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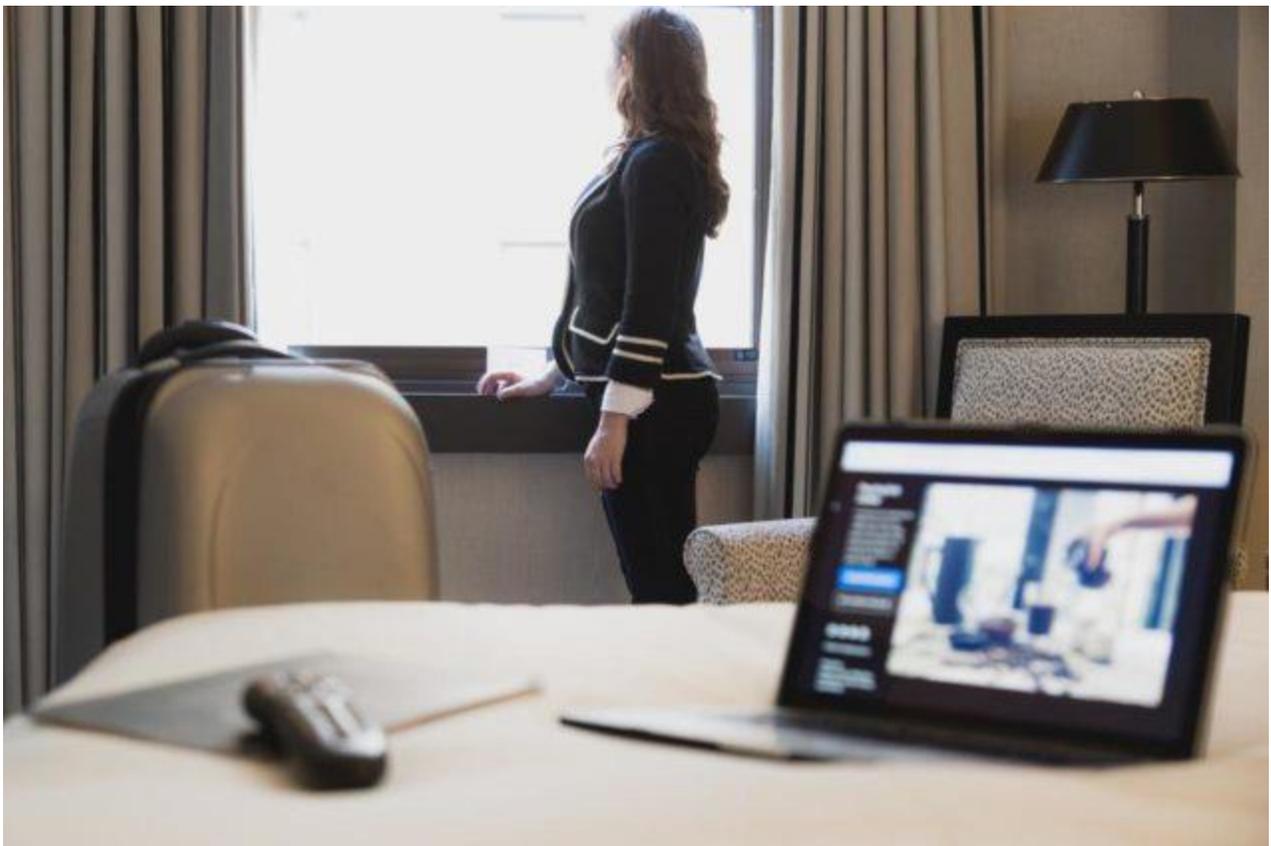
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The Digital Future of the Tourism & Hospitality Industry

By Martin Zsarnoczky

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Digitalization is among the most important changes in our rapidly evolving world. Digital innovations and technological novelties are engines of development and show their impact everywhere, especially in the field of manufacturing, ICT and other service industries. Given the fact that tourism is based on the cooperation between a wide range of services and products, the benefits of the digital revolution in the sector are quite obvious.

Our living environment is a combination of online and offline spaces that co-exist together, defining our everyday habitat. In tourism, the special use of spaces has always been a unique feature of the industry, and as of today, the spaces of the digital world have become part of it. The rapid development of the digital world brings novel and innovative solutions into the digital tourism spaces by the day. Peer-to-peer communication is outstandingly important in the technological environment of tourism. This type of communication, together with the spreading of smart devices have revolutionized scheduling, administration and finances, and also opened new horizons for the introduction of innovative sales and marketing technologies in the whole tourism industry. As a result of the digital revolution, the international development trends in tourism have opened the way for novel solutions like cloud-based booking sites or information and experience sharing via digital platforms.

