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The metaverse in hospitality management in the age of digital transformation

Metaverse w zarządzaniu hotelami w dobie cyfrowej transformacji

Abstract. Currently, digital transformation and the development of metaverse technology is, alongside advanced data analytics, at the heart of the hotel industry. It is causing changes in economic and business models. The research objective of the study is to evaluate the metaverse more broadly and to identify the potential and risks that the development of this technology brings to the hotel industry. Future research directions for interested researchers are suggested. The metaverse represents great potential for businesses, helping to overcome physical boundaries while creating space for exciting customer experiences and delight, meaningful interactions and brand awareness. They enhance customer communication and relationships, customer decision-making processes, hospitality and unique, personalized guest experiences. Hotels must be ready to adapt to this changing technology to remain relevant in a competitive market. At the same time, there are concerns about the ethical, safe and inclusive experience of the metaverse.

Key words: metaverse, digital transformation, virtual reality, applications, hospitality management, hospitality industry

Synopsis. Obecnie transformacja cyfrowa i rozwój technologii *metaverse* jest, obok zaawansowanej analityki danych, w centrum zainteresowania branży hotelarskiej. Powoduje zmiany w modelach gospodarczych i biznesowych. Celem badawczym opracowania jest szersza ocena *metaverse* oraz wskazanie potencjału i zagrożeń jakie niesie ze sobą rozwój tej technologii w branży hotelarskiej. Zaproponowano przyszłe kierunki badań dla zainteresowanych badaczy. *Metaverse* reprezentuje wielki potencjał dla firm, pomagając pokonać fizyczne granice, jednocześnie tworząc przestrzeń dla ekscytujących doświadczeń i zachwyty klientów, znaczących interakcji i świadomości marki. Wzmacniają komunikację i relacje z klientami, procesy decyzyjne klientów, gościnność i unikalne, spersonalizowane

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doświadczenia gości. Hotele muszą być gotowe na dostosowanie się do tej zmieniającej się technologii, aby zachować znaczenie na konkurencyjnym rynku. Jednocześnie istnieją obawy dotyczące etycznego, bezpiecznego i integracyjnego doświadczenia metaverse.

Słowa kluczowe: metaverse, cyfrowa transformacja, wirtualna rzeczywistość, aplikacje, zarządzanie hotelem, branża hotelarska

JEL codes: O33, L20, L22, L83, M31, Z31

Introduction

The future of the global economy is somewhat uncertain in the face of the crisis. However, one trend is certain, stable and definitely gaining importance: digital transformation supposes the dynamically increasing use of data and software in production, distribution and sales processes. The importance of this trend is best illustrated by the fact that investment in digital assets (software and ICT hardware) has risen sharply (e.g., investment in software rose by 36% and in hardware by 22%) following the great financial crisis and despite a general decline in investment in the European Union. At the same time, outlays of other machinery and equipment were virtually the same and outlays of construction assets fell by 23%. Companies in many areas are struggling with overcapacity, uncertainty about future demand, as well as regulatory and political changes in the world. Nevertheless, the rise of data and smart machines is absolutely certain [Digitalisation is... 2018].

World economic science has accumulated considerable theoretical potential in the field of organization (management) and the economics of business operations in the age of information technology [Lypchuk and Voytovych 2021]. The current stage of social evolution, dubbed 'Society 5.0' by Japan, was preceded by four social models: based on hunting (Society 1.0), agriculture (2.0), industry (3.0) and information (4.0). The new social model is also referred to as a Super-Smart Society, a Data-Driven Society or a Knowledge-Intensive Society [Chaber et al. 2021]. Four levers of the digital transformation process have also been identified, i.e., digital data, automation, connectivity and digital customer access [The digital..., 2015]. Researchers are paying a lot of attention to in-depth studies on the issues of assessing the effectiveness of building and implementing digitalization in companies [Lypchuk and Voytovych 2021].

The spread of advanced technologies and the advent of the Internet, contributes to increased optimization of processes, expansion of the market, implementation of innovative solutions and more efficient use of human capital. The process of digitalization contributes to productivity growth and affects individual economic participants. The increasing level of digitalization of the economy requires companies to adapt to digital business changes. Digitalization intervenes in the functioning of all sectors of the economy, and it is a driving force behind innovation, also in the hospitality industry [Chądzyński et al. 2021, Balasubramanian et al. 2023].

