreme scenario, but they are already justified today and become increasingly relevant as our machines become smarter. And machines are indeed getting smarter every day. It's also important that such a future does not just happen upon us, but that it is shaped together by all those involved. Installing sensors isn't something that should only happen when assistants are smart enough to use them; they are part of what helps assistants to become smart in the first place. So in what follows below, we are going to look again at the concrete action that DMOs can take today, both to prepare for a digitised future, and to help shape it.

MACHINES HELP US UNDERSTAND THE WORLD

First, however, we have to understand what digitisation really entails. In its original sense, digitisation meant transforming analogue realities into digital data comprising ones and zeros. Such as when a song on a record was digitised into an MP3. Digitisation as a global megatrend is naturally a subtler, more varied process than simply making an MP3. One basic issue that we can however observe throughout all aspects of digitisation is that it is creating an ever more accurate digital image of the world (one can also speak of a digital model or representation). The more precise our digital representation of the world, the better machines can understand it. These machines know where they are (thanks to GPS), they understand spoken language, they recognise people and their gestures, they can identify objects or animals on pictures, they know how many beans are left in the coffee machine, they know how much electricity we're using right now, and so on.

The more comprehensively machines are able to capture our world and understand it, the better they can help us to find our way around it. In order for machines to be able to understand the world, they (still?) need help from us. The barcode is an example of this. Perhaps products will soon only be recognised by their visual appearance –

You can collect data for customers and data about customers. Data for customers is not a problem in terms of data protection, and it's more valuable for smart assistants than data about customers that the assistants already have access to anyway.

but until that happens, they are marked with a barcode so that machines can recognise them. This barcode can be read by the supermarket checkout, but can also be recognised, for example, by the smartphone app Codecheck,[38] which enables manufacturer-independent information on the product to be downloaded.

Capturing and standardising tourist data should be understood as similar to a barcode. Digitising tourist regions will make it simpler for machines to understand the region in question – it doesn't matter whether these machines are smart assistants or apps from the tourist region, or even just Excel tables of DMOs. This in turn enables travellers, service providers and DMOs to make better decisions.

«The more sensors and data sources that exist, the better it is. But data for voice assistants has to be semantically labelled – in other words, it has to be interpretable and machine-readable.»

Florian Bauhuber, CEO, Tourismuszukunft

There can be two reasons for DMOs to increase the amount of data available for their region. It can be in order to gather data *about* customers so as to understand them better and adapt service offerings accordingly. But it can also be in order to gather data *for* customers, so that they, their assistants and apps can make better decisions. We should regard the latter category more as a kind of data infrastructure that can be used by customers, not unlike signposts on a hiking path. Of course, this differentiation is not so clear-cut in the real world. The same data can be used both *for* customers and *about* them, such as user statistics for tourist attractions. What's more, it might be necessary to collect data *about* customers in order to learn what data is needed *for* them.

In what follows, we want to concentrate above all on what data can be offered *for* customers and how, because the availability of such data is a prerequisite for smart assistants to be able to function properly at all. In contrast to data *about* customers, data *for* customers also presents fewer data protection problems, because this data mostly comprises descriptions of what is on offer and does not contain any personal information.

[38] www.codecheck.info

How to proceed with a data strategy

Every region has to decide for itself how to put its data into machine-readable form. We shall here offer some decision-making aids in the form of a sequential decision-making process.

A BRAND PERSONALITY – IS THIS FOR US?

Every tourist region will be digitised more and more, but not all will have to do so to the same degree. It's the brand personality of the destination that will decide how much data should be provided for customers, and how many digital services should be offered. If a region wants to market itself by offering adventure in unspoilt nature, it is less important to engage in complete digitisation and maximum convenience than to offer comfort, relaxation and being hip.

«If the brand personality of a DMO represents service and perfection, then it won't be able to make use of the counter-trend of digital withdrawal. But if the DMO wants to focus on the carefree and the natural, then it can communicate its digital distance from the mainstream.»

Florian Bauhuber, CEO, Tourismuszukunft

But it's important to consider here that offering a low level of digitisation is a niche. In trend workshops, where small groups develop product ideas based on current trends, the analogue counter-trend scenarios are always very popular, along the lines of: «We're not jumping on the digital bandwagon; we're still offering people an authentic, analogue experience.» This can certainly prove to be a successful strategy, but this digital denialism will presumably only work for very few organisations. It's like insisting on using wood-burning stoves despite the existence of central heating. For individual, specialised destinations, this can be a USP. But the number of destinations that could market themselves on the basis of authentic, homespun, wood-burning stoves is going to be very limited indeed.

