

# CAN SUSTAINABLE AND SMART TOURISM BE CONNECTED?

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## **Kulcsszavak:**

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## **Összefoglalás**

*A dolgozat annak az elméleti paradoxonnak kíván utánajárni, amit fenntartható turizmus és a smart (okos) turizmus koncepciójának egyidejűsége jelenít meg a digitális átalakulás korszakában.*

*A téma az ipari innováció és a stratégiai szükségszerűség elméleti koncepcióival igyekszik alátámasztani azt, hogy az új informatikai eszközök révén a turizmus smart teljesítménye nem feltétlenül válik hatékonyabbá, de a fenntarthatóság fogalmi kereteit elkerülhetetlenül kitágítja.*

*A digitális technológia fejlesztése a turizmusban a kényelem biztosítására, az elérhetetlent valósággá alakításának céljából bővül, miközben növeli a termelékenységet, a fenntarthatóság előmozdítása és az életminőség javítása játszott szerepet.*

## **Abstract**

*The paper aims to explore the theoretical paradox of the coexistence of sustainable tourism and the concept of smart tourism in the era of digital transformation.*

*The theme uses the theoretical concepts of industrial innovation and strategic necessity to argue that new IT tools do not necessarily make the smart performance of tourism more efficient, but inevitably expand the conceptual framework of sustainability.*

*The development of digital technology in tourism is expanding to provide convenience, transforming the unattainable into reality, while increasing productivity, promoting sustainability and improving quality of life..*

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## **1. Introduction**

The closures of the COVID pandemic have accelerated the era of digital transformation (1), while at the same time pushing the boundaries of human presence with technological support, enabling virtual presence, travel, shopping, advertising in the metaverse, but also opening up space tourism to the wider public. There are still few examples of full automation being demonstrated in tourism, while understanding and applying the organisational and strategic decision drivers for the adoption of the digital economy is more urgent to increase the adoption

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rate and the willingness to embrace the ever faster changing technologies, along with competitiveness.

The aim of this paper is to shed light on the factors identified by theoretical and practical literature as drivers of organisational adoption of automation within tourism. There are a good number of successful findings in the international literature on the effective integration of automation in tourism, which provide unique solutions for the sector. Through automation, professionals can become more open to understanding customer expectations (CRM), to certain unstaffed services and solutions (HR), and to softening management's attitude to introducing certain innovative solutions.

The paper uses the theoretical concept of strategic imperative to argue that the process of digital transformation through new IT tools may not necessarily make the smart performance of the tourism sector more efficient, but will inevitably broaden the conceptual framework of sustainability and lead to closer collaboration (2) and at the same time inevitably require a more sustainable approach (3). also examining the social context of the destination as a space (4). Clemons and Row (5), with the strategic necessity hypothesis, and Solow (6), with the concept of technological paradox, support the dichotomy, arguing that new IT tools do not automatically transform a company's performance into a better one where they are used. It is merely one way of establishing an engagement relationship where management is heavily involved in the introduction and development of the technological resources necessary to increase member satisfaction.

## 2. Methodology

At the heart of scientific research is the search for truth, which is a fundamental concern in Berger and Luckmann's (7) scientific discourse. Recognizing the complex and multifaceted manifestations of the truth of smart tourism and sustainable tourism, this paper seeks to approach the dichotomy between positivist and interpretivist approaches, using the results of quantitative and qualitative research methodologies. While in the evolving field of smart tourism, the qualitative and quantitative literature on truth exploration remains significantly limited in relation to the adoption of technological innovation, management strategy critique studies have revealed a significant gap in this area, urging the need for further constructivist research in the field of tourism research as well (8);(9).

## 3. Theoretical part

Sustainable development and the digital economy are classified as emerging megatrends of the 21st century, which also led to a paradigm shift. While government agencies and leading companies are focusing more and more on the integration of environmental protection and the digital revolution, there has not yet been a dialogue in academic circles about how the two megatrends can be integrated (10).

Based on the research of Bharadwaj et al. (11), the transition to digitization is a key strategic decision and an inevitable choice for companies to modernize modern management and information systems. At the same time, Freeman (12) sees innovation as a means of sustainable development, so discussing innovation through the lens of sustainability has become an important trend in the field of innovation.

According to Buhalis (13), the term "smart" is increasingly used as a prefix for developments based on a combination of automatic data collection, open and big data systems, and artificial intelligence. However, it can be concluded that despite the rapid pace of technological development, the theoretical use of the term smart is still unclear. Based on the contexts in the literature, the "smart" system is suitable for connecting certain technologies, and is also suitable for the production of innovative products and services through the redesign of processes, thereby maximizing the added value for the interested parties.

Harrison et al. (14) emphasized that smart cities are based on IT tools capable of connecting both physical and virtual sensors using near-real-time real-world data. While these parts are

connected and integrated with multiple stakeholders through IT platforms and operational decisions are automated with complex analysis, modeling and optimization processes. Several stakeholders are simultaneously involved in the process to optimize the collective performance of the entire ecosystem.