In line with the new trends of travelling, there is a dynamically growing demand for special tailor-made offers beyond mass tourism, as conscious consumers expect personalized solutions that answer their individual needs. As of today, the vast majority of tourism market stakeholders have access to detailed information on their consumers

and can closely follow and track consumer behavior and its changes. These novel systems of personalized products and services are available thanks to various flexible follow-up techniques like CRM client databases. The cloud-based CRM client database systems – ones that create offers by analyzing previous sales records and demographic data – have evolved rapidly. As of today, they can analyze huge datasets by big data analysis and scaling methods in a cost effective and anonymous way, searching for significant event points. Although big data research is based on working with large samples, it is the most efficient method to reveal individual personal preferences (Stadler, 2015).

How did sharing economy pave the way to personalized tourism services?

In previous decades, the results of digital development have opened the door for the real life implementation of shared economy theories. It was almost ten years ago that Chris Anderson (2009) introduced his pricing theory in digitalization, basically suggesting giving away products for free, based on the principle of shared goods and resources. Although at the time Anderson's theory was considered as a technological solution, the principle of digital sharing have induced serious social changes as well. One of the most important positive messages of shared economy is the maximum use of resource capacities for the purpose of social well-being (Sundararajan, 2014). Social well-being is also a key priority in tourism, because a well-managed tourism industry brings profit not only for the business operators but also for the local communities.

In the sharing economy model, the stakeholders – who are also consumers at the same time – offer their excess capacities for collective use in order to maximize the exploitation of their goods and resources. These economic processes consist of so-called hybrid transactions with maximum capacity use (Hyde, 2007), for both commercial and social purposes. An important drive in the evolution of collaborative consumption theory was the realization of the fact that using or possessing the same consumer goods can result in different advantages. The core element of the model is that sellers offer their excess capacities, while the consumers in need use them in return for payment. In the sharing economy (based on the aforementioned primary idea), more and more industrial, commercial and service providers offer innovative solutions.

The principle of sharing is not a new idea in the tourism industry. In the case of some accommodation services, seasonal price reduction has always been a practice. Hostels and youth hotels have always been popular – these facilities are often used as dormitories throughout the academic year and lease their rooms for backpackers in the summer season, when the students are away. Of course, these seasonal options would not have been enough for creating a new market sector; the dawn of the new business era was marked with the emergence of wide platform solutions like Airbnb, Booking.com, Agoda, etc.



Casa de la Musica Hostel Budapest. Photo by Martin Zsarnoczky

In the strategy of digital platform tourism businesses, consumers are considered as partners in the business activities. This shared operation can be best defined as a postmodern business model. Although the complex idea of postmodernism is quite difficult to describe, its main characteristics – shared participation and the subjective passion of each contributor – can lead closer to understand the phenomenon. It is clear that postmodernism will change some processes of the classic market laws in the near future. While "shared experience" has become a key marketing term for selling goods and services, specialized offers inevitably lead to a market fragmentation that will result in the fragmentation of users as well. In a disintegrated market, consumers will behave differently in fragmented times and spaces, paving the way for personalized services and tailor-made solutions. At the same time, individualism has become the key characteristics of the younger generations (McCrandle et al., 2009); a phenomenon that will have to be taken into account whilst creating business strategies. Due to the emergence of individualism, more and more young people are trying to create something unique that can serve the long-term benefit of the community. Their drive for creating businesses based on their own ideas and experience accounts for the increasing popularity of start-up businesses. These aspects of uniqueness, community thinking and experience-centered approach hold a huge opportunity for the future of the tourism industry.

The Future: AI, VR/AR, Blockchain

While looking through their photos, tourists usually have a positive experience remembering their travels, experiences and the destination they had visited. Some

specialized digital technologies can offer this assumed positive experience in a searchable and changeable form. With regards to real life objects, their connections and relations, there is only a limited amount of information available in a format that could be handled by computers. The main problem is that computers need sufficient coding solutions created by artificial intelligence to be able to store, handle and organize information. The methods of coding for tourism experience purposes affect the speed, efficiency and knowledge/experience-based computing abilities of today's computers.

According to the forecasts of product development strategies in various industries, almost all of our everyday objects and equipment will be accessible through the internet in the future. As a result, all devices that are capable of two-way communication will belong in the framework of IoT (Internet of Things). The devices of the future, unlike the devices of today, will communicate in a bidirectional way, where robust safe data handling, personalized differentiation and sufficient decision management will be part of the user experience. As a result of the continuous data collection during the use of these devices, all relevant information will eventually end up in a final centralized system at the top of the dataset.