WHERE DO WE BEGIN?

If one decides to proceed with digitisation, the question arises: «Where do we begin?» First, the necessary Internet infrastructure must be available. But then what? To what extent should the data infrastructure be expanded? Where, for example, should the next sensors be installed, videos made or interfaces created? Should we be registering the current locations of busses and trains, providing images and locations of public toilets and diaper-changing tables, or the utilisation rates of ski pistes, or other data altogether?

«The infrastructure for data gathering should only be installed if such data gathering is actually worthwhile in financial terms. That's why at first, it's enough just to register the most important parameters. But who's going to say what these are?»

Boris Paskalev, Co-founder and CEO, DeepCode

Since these parameters are different from one destination to another, and since they are constantly changing, it is naturally impossible to offer answers that have any general validity about what concrete data is the most urgent. So how can a DMO ascertain this?

Since the data in question is meant to be useful to the customer, one obvious possibility is to ask both customers and those service providers who are in close contact with them, to find out what information would interest them. For example, if many of them would be keen to know the water temperature of lakes for swimming, then you

Digitising a region can't proceed without having data specialists in your team.

could go ahead and link up thermometers in those lakes, even if you yourself have no use for this data. If there's a demand for this information, then it will be accessed by people who are programming a bathing app, or used by smart assistants of swimming enthusiasts to suggest where their owners could go swimming.

But customer surveys aren't a general panacea. Many customers can only guess what data they might actually use once it's on offer to them. Before smartphones arrived on the scene, for example, many people said they'd never ever use such a device. But as soon as you've got one, you wouldn't want to be without it. Nor should high demand be the only criterion. For example, a destination can also decide to offer data that makes travelling easier for people with disabilities, even if this might only be useful to very few people.

Surveying customers can also be done indirectly. For example, you can analyse how people access your website to find out what information is interesting to customers. It is also conceivable that you might experiment with certain content and place this on your web page as a kind of A/B test. If one topic gets a lot of hits, you can expand this area digitally and ensure that further data is captured and offered there. Searches by digital assistants are going to be an increasingly important source of information about users' interests, because these will search primarily for what they think will interest their owners. In order to get this information (and much more information besides), we have to have data specialists who are able to analyse the search data properly.

Besides learning from your customers, you can also learn from other destinations. The federal structure of Switzerland means that different regions can experiment with different approaches and then exchange information on their respective experiences.

Finally, you can also talk to platforms such as TripAdvisor and Booking.com. Given the huge quantity of data that they possess, they might have other insights about what could interest customers and what data should therefore be gathered. If destinations place this data on open access to everyone, TripAdvisor and Booking.com can also profit from it, and might be more willing to share their own knowledge. It's undoubtedly helpful if you can talk to these companies as a supra-regional organisation, instead of every regional tourism organisation trying to negotiate with the big platforms on its own.

DON'T RE-DIGITISE THE WHEEL

Besides the question of what data might be requested by customers and their assistants, it also matters how expensive it is to procure this data in the first place. It is possible that some of this data already exists and could be made accessible with

When standardising data, it's not a matter of creating a joint website or app, but about agreeing to use a common language that allows all kinds of data to converge.

little effort. This is especially the case with data from service providers such as hotels and restaurants. They will have gathered a lot of data already, but don't generally make it accessible.

Standards

The more data converges, the more valuable an individual data point becomes. In order for data to converge, it has to be mutually compatible. In other words, it has to use the same standards and the same language. It's not important for all data to converge on a single server, just that it's all written using the same principles. It's like websites: they might all be located on different servers, but it doesn't matter as long as they're all written using HTML and are linked together. HTML is a standard that people agreed upon so that Internet browsers like Firefox and Chrome can all depict the data of every website correctly. If we can all agree on a standard for tourist data, then smart assistants and app programmers will be in a better position to utilise existing data in the same way that browsers can function thanks to HTML standards. If the data in question is linked (such as Linked Open Data – *see above*, «Linked Open Data – the WWW for data», p. 27), it will be even easier for assistants to find their way around the data.

For a tourist destination, this means that we have to agree on a standard and implement it as comprehensively as possible. The more widely a particular standard is accepted across the world, the more attractive it is for anyone to adapt to it, because smart assistants and app programmers can draw on a lot of data with very little effort, and don't have to get to grips with a new standard for every new place.