The development of new digital technology, including the concept of the metaverse and virtual reality, enjoys an increasingly unique business. According to the McKinsey

& Company Report [2022] entitled “Value creation in the metaverse. The real business of the virtual world”, the metaverse has the potential to be worth \$5 trillion by 2030 (out of \$57 billion invested in all of 2021). Interestingly, the driving force behind the virtual world is e-commerce (USD 2.6 trillion), ahead of sectors like virtual learning (USD 270 billion), advertising (USD 206 billion) and games (USD 125 billion). Especially large technology companies, private equity (PE), venture capital (VC), start-ups, and established brands, most often are implementing the metaverse in the scope of: marketing campaigns or initiatives, learning and development for employees, meetings in the metaverse, events or conferences and product design or digital twinning.

The objective of the study was to determine the importance of metaverse technology in the development of the global economy, as well as to identify the potential and threats posed by the development of the metaverse in the hotel industry. In addition, it points interested researchers to future research directions in the area of metaverse use and the impact of this technology on various areas of socio-economic life.

Materials and methods

In the study, in terms of collecting research material, the method of literature studies and studies of web resources was applied, aimed at identifying the most important determinants of the development of the metaverse concept, including in the hotel industry, and the main research directions in this field.

Articles from such databases as Google Scholar, Elsevier and Springer were the subject of critical evaluation. The search for articles was conducted irrespective of time constraints, although most publications in this area were produced in 2022. An assessment of literature reviews between 1992 and Q1 2023 was conducted, and was limited to publications in scientific journals, reports (i.a., McKinsey & Company, GlobalData, UNCAD), conference proceedings and blogs. Finally, 47 articles were classified for in-depth analysis (based on selected keywords, abstracts and titles). Articles were searched for using the following keywords: “metaverse”, “metaverse implementations”, “metaverse application”, “digital transformation”, “digital future”, “virtual space”, “digitalization”, “hospitality industry”, and “tourism industry”.

Research results and discussion

The digital transformation

Researchers from the Massachusetts Institute of Technology, namely Erik Brynjolfs-son and Andrew McAfee, have analyzed technology trends and pointed to the existence of synergies between parallel processes. Those have received the acronym DANCE from the first letters of the words [Digitalization is... 2018]:

- Data (because data resources are growing exponentially),
- Algorithms (new computational methods, such as machine learning, enable the efficient use of large data sets),
- Networks (the Internet is starting to connect not only people but also machines),

- Cloud (computing power can be increased almost without limit)
- Exponentially rising computer power

According to the United Nations Conference on Trade and Development [UNCTAD 2017], the new digital economy is developing through the deployment of advanced cyber-physical systems that connect machines, information systems and workers. These systems include technologies and processes that rely in various ways on advanced information and communication solutions, such as: the Internet of Things (IoT) and Internet of Everything (IoE), Hyperconnectivity, Cloud Computing – apps and services, Big Data Analytics (BDA), Big-Data-as-a-Service (BDaaS), Automation and robotization, Multi-Channel and Omni-Channel distribution models of products and services [Gajewski et al. 2016].

The UNCTAD [2017] and McKinsey & Company [2022] experts said that these technologies would radically reduce the need for so-called routine tasks (part of the workforce will need to be reskilled) and will change the location, organization and content of work, especially mental work. Digitalization particularly affects three areas of the organization, i.e., the organization's customer experience (understanding customer needs, introducing different channels of communication with the customer or elements of self-service), operational processes (the organization's internal processes, work environment, mechanisms for monitoring performance) and the organization's operating model (what products/services the organization provides and to which markets [Sobczak 2013]).