### **3.2. Competitive Advantage and Technology in IR 4.0**

In recent decades, significant progress has been made in the theoretical formulation of the reasons behind organizational success. Porter (15) established that the reasons for business success depend fundamentally on the structure of industrial sectors and the competitive forces affecting them. According to Porter, technological change plays an important role in competitive advantage because it creates new competitive opportunities, and also because it plays a central role in the existing competitive strategy through its ubiquity in the value chain. In his view, "information technology" and "information systems" are particularly important because all activities create and use information. He emphasizes that modern information system technology plays a particularly important role in scheduling, controlling, optimizing, measuring and coordinating all kinds of activities. Adding that office or administrative technologies, although often neglected or classified under the umbrella term of information systems, also have an important role.

However, Wernerfelt (16) and Barney (17) claim that the original reason for competitive advantage lies in the company's ownership of specific resources that are both capable of generating value and are rarely or difficult to imitate or replace with solutions obtained from the IT field.

Powell and Den-Micallef (18) and Bharadwaj (19) also analyzed how information technology affects competitive advantage. In their opinion, the sector's competitive advantage was supported by the combination of the low level of conflict, open communication, organizational flexibility and the integration of IT planning within each company.

According to Schwab (20), we are living in the fourth industrial revolution (IR4.0), an era characterized by breakthroughs in emerging technologies in areas such as robotics, artificial intelligence (AI), nanotechnology, quantum computing, IoT, the Internet of Things, fifth generation wireless technologies, self-driving vehicles, all of which will impact how we create and distribute value and change the way we live, work and interact (21).

According to Addo and Yagci (22), automation has become a key element as a result. Automation does not mean the replacement of human work with simple machines, but rather the integration of machines into a self-managing system that performs a certain process without human assistance.

Like every other sector, tourism faces a more automated future. Tourism suppliers have also started using smart machines after KLM introduced Spencer, an android robot (23) in 2015, which guides passengers at Amsterdam Schiphol Airport, and in 2018 KLM Royal Dutch Airlines' new robot, Care- E, an intelligent self-driving car to help passengers carry their luggage (24). The first robot hotel, Henn na Hotel, opened in Japan's Huis Ten (25) in the Bosch theme park in 2015 (26) and has since expanded its operation to several other cities. Hotel properties are staffed with robot receptionists, robot porters, wardrobe robots and room personal assistants, to name a few. While such a fully robotic hotel is still rare today, hotels around the world have introduced intelligent automation for certain customer-related operations such as check-in, virtual personal assistants, and cleaning robots.

Ivanov and Webster, (27) are optimistic when they claim that with the development of robotic technologies, there is a huge potential to automate various aspects of tourism services. However, an important realization arising from the automation of tourist services is that the human connection is lost during the tourist experience, which can have a significant impact on the future of those who make a living from tourism on many levels.

### 3.3. Smart Tourism and Doubts on Sustainability

Among other things, there can be such inequality, which is a critical point from the point of view of tourism research, the different dynamics of tourists and destinations. The attractiveness of individual destinations greatly influences the interaction between tourists and destinations (28). Newer and newer technologies are being developed and applied in tourism (VR, drones) in terms of how to convey digital technology and, at the same time, how to enhance tourist experiences without space and time limitations. These technology and digital developments are capable of transforming the tourism activities and interactions of the destination (29). Perhaps another good example of this is wine tourism. Wine tourism is traditionally classified as sustainable tourism, primarily because wine tourism can be considered a specific form of village tourism, which is connected to nature and the countryside, and is also a "green" service (30), (31), (32).

At the same time, according to Poitras and Getz (33), the perspective of sustainable wine tourism should be strengthened, while Marlowe and Sojung (34) use the overall concept of "terroir" to differentiate individual destinations. Elena and Pantea Foroudi think about a slow and thought-provoking world combined with awareness through the local and "slow concept" (35) when researching the success inherent in the regional possibilities of wine tourism.

According to Sa et al. (36), however, it is possible for wineries to find a way out with the help of digitalization. Through technological and organizational innovation, wineries can achieve sustainable development and guide the niche branch of tourism in the direction of survival and development, e.g. they can take part in virtual cellar visits, wine tastings or even develop the concept of wineries built in their own metaverse anywhere in the world. This is the level where automation enters the realm of tourist experiences and replaces interpersonal relationships, and the transformation goes beyond the theories of tourism literature so far.

When the WCED (37) formulated the paradigm of sustainable tourism development (in short: sustainable tourism paradigm), it traditionally focused on the economic, social-cultural and environmental (natural) sustainability of our Earth, firmly rooted in the principles of sustainable development of the 20th century. However, the 21st century broadened the boundaries, allowing astronauts to travel into the universe and virtual travel in the metaverse, which challenged these established principles. Tourism (extreme) e.g. overtourism, its consequences can now put pressure on the resources that involve technological and organizational transformation, which can affect the previous concept of sustainability.