Previously, tourism used to be an industry based on personal relations and connections, where the trends - and therefore travelers' decisions - were set out by a limited number of large international tourism and travel enterprises. As a result of the digital revolution, the transparency of "hidden markets" had been revealed and numerous other factors have to be taken into account (Fig.1.).

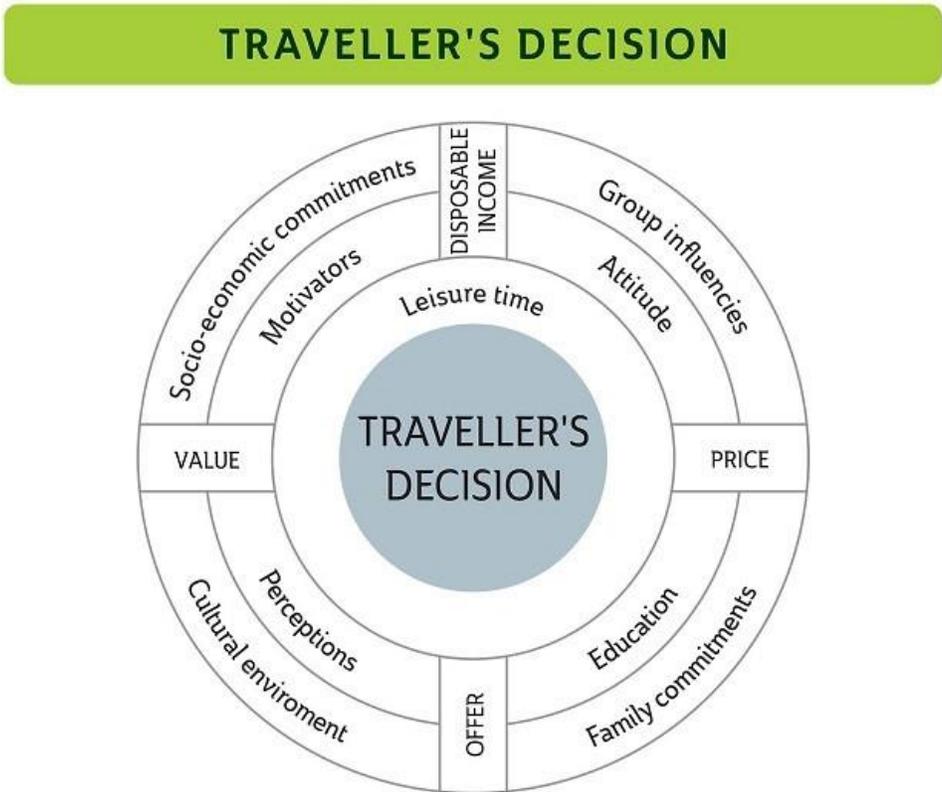


Figure 1. Influencing factors of traveler's decision. Source: Zsarnoczky, (2017a)

The early development of ICT resulted not only in the better capacity utilization of airlines, but also on the compatibility of the prices; and soon, the emergence of the

discount airlines had led to the innovation of the whole industry and forced out efficiency in all segments. The novel travel recommendation sites (Expedia, Orbitz, Kayak, etc.) were created with the aim to make travelers' decisions easier; however at the same time, a lot of tourism service providers who could not keep up with the new challenges were forced out of the market. Although the new trends like travel packages (including car rental) or taking into account the reviews of previous travelers (Lonely Planet) were from many aspects opposite to the former business models, the rapidly increasing popularity of online offers required quick and user-friendly tourism product development from the industry.

With the arrival of Google, which was able to rank the sites' appearance in internet searches, a fierce competition begun between blogs, tourism recommendation sites and price-comparing OTA systems. The bidirectional communication started with the use of cookies 2.0; since then, consumers have become an integral part of the business models, because businesses who seek to be successful in the long run, need to know their customers' demands in detail. The development of digital services require the identification of the user, information on their individual preferences and a decision-based calibration (by AI). In AI-based decision making solutions, the former decisive factors are replaced by a virtual personal assistant, which is able to map the consumer's preferences based on their digital footprint, and create an optimal personalized offer from the available big data systems (Fig. 2.)