Different sectors of the economy are susceptible to digital transformation in varying degrees, while also being threatened by digital developments. In response to the COVID-19 pandemic in 2020, 35 countries, including China, the U.S., Thailand, Belgium, Hong Kong and India, found “clear expansion” in the use of robots. They performed roles directly addressing the need for distancing or physical isolation. The robots were used in hospitals, health centers, office buildings, airports, and other public and private spaces, for example, to deliver food from restaurants. The following roles have been assigned to these robots: as safeguards that minimize infection risk, as liaisons in tasks that require human-human interaction, and as well-being coaches that entertain and guide quarantined patients through therapy. Growing numbers of robots being used for delivery, for example, by Amazon, KiwiBot, Starship Technologies, Nuro, and Postmates, continue to transport food to customers autonomously [Wiggers 2020]. Robots have rapidly made inroads in the retail sector: in-store labor automation and robotics, i.e., warehouse-to-shelf automation, next-gen cameras, supply-chain optimization (2–4%), inventory management (1–2%), customer experience (1–2%) and back office automation (0,5–1%), [Robles 2021].

It is considered that digitalization could displace around 40% of companies that currently hold strong positions in their sectors. The most radical changes are likely to occur, especially in ‘data-driven industries’ such as: new technologies (including products and services), media and entertainment, financial services and banking, telecommunications, and retail [McKinsey & Company 2018]. According to the Office for National Statistics, jobs at the highest risk of being automated are: waiters (73%), shelf fillers (72%), elementary sales occupations and bar staff (71% each), kitchen and catering assistants (69%) [Wiggers 2020]. On the other hand, the most ‘resistant’ sectors include the oil and gas sector, the pharmaceutical sector and the utilities sec-

tor (energy, gas, heat and water companies). The traditional sectors are affected to a lesser extent. Smaller operators are also coping better with the transition [McKinsey & Company 2018].

The metaverse concept

The concept of the metaverse dates back to 1992, but made headlines after sandbox gaming platform Roblox included it in its March 2021 prospectus, causing the company to become known as the first “metaverse concept stock.” Following this, Facebook officially changed its name to Meta in October 2021. Since then, there has been extensive discussion in capital markets and industries around the world, helping to turn the metaverse into a global phenomenon. Shanghai, too, in late 2021, officially included the concept in its “Five-Year Plan” for developing its electronic information industry. China launched the Metaverse Industry Committee, under the state-supervised China Mobile Communications Association (CMCA). That is why the year 2021 was called the first year of the metaverse era in China. Moreover, the European Union intends to introduce a draft metaverse regulation. The solution is gaining popularity thanks to the emergence of various consumer-oriented products, which are being created thanks to the continuous development of the underlying technologies and hardware. At the same time, the COVID-19 pandemic and the corresponding requirements of social distance, the sense of disconnection and isolation have affected people’s changing lifestyles and work, which has greatly accelerated the digital transformation of businesses, providing a unique opportunity for the innovative concept of an alternate reality metaverse [Sigalla et al. 2021, Hui 2022, Goschenko 2022, Gursoy et al. 2022, KPMG China 2022, Rawal et al. 2022, Oh et al. 2023].

There is no universally accepted definition of the metaverse [Mystakidis 2022, KPMG China 2022]. The term was coined in 1992 by Neal Stephenson, the author of the science fiction novel “Snow Crash” [Gursoy et al. 2022]. The most basic definition refers to “the concept of a fully immersive virtual world where people gather to socialize, play, and work” [Laeq 2022].

According to the Council of the European Union [2022], the term comes from ‘meta’ meaning “beyond”, and the word “universe”. Discussions in the industry suggest that the metaverse “represents a real-time online network empowered by the integration of different technologies, including blockchain, artificial intelligence (AI) and interactive sensing technologies” [KPMG China 2022]. In reference to Mystakidis [2022], this concept is “the post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality. It is based on the convergence of technologies that enable multisensory interactions with virtual environments, digital (smart) objects and people, such as virtual reality (VR) and augmented reality (AR)... it is an interconnected web of social, networked, immersive environments in persistent multiuser platforms. It enables seamless embodied user communication in real-time and dynamic interactions with digital artifacts”.

The metaverse is an ecosystem created by interaction between the digital and physical worlds and is expected to have a profound impact on people’s livelihoods and work, business operations and the economic environment in general [KPMG China 2022]. However, there is a common understanding that this involves the three-dimensional experience of

the Internet, combining and/or blurring the real and the virtual [Hui 2022]. The metaverse is not just a virtual version of today's Internet, but rather replaces it entirely and allows its users to live online [Gursoy et al. 2022]. It comprehends “virt-real” – the range of experiences, from purely virtual to physical. Moreover, it describes the spectrum of new consumer experiences and enterprise applications, as well as the business models that will be reimagined and transformed [Sweet and Daugherty 2022].