Alami et al. (38) were the first to use the term "Smart Tourism 4.0" in their technology-related research when they researched the measurement of customers' willingness to shop online in the Malaysian hotel industry. According to Alami et al., the concept of "Tourism 1.0" encompasses the period before the invention of railways and steam engines, when people traveled not for leisure and entertainment, but for trade, pilgrimage and medical treatment.

"Tourism 2.0", according to the authors, in addition to including the invention of the railway and the steam engine, allowed the level of awareness of attractive economic and tourist destinations to increase. The discovery of new technologies, including the wider use of radio and television, further sensitized the acceptance of tourist services, since the main goal of "Tourism 2.0" is to inform and encourage travel.

The period of "Tourism 3.0" can be considered an information and business revolution in the tourism and leisure industry, as customer service through interactive platforms based on web technologies, special websites, mobile applications and social networks can lead to the creation of an efficient and user-friendly environment, which shortens the communication between tourism participants and become faster, and by ensuring customer satisfaction and efficiency, the sector can become more stable.

"Tourism 4.0" can be interpreted as a concept that aims to increase the added value of tourism along the technological possibilities of "IR 4.0". With the simultaneous use of innovative developments in the field of tourism, such as autonomous robots, robots, virtual reality, autonomous transport, big data and artificial intelligence, they all contribute to the creation of

personal tourism experiences and the development of a cooperation model between the participants of the process. Therefore, the goal of "Tourism 4.0" is mostly considered to ensure the efficiency of tourism.

It is clear that digitization in tourism has not yet reached its full potential on a global scale. It is achieved by using the core enabling technologies of "IR 4.0" such as the Internet, Big Data, Blockchain, Artificial Intelligence and Virtual Reality. "IR 4.0" aims to achieve high added value products and services through operational efficiency and automation of production processes using modern technologies. "Tourism 4.0" envisages the introduction of similar technological developments for the tourism sector. Tourism and hotel companies are gradually introducing some of the "Industry 4.0" solutions, such as service automation, chatbots, delivery robots, cleaning robots, reservation systems, self-service restaurants, information apps. Although the tourism industry has reached a remarkable milestone with the integration of digital transformation, artificial intelligence and modern technologies, thus creating a new quality in the development of tourism products, which also requires a new paradigm by connecting existing ones.

#### **4. Metaversal Sustainability Paradigm**

Based on Kuhn's paradigmatic theory (39), Mihalic (2024) now supports the recognition of the concept of metaversal sustainability. Recognizing that the involvement of the metaverse as a space (environment) in the interests of the individual stakeholders has an increasing impact.

In contrast to traditional 'on-site tourism', this direction is often called 'virtual tourism', 'VR tourism', 'metaversal tourism' and 'metaversal' tourism' (40).

According to Song et al., the metaverse has become a prominent topic and business reality of the 21st century (41). Technology has answered the challenge of how and how to bring 3D experiences, such as time travel, historical cultures or phenomena of natural experiences (42) closer to visitors. For example, Japanese First Airlines (43) organizes virtual flights, while National Geographic organizes virtual kayak tours among Antarctic icebergs (44-45), but it is also possible to visit Machu Picchu or Wander through historical walking tours with Google Street View (46-47).

It can be seen that the increasingly available and affordable VR headset devices are expanding the tourist space into a kind of mixed reality (MR) by creatively merging the real and computer-generated worlds. Whether realistic or fantastic, these realities are increasingly strategically unavoidable because they are intertwined with the future of tourism.

According to Go and Kang (48), these changes enable collective experiences that affect both guest experience and destination evaluation. The terminology of the emerging phenomenon of "tourism in the metaverse" is expanding day by day. According to the authors, it is important to understand the factors influencing the organizational decision to introduce automation in order to understand how likely it is to increase the acceptance rate and success rate of enterprise management systems embedded in automation in the future. In addition to identifying potential factors, it may also be important to identify best practices that can be adapted more widely to improve the quality of certain services.

At the same time, sustainable tourism allows stakeholders to further develop tourism based on metaversal sustainability and take it out of its traditional triple framework, as it takes place in previously unexplored environments such as planetary, extra-planetary, physical, virtual, mixed, fantastic or realistic worlds.

#### **Summary**

Innovative technological solutions are expected to bring many transformations in the sector (49). The goal was to suggest further research directions by presenting the results so far and to offer professionals best practices for the introduction of automation in tourism. It can be assumed that by rethinking tourism, the future goal is to build more destinations that support sustainable development and meet the expectations of global tourists. Based on a

comparison of the international literature, the study concluded that those areas that have shown impressive progress in their digitalization in the tourism industry have gained a greater competitive advantage and gained a dominant position in the global tourism market.

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