«If we in Switzerland can get our act together and decide to implement a single standard format, then as a tourist region we'll be far more efficient and visible to the outside world.»

Pascal Kaufmann, founder of Starmind

If all data is open and conforms to a widely used standard, then it's not just apps and smart assistants that will be able to access it, for it will also be available to providers such as TripAdvisor and Booking.com. It is even conceivable that service providers would only have to enter information once about their offerings for it to be available for use by all possible third parties. Examples of such standards are the Knowledge Graph DACH and datatourisme.fr in France. The goal is not to set up a common website or a Swiss-wide app, but to achieve a common language that will enable data from all kinds of sources to converge. That point of convergence might be a regional tourism app, TripAdvisor, a smart assistant belonging to a customer, or an app for tourists with impaired mobility. The example of datatourisme.fr can give us an idea of what such a common language might look like (*see Figure 5*).

But establishing a standard format is only half the battle. For how can we get service providers to adhere to it? First, it's important for service providers to recognise the advantages of using such a standard. Secondly, they have to see that they can reach more customers this way, and become visible to smart assistants and third-party apps.

«Sharing data is always bound up with fears. You don't know exactly what's going to happen to it.»
Damian Constantin, Director, Valais/Wallis Promotion

By agreeing on a uniform data standard, you also get the opportunity to make yourself more independent of monopolies like Booking.com. Even sharing data *about* customers is possible, and doesn't necessarily have to contravene data protection laws. For example, you could enter encrypted data samples, and different service providers could bundle their encrypted data together. Outside data analysts might well recognise patterns within this aggregated data, but they would not be able to find out precisely what they are. The individual service providers, however, would know which data points are connected among the encrypted data, so they could recognise the connections through referring back to their own, unencrypted data.[39]

«In order for service providers to adopt common standards, the short-term advantages have to be recognisable for them right from the start.»
Prof. Dr Andreas Liebrich, Institute of Tourism, Lucerne University of Applied Sciences and Arts

Service providers don't just have to recognise the advantage of using common standards. It also has to be made as easy as possible for them to implement such standards. To this end, it would be possible to build application programming interfaces (APIs) for existing restaurant and hotel software, for example, which would convert the data it holds into the right format. Alternatively, a new software package could be developed and distributed free of charge that would keep to the right format right from the start, and which would make it easy for service providers to make their own data available.

[39] Mulligan, K. (2018). *Machine Learning for Encrypted Blockchains — Sandy Pentland, MIT.* [Link: bit.ly/umsa-crypto – Source: Medium]

Data standardization using the example of DATAtourisme

One problem for data tourism is how to bring together very different data. datatourisme.fr in France offers us an example of how such a common language or format could look in the tourism industry. It does not use the tourist data itself, but according to the open data approach it makes it accessible to all interested parties. For example, someone might program an app showing all the restaurants where films have been made. Or an app showing the complete cycling infrastructure of Normandy. Figure 5 to the right offers a rough illustration of how datatourisme.fr structures its data.

What information is saved on the database?

The database contains information on so-called points of interest. These comprise four basic types:

- Places and landmarks (hotels, restaurants, nature parks, sports fields, shops etc.)
- Festivals and events (theatres, exhibitions, cinemas, sports events etc.)
- Products (recreational courses, equipment rentals, tastings etc.)
- Travel routes (bike paths, boat routes, roads, hiking paths etc.)

The database will contain additional information about every point of interest:

> Subcategories (restaurants, hotels, nature parks etc.)
> Names («Le Grand», «Felsenalp mountain hike» etc.)
> Descriptions (the best bakery in town, a relaxed music festival with good food etc.)
> Location (address, geo-coordinates, opening hours etc.)
> Contact information (phone numbers, names of contact people etc.)
> Price category (cheap, expensive etc.)
> Clientele (adults aged 18 to 35 etc.)
> Documents (images, flyers, videos etc.)
> Facilities (wheelchair accessibility, WiFi, aircon etc.)
> Rating (number of stars, customer feedback etc.)