It is an immersive 3D virtual world where people interact (via avatars) to enjoy entertainment, make purchases and transactions with cryptocurrencies or work without leaving their place of residence. The metaverse market is estimated to reach USD 800 trillion in 2024 (Council of the European Union 2022). Restaurants raised almost EUR 13 million with the pre-sale of their NFTs and others earned 300% in Bitcoins. The white truffles are auctioned as NFTs with guaranteed total traceability. Restaurant chains, food brands and supermarkets enter the metaverse so that customers can buy or order real food through their avatars. The time of crypto restaurants, robots, meta-supermarkets and food on NFTs is coming [Robles 2022].

It is considered that in the future, a mature, sophisticated metaverse will have the following six characteristics [KPMG China 2022]:

1. Digital immersive experience – With the development of XR (extended reality) technology, which incorporates: VR (virtual reality), AR (augmented reality) and MR (mixed reality), complete immersion in the metaverse is possible through online gaming and social networking to online-offline integration of various real-life scenarios, in order to provide enhanced efficiency in daily life and the ultimate entertainment experience.
2. Openness to third parties – Allowing for the diversification of the technological ecosystem, devices should have a low threshold to usage and be highly compatible with the rest of the ecosystem.
3. Virtual identity – Depending on the supervisory model, real-world users can interact in the metaverse through one or more identities (by their virtual names or anonymously).
4. Virtual-real interaction – The physical and digital worlds will gradually merge, influence and interact with each other.
5. Ongoing evolution – the metaverse is constantly evolving, is always up and running, and is impacting users' virtual identities.
6. New authentication methods – NFTs (non-fungible tokens) and other blockchain technology, assigned a unique label and a special purpose.

The metaverse system is made up of a few major components, including application scenarios, core technologies and base-layer hardware components (Table 1). The base layer consists of basic hardware, such as network transmission devices, interactive sensing devices and computing chips. On this basis, blockchain, AI, cloud services, digital twins and other technologies can be combined to build an extensive digital world [KPMG China 2022].

The metaverse can be widely used by consumers, enterprises and governments. It will have a profound impact on areas such as entertainment, shopping, banking and finance, manufacturing, remote work, city governance and business services. The concept will

Table 1. The metaverse ecosystem

Tabela 1. Ekosystem *metaverse*

	CONSUMER		BUSINESS	TO GOVERNMENT
Application scenarios	Education and training Travel Shopping Remote work Entertainment Social networking and others		R&D Business services Banking and finance Health care and others Supply chain Manufacturing	Transportation City governance Infrastructure Government management and others
	AI	CLOUD COMPUTING	BLOCKCHAIN	DIGITAL TWIN
Core Technologies	Machine learning Computer vision Natural language processing	Cloud computing Cloud storage Cloud rendering Cloud edge computing	Distributed ledger Smart contract Non-Fungible Token (NFT)	Digital twin of humans Digital twin of systems Digital twin of physical objects
	INTERACTIVE SENSING		NETWORK TRANSMISSION	COMPUTING CHIPS
Base layer hardware	Wearable devices Brain-computer interface Sensor		5G/6G WIFI6 Low-earth orbit satellite +6G converged network	CPU/GPU ASIC FPGA Quantum computing

Source: own study based on: [KPMG China 2022].

bring about changes to economic and business models, such as changing the ways of doing business [Śledziewska and Włoch 2020, KPMG China 2022].

Virtual, augmented and mixed reality is driving metaverse services through innovative hybrid experiences, integrating the reality of the physical world with the virtuality of the constructed world [Buhalis et al. 2019]. Specialized metaverse organizations will develop comprehensive marketing solutions. They will offer value and services across the entire customer experience. Digital implants and wearable technologies will gradually introduce the Internet of Bodies and the Internet of Senses, which will be accessible through the 6 G's [Ericsson 2020]. The Internet of Things and the Internet of Everything will increasingly integrate resources into the metaverse environment [Buhalis 2020]. Robots, autonomous vehicles and drones will facilitate service delivery, bringing about a paradigm shift in the service sector and disrupting many functions, processes and roles. Metaverse technology and smart methods will increasingly determine the competitiveness of any entity, including hospitality, in the ecosystem.