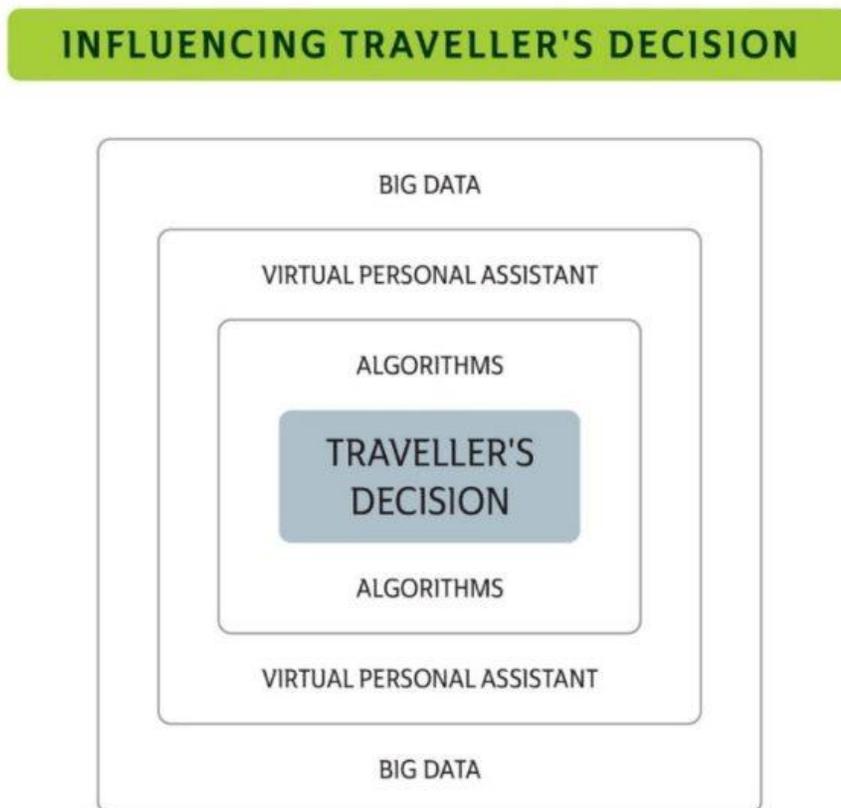


Figure 2. Virtual Personal Assistant – VPA. Source: Zsarnoczky, (2017a)

The technological development cannot be stopped; however, with sufficient flexibility and openness, tourism businesses can prepare for the upcoming challenges. In the tourism of the future, the new consumers will bring forth new priorities and new demands. As a revolutionary approach, the members of the IoP (Internet of People) community offer their free time in order to reach joint IT/industrial goals, where frameworks are created in line with the preferences of other people, for a yet not specified consumer segment (Miranda et al., 2015). Beyond innovative technologies, whole new spaces have opened in tourism, completely different from the usual destinations. University researchers^[1] have been carried out to study the possibilities of online tourism spaces and their opportunities for the tourism and hospitality industry. In virtual reality, with a special "glass", the user can look into an optional tourism space, from which the real world is completely shut out. The Augmented reality is a different technological solution, where digital elements are projected into a real life space.



In 2011, the interior designers of cafés only used and re-designed the existing design panels; today, the traditional living spaces are often combined with the online world. Carnival Coffee Budapest. Photo by Martin Zsarnoczky

The newest technological developments and the innovation in the use of living spaces are all connected to the alternative payment options that can be used in tourism as well. The emergence of Bitcoin and other cryptocurrencies has led to the creation of a novel payment system. The Blockchain payment system is a shared database, which records a continuously growing list of data blocks, preventing any counterfeiting or alteration of the data. One block consist of a list of transactions and the results of computations made by the stored programs. For example, if a customer buys some cryptocurrency or any other kind of currency, and then transfers it to anywhere in the world to another partner, who exchanges it instantly, both partners can avoid any loss caused by

exchange rate fluctuations; furthermore, the whole transaction takes only minutes instead of the usual couple of business days. This solution can mean a revolutionary innovative payment option for everyone in the tourism industry.

The applicability of the blockchain system is independent from currency rates. In the case of cryptocurrencies, it is not the exchange rate that really matters - instead, the true value of the currency lies in the safety of the blockchain technology and in the authentic, transparent, unalterable and decentralized recording system (Pilkington, 2016). This payment system offers a new level of encryption safety and intervention-free operation, and the data handled in the system cannot be modified in any way. Another huge benefit of the system is that the transactions are realized without any intermediate agents, thus eliminating any additional transaction costs. By the time of the "maturity" of blockchain payment solutions, today's large service intermediators like Airbnb, Booking.com, Agora, etc. are foreseen to lose some of their market positions, as consumers and service providers will probably deal with their transactions directly.