Figure 5 (Source: www.datatourisme.fr)

Example 1

<Hotel>
<Name> “Le Grand” </Name>
<Description> Beautiful 3-star hotel in the middle of town with a view of the river </Description>
<Contact> 044 321 56 28 </Contact>
</Hotel>

Example 2

<Restaurant>
<Name> “Cyberpunk” </Name>
<Clientele> People aged 18 – 35 </Clientele>
<Facilities> Sells takeaway pizzas </Facilities>
<Rating> 4.4/5 </Rating>
</Restaurant>

Example 3

<Bike path>
<Description> Cycle tour with view of the valley </Description>
<Location> 6.70 N / 48.17 W </Location>
</POI> Restaurant “Cyberpunk” nearby </POI>
</Bike path>

Data from third parties

Some data is already accessible. For example, you can use a web scraper on TripAdvisor to sort local attractions according to location and type and to extract ratings, user statistics and typical customer profiles (families, single people, business people etc.).[40] On Wikipedia, you can even use the number of page views as an indicator of future visitor numbers.[41] Data from mobile phone companies can reveal the user statistics of certain attractions in real time. Such data could be bought or otherwise acquired in aggregate form from its respective sources, without any personal data being revealed, and it could then be placed at the disposal of one's own customers using one's own data standards.

While much data *for* customers can be created by the destination itself because this often comprises information about the destination, international platforms have an advantage when it comes to data *about* customers. They have much bigger data sets, and this enables them to recognise more patterns, especially when it comes to potential customers who have never yet visited Switzerland. In order to deal with such monopolies, the idea of a data tax has achieved currency. This would compel the big players like Booking.com or Google to reveal a random portion of their user data in anonymised form.[42] Just how much data would have to be revealed would depend on the market share of the company in question. DMOs could lobby politicians to create such a tax, in order to get access to data from third parties.

SENSORS

Data that is not already easily accessible has to be measured. Thanks to the Internet of things, this is getting ever easier. Sensors for all manner of things are getting cheaper, and just like many other devices, they have access to the Internet. Thanks to Swisscom's Low Power Network[43], for example, which is already relatively widespread across Switzerland, it is possible to let sensors communicate with each other; they need very little energy, and they have a low data throughput. In other words, these sensors can be run by battery for a very long time and need no cable access, either to the power grid or to the Internet. We have already mentioned sensors embedded in the ground of parking spaces that can send information about the space's use for some seven years without having to have their battery changed. GPS transmitters the size of a wristwatch can also function for a long time with a single battery, and could easily and swiftly be attached to rented bikes, public transport or even sheep on a meadow. Avalanche hazards, air quality, water temperatures and the fill level of self-service machines are just a few examples of data that could be offered to travellers in real time through the Low Power Network.

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40 de Oliveira, R. A., & Porto, R. M. A. B. (2016). Extracting web data from tripadvisor as a support for tourism indicators development in Minas Gerais.

41 Signorelli, S., Reis, F., & Biffignandi, S. (2016). *What Attracts Tourists While Planning for a Journey? An Analysis of Three Cities through Wikipedia Page Views*. In 14th Global Forum on Tourism Statistics, Venice, Italy, November (pp. 23–25).

42 Prufer, J., & Schottmüller, C. (2017). *Competing with big data.*

43 lpn.swisscom.ch/e

The abovementioned sensors provide data *for* customers. Of course, sensors can also provide data *about* customers. In China, an increasing number of public spaces are being filmed, and the people in the videos identified by means of facial recognition software. This makes it possible to fine errant cyclists, for example. But basically, it also means that the movement behaviour of every individual Chinese citizen can be depicted digitally. This data can also help us to understand tourist behaviour better and to optimise what we offer accordingly. Since we have different value concepts in Europe, such measures would be unthinkable here. Nevertheless, most companies today are trying to trace their customers' behaviour as precisely as possible. They often do this with customer cards that let you collect loyalty points. A Swiss tourism card or an app such as the SwissPass could also fulfil this role – the latter can already be used for gaining entry into museums, as a public transport ticket and as a skiing pass. But along with data protection issues, the federal structure of Switzerland also provides a challenge to any such undertaking.

«If we could start everything from scratch, then it would make sense to set up a unified system in which all data converges. But I know Switzerland, and there are just too many special interests involved here. If we could work together, we could have realised such ideas a long time ago.»

Pascal Kaufmann, founder of Starmind

THREE OPTIONS FOR DEALING WITH DATA

Once data has been measured, collated, bought and linked, there are still different ways of dealing with it. The most important question is: Who gets access to this data? We shall here describe three different ways of dealing with it.