According to Jiang and Xu [2022], “the metaverse promotes the deep metaverse of daily life at the material, spiritual and social levels, providing a new possibility for future human society, work and life (...), the metaverse era will realize the multi-dimensional and multi-modal ecological application of diversity, multi-scenario, multi-industry and multi-energy when human beings face short video media dissemination”. The metaverse will affect sectors such as: marketing, education and healthcare. It is likely to have effects

relating to social interaction from widespread adoption, issues relating to trust, privacy, disinformation, bias, application of law, and psychological aspects linked to addiction, as well as an impact on vulnerable people [Dwivedi et al. 2022].

The metaverse is creating a new economy in which wealth will be traded, generated and increased with a different currency, but linked to real money. Digital commerce in the metaverse is forecast to grow rapidly. A major retail company, Walmart, intends to sell things through the metaverse. Adidas has launched a NFT and a virtual real estate company. Gucci, a fashion brand, is selling merchandise in the metaverse in partnership with a game developer, Roblox. Balenciaga has partnered with Fortnite developer Epic Games to provide virtual boutiques. Nike has purchased RTFKT, a well-known brand in the metaverse, with a collection of virtual sneakers and digital artifacts. Nike wants to hire virtual apparel designers and is filing its trademark applications for virtual footwear, among other things [Laeq 2022]. Even governments may extend their reach into the metaverse. For example, Barbados plans to open a diplomatic embassy in the metaverse (the online world Decentraland) [Needle 2021].

The metaverse is coming to Microsoft Teams with the AR/VR collaboration platform Mesh. The new service lets Teams users in different physical locations join collaborative and shared holographic experiences during virtual meetings. “Holoportation” is a 3D capture technology. It lets users reconstruct and transmit high-quality 3D models of people in real-time, on any device using a customized avatar of themselves [Needle 2021]. Moreover, the Walt Disney Company was recently the most active in job postings for AR. It has also been granted a patent to create a real-world theme park ride during which users can experience a 3D virtual world without requiring specialized wearable hardware. A simultaneous localization and mapping (SLAM) technique will also be used to map the visitor’s surroundings during their move through the real world [GlobalData 2022].

The application of the metaverse in the hospitality industry

Hospitality companies are looking to increase the efficiency, safety and sustainability of the industry, as well as to address the new expectations, needs and lifestyles of their guests. In particular, the pandemic risk and the war have demonstrated the vulnerability of the hotel and tourism industry to both external and internal shocks. Growing awareness of climate change, modification of customer wants and needs, generational shifts and other external factors are likely to drive customers to choose hotel properties that imply sustainability and domestic locations rather than international destinations. These changes in customer attitudes may even motivate customers to experience some of the experiences, such as attending meetings, visiting museums, concerts, etc., that can be provided in metaviews, in order to reduce their carbon footprint while saving time and money. These possible changes in customer behavior underestimate the importance of industry efforts to develop and offer realistic hospitality and tourism experiences in the metaverse. As customers and technology evolve, metaverse applications are likely to play an increasingly important role in the industry, enhancing marketing, communications, customer relationships, customer decision-making processes and guest experiences [Buhalis and Karatay 2022, Utkarsh and Sigala 2022].

For example, the hospitality applications balance all three features of the metaverse (i.e., interaction, immersion and NFTs/cryptocurrency). Their implications go beyond enriching the hospitality experience throughout the customer experience, but also improve business operations such as new product development and human resources. More importantly, the metaverse applications are also driving industry transformation and redefinition of the hospitality concept, changes that we cannot fully and easily conceptualize at the moment [Buhalis and Karatay 2022].

The notion of the metaverse and its associated virtual experiences have radically altered clients' perspectives on the future of technology and its potential impact on the hospitality industry [Buhalis and Karatay 2022]. Businesses in this industry are eager to explore ways to capitalize on the metaverse and create virtual hospitality and tourism experiences, products, and services for their consumers. Enabled by Internet 3.0, the metaverse refers to a three-dimensional virtual space that focuses on social connections. The metaverse creates a sense of presence to promote social connection and hence it is attracting attention from the hospitality and tourism industry [Gursoy et al. 2022, Zaman et al., 2022].