Will Artificial Food be the next meal on the table?

With the worldwide population boom, the demand for food is also increasing. To satisfy this growing need for food, the extension of agricultural areas is required for food material production, and at the same time, sufficient land management is needed for animal husbandry. The greatest challenge of sustainable agriculture lies in the fact that the agricultural areas can only be further expanded at the expense of forested lands. In addition, the current changes in the environment has also led to the decrease of fishing possibilities, another difficulty in the availability of food materials.



Shrimp in pasta shell by Martin Zsarnoczky

The decreasing resources of food materials will force the food production industry to re-think their former concepts. New technologies like 3D food printers can even bring the fast food era to an end. The novel inventions of food production and food engineering - like artificially flavored drinks, chocolates and dairy products - have been on the market of more than a decade now, and so far, they have not had a negative effect on the common taste of consumers.

In the concept of 3D food printing, popular sweets and delicacies are synthesized by a layered printing technology, using the various pre-mixed powders, flavorings, fixers and oils that are stored in the "toners" of the printer. These artificial foods are already available: specialized franchise restaurants like the Food Ink chain offer a wide variety of printed meals for consumers who are curious about the future of gastronomy. It is also likely that with the next generation of the food printers, we will be able to calibrate the nutritional values and energy content of the meals.

The 3D food printing technology is not only important for HoReCa businesses, but holds a great opportunity for the health industry, too, especially in the field of special diets and medication. Using 3D food printing for these purposes can increase cost-effectiveness, efficiency and sustainability, thus supporting the food industry and hospitality and tourism businesses alike.

The option of personalized 3D food printing is just one of the innovative technological solutions in the tourism and hospitality industry. The Henn-na Hotel [\[1\]](#) in Huis Ten Bosch, Japan is the first hotel in the world, where customers are served exclusively by robots. At another Asian location in China, there are 24/7 cafés that follow the no-staff business model of Amazon Go. As for the restaurant market, the Chinese food brand Wufangzhai has recently opened the first unmanned restaurant [\[2\]](#) in Hangzhou, capital city of east China's Zhejiang Province.

The question is: how long will it take until food production and consumption will need no human resources at all?

Summary

For innovative enterprises, the efficiency of interactivity is of key importance for the success of their business. The rapid development of ICT solutions has brought immense changes in the tourism industry. Previously, consumers' decision making was mainly affected by the industrial environment. The era of digital tourism spaces – preceded by theme parks and thematic destinations – started with the emergence of information websites; however, this targeted information flow used to be one-directional with narrow choices. In today's digital era, the new generation of commercial activities take place in VR or AR spaces, and the instant analysis of the customer's reactions and behavior support the enhancement of their buying willingness. The traditional decision making processes are gradually being replaced with personalized offers, further increasing the importance of AI.

With the development of shared economy, greater emphasis is put on social well-being, as user experience slowly becomes more important than ownership. This new approach is also expressed in novel forms of payment, which can seriously decrease the profits of intermediate activities. The new trends do not seem to be problematic in the tourism

industry, mostly because in this sector, the exact costs and incomes are not clearly visible yet. On the other hand, the quality development of the 3D printing technology holds a great opportunity for the tourism and hospitality sector. The development of digitalization has finally reached a level where it can truly support the cost-effectiveness and sustainability of industrial food production, paving the way to the future of tourism and hospitality businesses.

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Martin Zsarnoczky, Ph.D. has several years of experience in the huge tourism and hospitality industry. He has worked with P&O Princess Cruises, Intercontinental and Marriott Hotels in Budapest. Between 2005 and 2015, he was the founder, developer and CEO of Casa de la Musica Hostel and Event's Hall, one of the largest multifunctional private tourism & hospitality businesses in Budapest downtown. He holds a BSc degree in Tourism and Hospitality from the Budapest Business School, and graduated at MSc/Med level as Teacher of Economics in Tourism and Hospitality. During his studies, he had spent short a term mobility period at Utwente University in the Netherlands, and later earned his Ph.D. in Regional Sciences at Szent Istvan University. At the moment, he is still very active as an entrepreneur and is actively involved in community development. He is also a board member of the Budapest Chamber of Commerce and Industry, and works as a mentor for the Young Entrepreneurs Association Hungary. With regards to his academic career, he is a full time assistant professor at the Institute of Marketing and Media at the Tourism Department of Corvinus University of Budapest.