Own channels – «data as a resource»

If data is regarded as a valuable resource – the new oil – then it makes no sense to share it with anyone. Instead, you'll use it yourself to offer the best possible information and services to customers through your own channels. A smart assistant could be called up via terminals in hotel rooms and at attractions, or could run via apps and websites, or even be integrated in a customer's personal smart assistant, rather like having an app. This could function via platforms such as SingularityNET, where customers' personal assistants buy services from regional assistants, paying either money or in the form of data about customers (see «Monopolistic life-assistants versus decentralised travel assistants», p. 30, and «Is there no alternative to monopolies?», p. 32). It is even possible that services could be swapped actively, meaning that customers would consciously offer up certain data about themselves in order to be able to use regional assistants that possess a lot of information for them, and who would have a local brand personality and a local voice.

If you want to distribute data *for* customers via your own channels, then it's imperative to possess as much data as possible *about* customers. This is the only way in which you can offer the right information to the right customers. In the case of data *about* customers, it's obvious that regional players could never possess the kind of comprehensive data owned by international giants such as Google or Booking.com.

Regional providers will never know their customers as well as global platforms can.

Open data is an infrastructure on which an unlimited number of providers can build.

Nevertheless, it's still important to bring together as much data as possible so that you can at least endeavour to personalise your services in however crude a fashion. An app, a website or a national assistant would make it possible to collect more data about customers than a similar offering that is limited to a particular region. If the app, the platform or the assistant can recognise the customer across different sectors (on a toboggan run, in a restaurant or in the car park), then the data collected about the customer is more varied than would be the case if it came from just one domain.

Versatile usability doesn't just make it possible to gather more comprehensive data. It also increases the chance that customers will actually use what's on offer. Because many customers don't want to install an app that's only valid for a particular region or destination, let alone for every single hotel. In the case of first-time visitors in particular, it's difficult to make local channels attractive to them, even if those channels are nationally based. But if tickets for certain tourist highlights could only be booked through this particular app or platform – such as tickets for the Jungfrau Railway – then you could use this to create a bond with the customer.

Platforms – «data as content»
If data is regarded as content, then the goal is to get as many people as possible to see your content. Instead of using your own platforms or apps, it's better to use big platforms such as WeChat or TripAdvisor, which can then disseminate own content – i.e. data for customers such as photos, weather data and occupancy rates.

In this scenario, you don't need to bother about data *about* customers, because the big platforms already possess this, and they want to ensure that the right content is shown to the right customers. You just have to make sure that as much data as possible *for* customers is placed in the right formats on the right platforms.

It's important here that you don't get left behind when new developments happen. You don't want to miss the emergence of new platforms in growth markets, new interfaces with augmented reality, or smart assistants.

Most data is provided by the service providers or the customers themselves. In these cases, DMOs function primarily as enablers. They can keep service providers informed about the latest develop-

ments, and help to ensure that their data is of a high quality. They can help service providers to understand the dynamics of social media so that they can display their content in the right places. And it's even possible that professional photographic materials could be placed at the disposal of service providers, or even customers, so that their destination is seen at its best. For example, some restaurants and hotels lend out tripods and lighting so that customers can take the best possible photos of their meals or of the view from the hotel, and then post them on Instagram.

Open data – «data as infrastructure»

The first two options above are often regarded as the only possibilities. Either you use data for customers yourself with your own apps, website etc., or you distribute this data via Booking.com, TripAdvisor and Co. But there is a third option. Data for customers can be regarded as infrastructure that can be linked and made openly accessible to everyone.

«Data isn't like oil. Data can be shared and used simultaneously by different players. It's the basis of services. Data isn't the actual service.»

André Golliez, Managing Partner, Zetamind

Just like in the platform scenario, coordinating the data – deciding who gets to see which data – is done by third parties. The difference here is that the open-data scenario does not involve being dependent on a monopoly such as Booking.com or Google. You define a standard for yourself instead of letting a giant tech company prescribe it to you. What is important is that you choose a data standard in collaboration with sufficient other players so that your standard achieves widespread use. This means that TripAdvisor or Booking.com will also have to use data employing your standards.

With open data, you define your own standards instead of letting the big tech companies prescribe them to you.