Virtual reality is changing the scope of interaction in many industries [Buhalis et al., 2022]. Recently, virtual offers have appeared on the market, such as virtual museums [Gutowski and Kłos-Adamkiewicz 2020], virtual churches (June 2020), ghost kitchens [Cai et al. 2022], virtual travel [Dwivedi et al. 2022], virtual tours with wine tasting [Wen and Leung 2021] or virtual hospitality experiences in hotels [Buhalis and Karatay 2022]. Thanks to the metaverse, a new challenge has emerged for the hotel industry: virtual guests. Until now, an industry based mainly on physical guest service is now transforming into an experience-based industry. The guest experience should be just as memorable as the physical one, so hotels must rise to the challenge [Lacalle 2022].

With the advent of new technology, hotels now have the opportunity to create a metaverse hotel. With a virtual hotel, during the booking process, it can be organized to tour the hotel with an avatar or provide access to virtual rooms to organize meetings or celebrations, and so on. In addition, the metaverse gives hotels the opportunity to create new opportunities for guests and travelers to compare offers and engage with hotel brands.

Through Artificial Intelligence (or AI), many 3D images, animations, statements and artwork are generated. In the metaverse of hospitality, AI can improve the guest experience while overcoming language barriers, data analytics and other technological offerings in the hotel. This gives the hotel company a new target audience for which to consider creating personalized experiences to turn 'virtual customers' into real paying customers [Lacalle 2022].

Consumers are increasingly opting for metaverse experiences, products and services in hospitality and tourism. An example of this is Japan's First Airlines, which offers virtual flights from Tokyo. The company has reported 100% occupancy on virtual flights to many destinations, such as Rome, Paris, New York, Hawaii, etc. Similarly, a subscription to National Geographic VR allows people to use Oculus VR equipment to explore the hidden treasures of Machu Picchu or virtually kayak across icebergs in Antarctica. What's more, "Wander" allows individuals to walk anywhere in the world that is mapped in Google Street View (GSV). In addition, integration with Wikipedia

provides location-based information while the user walks around their favorite place. It also allows users to travel back in time, and thus see the changes that have occurred since GSV was launched in 2005. The aforementioned applications are revolutionizing the hotel and travel industry.

Virtual hotels, destinations and tours are changing the way people choose accommodation and destinations, make reservations and even attend conferences or concerts. Travel and hotel metaverse apps are becoming increasingly immersive and encourage virtual travel. This has been made possible by technological advances and also by the advancement of quality virtual reality (VR) headsets. Therefore, the metaverse will certainly become an integral part of the industry and will enhance the overall tourism and hospitality experience in many ways [Dwivedi et al. 2022].

The use of AR (Augmented Reality) technology will improve the experience of booking services or trips for tourists, from translating menus and signs to guiding tourists through popular attractions. The technology will play an exciting role in the industry. It will enhance the travel experience, making it easier for travelers to reduce stress and have a more informative trip [GlobalData 2022]. Additionally, AR technology can help reduce costs during vehicle production or maintenance. Using smart glasses or AR headsets, engineers can diagnose problems quickly, with a reduced margin of error [Augmented... 2022]. According to GlobalData, the AR market was worth USD 8.6 billion in 2021 (up from USD 7 billion in 2020). It is estimated that this market will reach USD 152 billion by 2030.

The future of the metaverse in the hospitality industry

The metaverse is envisioned to bring people together to get informed, plan and go on a trip, dream and/or co-design a personalized hospitality experience that they wish, to work and to ‘edutain’ themselves in metaverse hospitality spaces. Therefore, hospitality companies should design immersive and valuable experiences that customers are willing to pay for. Therefore, they need to be inventive and innovative to create unique and immersive experiences that engage the customers’ multiple senses. The concept of metaverse travel and tourism experiences is based, among other things, on two fundamental dimensions, i.e. [Gursoy et al. 2022]:

1. Degree of interactivity, which can range from low to high. A low degree of interactivity means that customers passively engage with virtual products and services (e.g., passively seeking information). The high interactive experiences mean that customers actively participate in a live virtual environment – e.g., kayaking, playing virtual games, etc.
2. Type of motive for participating in the virtual experience (hedonic vs. utilitarian). Those with a hedonic motive undertake them for pleasure and enjoyment (e.g., virtual diving in the Pacific Ocean), whereas those with a utilitarian motive seek to satisfy their functional or utilitarian needs in the virtual world.

With the metaverse, people can experience completely virtual flights, cooking and preparing meals in restaurants, hotel suites, tours, conferences, meetings and conventions. Qatar Airways, for example, has designed the QVerse [Qatar Airways 2022] and

Boeing Company is working on engineering designs for 3D air travel in the metaverse ecosystem. They intend to offer customers a 'try before you buy' function. In this way, they will enable them to explore hotel and restaurant interiors, tourist attractions, flights, and other services they are interested in, all from the comfort of their own home. Customers will be able to virtually experience the services they are interested in before making a decision, such as shopping, visiting museums, enjoying concerts or walking through art galleries in a digital world [Gursoy, Malodia and Dhir 2022].

The COVID-19 pandemic has meant that more and more MICE events (an acronym that stands for Meeting, Incentive travel, Convention and Exhibition) have been held online and virtually or as hybrid events combining online and offline formats. In recent years, metaverse-based MICE events have also been in the spotlight for hoteliers. Participants can indirectly participate in a virtual world called the metaverse through virtual selves and avatars [Kondratska 2022, Yakimenko-Tereschenko et al. 2022, Heo et al. 2023].

Nowadays, demand-pull and supply-push are prompting hotel operators to look at these applications and accelerate the adoption of the metaverse in the industry. Socio-economic trends, technological advances, and, more recently, the need for survival associated with COVID-19 or the war in Ukraine, resilience, reset and transformation make hotel operators more willing to look into the application of those applications [Sigala et al. 2021, Yakimenko-Tereschenko et al. 2022]. The hospitality industry is increasingly adopting associated technologies (e.g., VR, AR and Second Life), expecting they will lead the industry in creative and effective use of the metaverse. Demand in the hotel industry is also looking for new hotel experiences that suit their new lifestyles, combining leisure, remote work and family responsibilities, and satisfying their needs for zero-touch services and hybrid hotel experiences. Metaverse experiences can be used to reduce the need to travel (reducing carbon emissions) and manage over-tourism and crowded destinations. Metaverse hospitality experiences can break out of the loneliness and isolation of shut-ins or people who cannot travel (e.g., the disabled market), making tourism more inclusive and accessible to all [Aydogan 2021].

It is likely that virtual experiences will not completely replace real customer experiences in hospitality, but the prognosis for the metaverse is optimistic. While visual and auditory stimuli are relatively easy to reproduce, so far, it is not possible to recreate the taste and smell stimuli in the metaverse [Gursoy et al. 2022]. The McKinsey & Company report [2022] indicates that 95% of executives believe that the metaverse can positively influence their industry. Similarly, around two-thirds of consumers are excited about the potential changes brought by technology that integrates the virtual and physical worlds. Today, the future development of the metaverse is influenced by a number of important issues, particularly in the following five areas: technological breakthroughs, lifestyles, privacy and data security, social ethics, legislation and surveillance [KPMG China 2022].

However, with reference to the report from McKinsey & Company in 2022, 31% of all researched managers are concerned about investing in this emerging technology. They perceive it as something new and unstable. The metaverse has an impact on social impli-

cations; therefore, different stakeholders will need to provide direction for an ethical, safe and inclusive metaverse experience. Guidelines will need to be established related to data privacy, security, ethics and compliance, physical and mental health, and finally to sustainability, justice and fairness.

The metaverse enables intelligent interactions with organizations and destinations and places visitors (customers), at a table in a restaurant both in their virtual and physical visit. These interactions should be cross-platform, cross-segment and take into account cultural diversity and be communicated in the customer's language. The result is a differentiated, personalized and contextualized experience. It is anticipated that the metaverse will significantly change the behavior and attitudes of both customers and businesses. These changes are likely to affect services, perceived value, purchasing behavior, choice preferences, consumption patterns and decision-making processes. However, it is not very likely that virtual experiences will completely replace real experiences in tourism and hospitality. While visual and auditory stimuli are relatively easy to reproduce, so far, it is not possible to recreate the taste and smell stimuli in the metaverse. If this concept cannot replace real customer experiences in the catering, hospitality and tourism sectors, it is bound to modify the ways in which consumers will use these products and services [Dwivedi et al. 2022].