By opening up data, you also create space for innovation.[44,45] It's comparable to the app stores of Android or Apple. By opening up the smartphone infrastructure, it meant a multitude of apps could be created that Android or Apple themselves would never have achieved. If there is a sufficient volume of open, standardised data, everyone can relatively easily program an app that can show, for example, all the vegan or gluten-free restaurants on a map. If smart assistants get smarter, you won't even need an app for this, because the assistant could search for this data itself. If as much data as possible is freely accessible, this will promote the development of smart assistants – not just because these assistants will need a lot of data, but also because it will make possible the development of alternative assistants. Companies such as Google or Booking.com have a head start in matters of data volume, but access to open data could mean alternative smart assistants could hold their own against the competition.

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[44] OECD (2015). *Data-driven innovation: Big data for growth and well-being.* Paris: OECD Publishing.

[45] Laesser, Ch., Schegg, R., Bandi Tanner, M., Liebrich, A.; Lehmann Friedli, T.; Fux, M., Stämpfli, A. (2018). *Digitalisierung im Schweizer Tourismus: Chancen, Herausforderungen, Implikationen. Bericht im Auftrag des Staatssekretariats für Wirtschaft SECO,* Bern: SECO.

The decision-making process

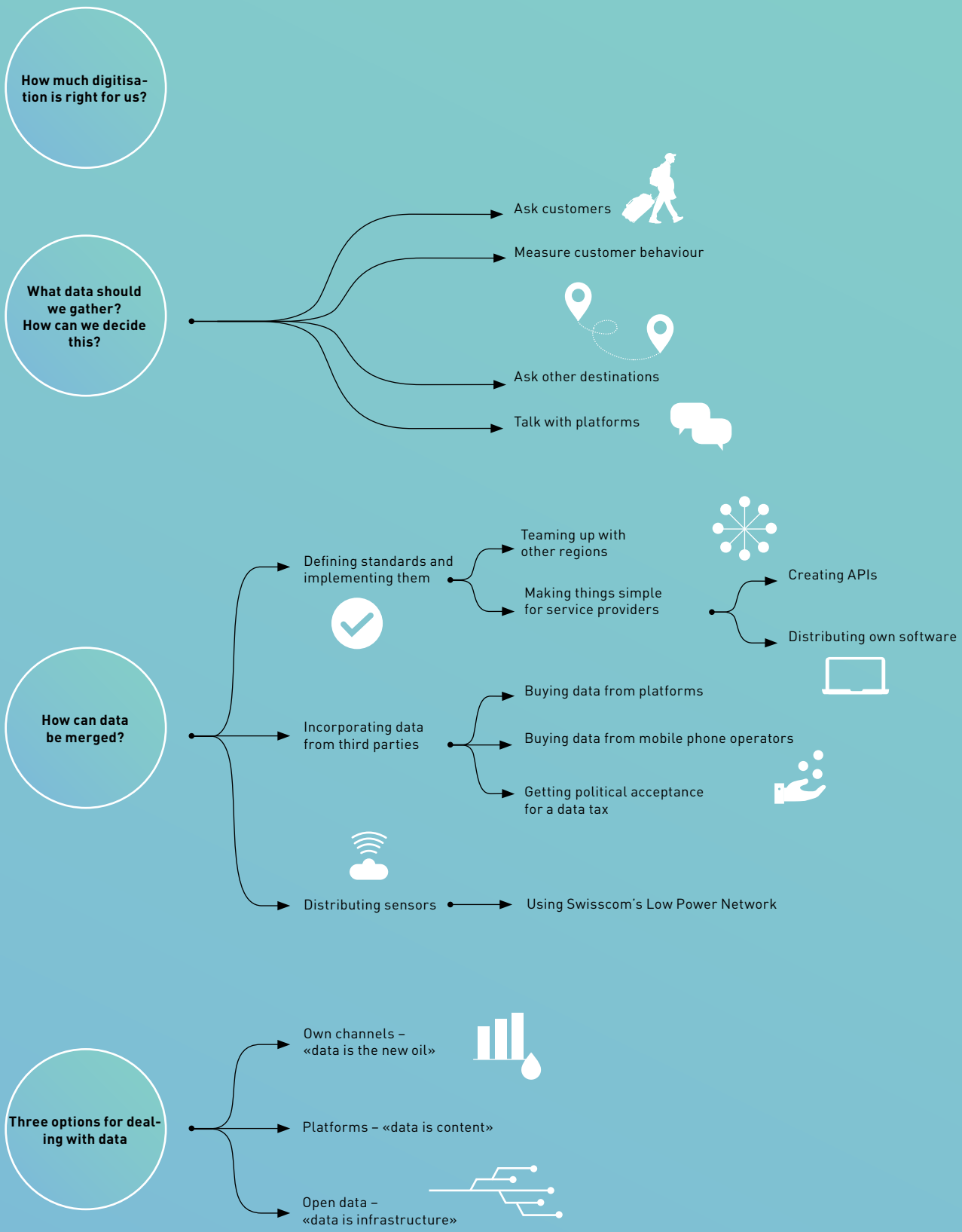


Figure 6

Conclusion

We have discussed three strategic approaches for dealing with data *for* customers:

> Data *for* customers can be communicated to them through one's own channels. But the disadvantage of this for a region is that you have little data about customers, which makes it difficult to convey the right information to the right people.
> Data *for* customers can be fed into digital platforms, since they can better coordinate data with customers. But this makes you dependent on the giant tech companies.
> Data *for* customers can be made accessible to everyone as open data. Coordinating this data – what is shown to whom – is then done by third parties. But in this scenario, you don't become dependent on a company that has a monopoly.

These three strategies are not mutually exclusive, but when you have limited resources, it's better not to embark on all three to the same degree.

«Basic data about the destination has to be open. Data about customers has to be accessible to the customer so that they can actively exchange this data for specific services.»
André Golliez, Managing Partner, Zetamind

Especially with a view to the emergence of smart assistants, the open-data approach seems to us the most promising, because the market for smart assistants has not yet been divided up among just a few big players. It is still unsure who will be in the driving seat, and open data enables us to avoid falling into the hands of the monopolies. Because open data – in the case of data *for* customers – makes the world visible to all machines. This in turn enables every customer to use this data in whatever way is most appropriate for them. This is important for data protection purposes, for example. Decentralised assistants without any connection to the Internet giants can only survive if as much data as possible *for* customers is made freely accessible. Open data will empower those of us who want to use smart assistants but still remain the masters of our own data.

Open data is already helpful today because it enables us to use special applications. It thus makes it far easier, for example, to program a travel app for people with impaired mobility or who need a special diet.

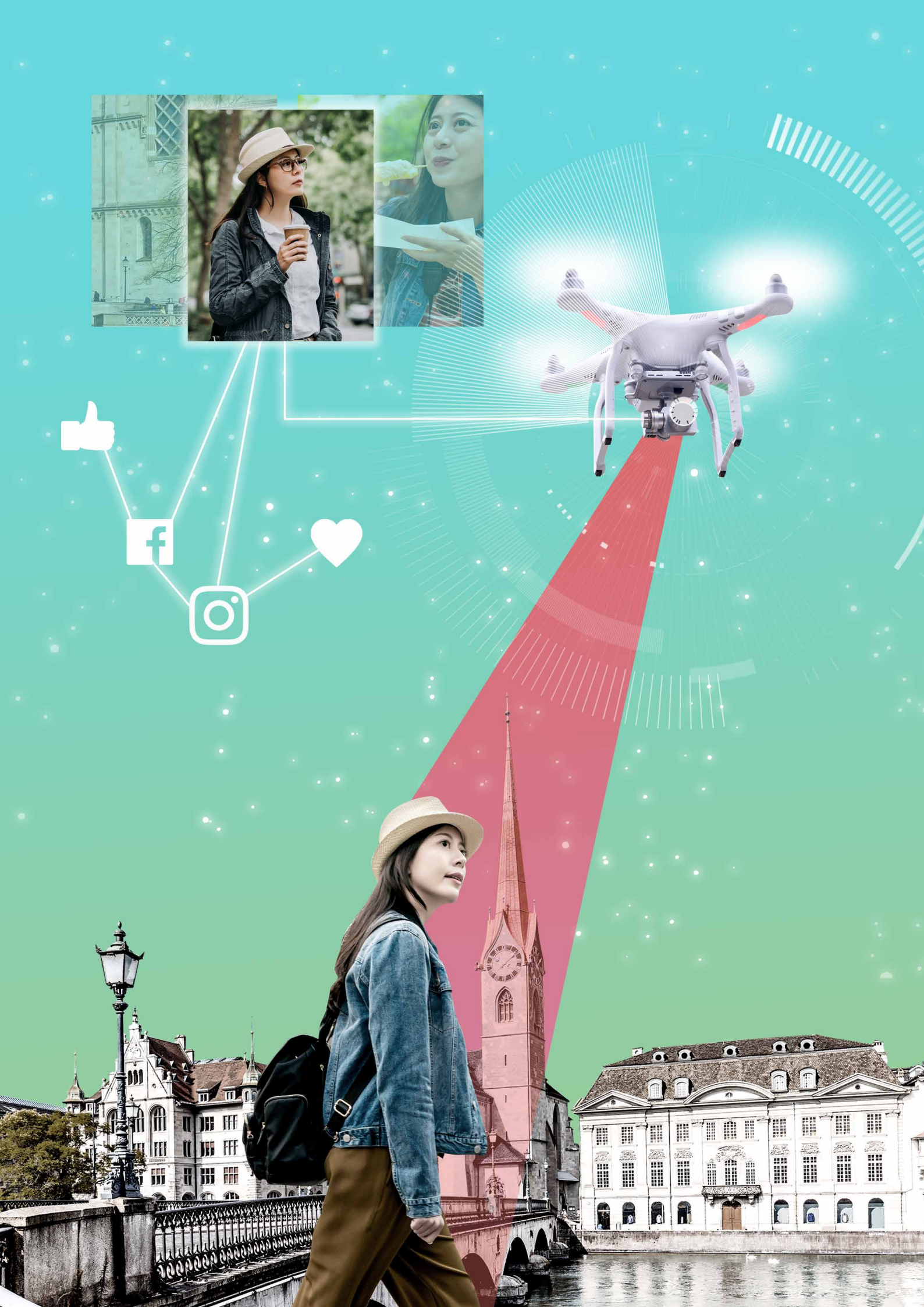
But this can only work if open data is created with a data standard that is in wide use. Only then is it really worthwhile to invest the time in programming such an app. And if this format is widely used, then smart assistants, too, will be programmed to understand it.