The metaverse experience can provide an additional incentive for customers who have doubts about making a booking. In this way, the metaverse offers significant opportunities for both service providers and customers. The metaverse provides companies with important marketing opportunities, facilitates customer relationships and saves customers time and money when planning their travel. It offers almost unlimited opportunities to transform traditional hospitality and tourism into virtual experiences [Dwivedi et al. 2022, Gursoy, et al. 2022].

Many industry leaders in hospitality have started to invest in these digital technologies, and 2022 could be one where the metaverse trend will accelerate significantly. The prognosis for this type of activity seems optimistic. Therefore, hospitality operators should fully appreciate the new solutions and develop their technical competence to interact with customers. They must understand the needs and expectations of consumers at different stages of the service (e.g., travel, hotel accommodation, business event), and develop appropriate offers, content and engagement to meet their requirements [Dwivedi et al. 2022, McKinsey & Company 2022].

Summary and conclusions

The development of the new digital economy, through the deployment of advanced cyber-physical systems connecting machines, information systems and employees, is changing the location, organization and content of work. Digitalization, including the metaverse, affects, among other things, the customer experience, organization and customer service, operational processes and the company's operating model. It will cause changes in economic and business models. The metaverse concept encompasses a wide range of ever-growing massive virtual-social platforms that will affect sectors such as marketing, tourism, hospitality, business events, commerce, education, ethics, law and also healthcare.

Virtual, augmented and mixed reality is driving metaverse services by engaging multiple customer senses and innovative hybrid experiences that integrate the reality of the physical world with the virtuality of the constructed world. This will cause paradigm shifts in the service sector and is likely to disrupt many functions, management processes and roles (e.g., radically reducing the need in organizations for so-called routine tasks).

The metaverse supports a profound metaversion of everyday life on a material, spiritual and social level, providing new possibilities for the work and life of future human society. It will affect social relations and trust, privacy, bias, misinformation or, finally, the application of law and psychological aspects related to addiction and the impact on vulnerable people. Hence, the market's concerns about the ethical, safe and inclusive metaverse experience and the need to establish appropriate guidelines (legislation and surveillance), to protect consumers and hospitality businesses.

The theoretical implications of the study improve the research community's understanding of existing knowledge on the metaverse technology and its application in the hospitality industry. The article further contributes to the body of literature on the application and direction of digital technologies, changes in the purchasing and social behavior of modern internet users, and finally, the sustainability of the hospitality industry and sustainable consumption.

It is difficult to predict the possible impact of new technologies and the metaverse in the hospitality industry. Therefore, scientists must systematically explore the potential roles and development directions for this concept. Furthermore, from a business perspective, it will be interesting to see how the metaverse will change the ways in which business is conducted, particularly in the service sector. Will it affect the efficiency, safety and sustainability of the industry? It is also interesting to see how the metaverse will affect perceived value, purchasing and social behavior, choice preferences, consumption patterns or decision-making processes.

For the hospitality and tourism industry, it will be important to study the changes in customer attitudes and behavior based on the time they spend in the metaverse, their perceptions of value, preferences, choices and avatar behavior in virtual reality. In the specific context of the hospitality and tourism industry, it is advisable for researchers to investigate: the process and ways in which users make purchasing decisions in the metaverse; and identify the values and motives of customers using the metaverse for hospitality purposes, as well as the cultural values and cross-cultural aspects of decision-making by metaverse customers. Research into the psychological determinants of consumer engagement and trust in contemporary digital technologies, including the metaverse, seems warranted. The research could also identify different formats and types of interactive marketing communication. Conducting such research is of value to both academia and industry.

Virtual spaces, like the metaverse, may soon disrupt the global hospitality market. It is therefore important to examine the phenomenon of the metaverse from the viewpoint of hospitality business professionals, developers or suppliers, policymakers and finally, customers. This viewpoint outlines some research directions, highlighting the need to understand the implications of metaverse for hospitality industries, but also wider society and the environment.

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