Individual service providers and even DMOs know too little about customers in order to select the most relevant information for them. Open data enables the coordination of this information to be delegated to others, but without your becoming dependent on one of the giant tech companies.

In Switzerland's federal system, a comprehensive solution is difficult to implement. Whereas the Party Central Committee in China can take decisions for a billion Chinese citizens, here in Switzerland, every valley wants to keep its autonomy. It is important to understand that open data means agreeing to use a common language, i.e. a common standard (just like with HTML), and doesn't mean that different regions or companies have to present a united front to the world – neither through a joint website nor a joint app. Nor would it be predetermined how much of one's data one ought to digitise. But if we're going to go digital, then we should follow a common standard. If we don't do this, then someone is surely still going to impose a standard on us anyway – only we won't have any say in the matter, because that «someone» is most likely going to be a company in Silicon Valley.

«Switzerland's difficulty is the small-scale structure and fragmentation of the various digital solutions. To break through this small structure requires a new approach to thinking and function.»

Damian Constantin, Director, Valais/Wallis Promotion



Experts

The following experts either granted us interviews, or discussed topics and problems on the future of tourism with us at a GDI workshop. We should like to express our cordial thanks to them for their valuable contributions, their excellent ideas and productive cooperation!

Andreas Banholzer, Director, tourism region Vaud, Lake Geneva Region (W)

Florian Bauhuber, CEO, Tourismuszukunft (I)

Damian Constantin, Director, Valais/Wallis Promotion (I)

Adrian Demleitner, Senior Frontend Web Developer, Cloudtec AG and Researcher, Institute of Experimental Design and Media Cultures, FHNW (W)

Christian Di Giorgio, Senior Consultant, Crypto Valley Labs, and author of «Live from Crypto Valley» (krypto-valley.com) (I/W)

Daniel Egloff, Director, Basel Tourism (W)

Karin Frick, Head Think Tank, GDI (W)

André Golliez, Managing Partner, Zetamind (I)

Pascal Kaufmann, founder, Starmind (I)

Gabriela Kunath, research associate and doctoral student, Faculty of Economics and Management, University of Lucerne (I)

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Gérald Marolf, Consulting & Management, HV Italic (W)

Martin Nydegger, Director, Switzerland Tourism (W)

Boris Paskalev, Co-founder and CEO, DeepCode (I)

Wilhelm Rahn, Brand Creator and UX/UI Designer, Localixo Travel Assistant (I)

Ivo Ruckstuhl, Head of Digital Consulting, Zühlke Group (W)

Robert Schäfer, sociologist, Senior Assistant, University of Fribourg (W)

Martin Sturzenegger, Director, Zurich Tourism (W)

(I) interview
(W) workshop participation
(I/W) interview and workshop participation

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