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Opinion

Travelling the Metaverse: Potential Benefits and Main Challenges for Tourism Sectors and Research Applications

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Abstract: The paper focuses on analysing the potential benefits and challenges of the Metaverse, particularly in the field of research in the tourism and food and wine sectors. The Metaverse is part of the new generation of the internet known as web 3.0, which also includes AI, blockchain and other digital innovations. The food marketing and tourism sectors are the main fields where companies are experimenting with solutions to offer people a fully functioning immersive Metaverse experience. This paper aims to highlight the potential impact of the Metaverse on tourism sectors as well as on research activities. Open challenges concern the social acceptance, affordability, and environmental sustainability of these technologies. Research is needed on the Metaverse's ability to reduce bias and accurately simulate real experiences, as well as on tourists' perceptions, attitudes, and willingness to pay for mediated experiences. Another important issue is the management of sensitive data that will travel through the Metaverse. Looking forward, the Metaverse has the potential to become a valuable tool for advancing tourism research through virtual collaboration and interdisciplinary research projects.

Keywords: digital innovation; food; Metaverse; phygital tourism; research; tourism; web 3.0; wine

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1. Introduction

Various fields of scientific research are increasingly turning their attention toward the Metaverse, both as an object of study and as a possible new space within which to practice research.

Currently, no unambiguous or shared definition of the Metaverse can be found in the literature, but from the major published studies to date, recurring elements allow it to be described as a shared online reality accessible via the internet, in which users are represented in three dimensions and can move around, share data and information, interact and socialise through shared experiences simulated in realistic, unrealistic, and mixed environments [1–3]. Thus, the Metaverse is a new way of interacting with reality, whether real, augmented, virtual, or mixed. It is part of the so-called web 3.0, a new generation of the internet that also includes artificial intelligence, blockchain, and new frontiers of digital and phygital innovation. Users access the Metaverse via 3D viewers and have virtual experiences connected to realistic avatars, other users, objects, concerts, events, travel, and more [4–6].

Although the publicity is only recent, the first attempt to design a three-dimensional environment in which people could create their own twin identity, communicate with each other, participate in events, and use a virtual currency was Second Life, launched in 2003. Since then, increasingly advanced technological infrastructure and investors' and users' interest in more user-friendly online environments for more immersive experiences have been central elements in the further development of virtual settings. Furthermore, the many restrictions on in-person activities and physical travel due to the COVID-19 pandemic have been an impressive stimulus for the growth of the Metaverse [7,8], creating a need for novel and unconventional mobilities.

Despite the embryonic nature of the Metaverse, several organisations, both public and private, have already begun to consider how they can reorganise their existing management models. For example, several recent studies [9–11] have analysed the potential impact of the Metaverse on the health sector. They argue that the use of innovative elements, such as immersion and interactive virtual reality (VR) technologies and applications would benefit both patients and healthcare providers, especially in the public sector. They describe the Metaverse as a space in which 'virtual hospitals' can be built, where consultations, remote care, physiotherapy, disease monitoring and even surgical operations can take place. Nevertheless, some experts have expressed critical issues about the health sector that arise with the development and implementation of Metaverse technology [12,13]. For example, with the rise of telemedicine and remote consultations, it is still unverified whether the quality of care provided in the Metaverse meets the same standards as in-person medical care. Furthermore, health data are subject to strict regulation, and it is crucial to determine how these regulations apply in virtual environments.

The potential of the Metaverse has also been evaluated in relation to the education field. The transposition of education into the Metaverse could be considered an evolution of the already well-known phenomenon of distance education, which has become common practice in schools and universities since the first lockdowns. The creation of virtual classrooms along with the use of digital twins by teachers and students may contribute to the creation of a new, more engaging, technology-driven style of learning [14–16]. Additionally, in the education sector, critical issues about the Metaverse have been raised with regard to both students and teachers [17,18]. For instance, are teachers equipped with the necessary skills and knowledge to effectively deliver education in virtual environments? How user-friendly and accessible are virtual educational environments for all students and teachers? Are virtual education environments designed to effectively engage and motivate all students?

Clearly, however, the increased levels of interaction and immersion offered by the Metaverse provide unprecedented opportunities and challenges for research. Some organisations and brands seeking to better position their products and services have already taken the first steps to harness the potential the Metaverse in their research. More specifically, as highlighted in a recent review of studies dealing with the Metaverse [19], the food marketing and tourism sectors currently represent the main fields in which companies are experimenting with solutions aimed at offering people the opportunity to enter a fully functioning, immersive Metaverse somewhere between the virtual environment and the real world.

Building on these considerations, this paper aims to analyse the potential benefits and main challenges of the Metaverse, with particular reference to the field of research in the tourism and food and wine sectors.

This topic calls for sociological, economic, and environmental reflections, since the Metaverse is an emerging and evolving entity that has not yet been sufficiently investigated [20–22], despite its complexity and impacts on people and society as well as on research activities. In fact, the Metaverse is contributing to the formation of new concepts and values that do not always overlap with those found in the real world [23].

The reminder of this paper is organised as follows: Section 2 deals with issues linked to tourism activities in the Metaverse, while Section 3 focuses on travelling the Metaverse, especially through gastronomy and wine tourism experiences. Section 4 discusses implications for research applications, and in Section 5, conclusions are drawn.

2. Tourism and the Metaverse

The tourism sector comprises the goods, services, and experiences of travel, hospitality, and entertainment and the enjoyment of cultural, social, and environmental resources. As highlighted within the most recent literature on the subject [24–27], tourism experiences provide not only moments of leisure and entertainment but also situations in which subjects

can form their own identity through confrontation with cultural elements other than their own.

Consequently, the Metaverse may represent an additional element capable of enriching tourism offerings beyond physical spaces. Even before the pandemic, certain digital solutions had been widely used in tourism and hospitality [28,29]. The forced immobility associated with lockdowns not only led many people to seek alternative and unconventional forms of mobility, but also incentivised many players in the tourism industry to offer mediated experiences. These give potential travellers the opportunity to experience the world and practice tourism without physically moving, in line with emerging needs related to the search for safety and sustainability [30].

In this regard, distinguishing between 'moving tourism' and 'stationary tourism' may be useful [31]. The first term denotes tourism in its conventional sense. Its main features include physical mobility, the use of transportation, and face-to-face interactions between visitors and the local population. 'Moving tourism' assumes that people travel to visit tourist destinations in person.

By contrast, 'stationary tourism' refers to tourist experiences that people can enjoy through technology, without physically moving. The word 'stationary' is commonly used in the fitness world, recalling the concept of 'stationary bicycles'. This stationary fitness equipment may be used in homes, gyms, and other indoor or outdoor locations to replicate the use of a regular bicycle for physical training, enabling people to move despite actually remaining in the same physical location. Thus, a stationary tourist can travel without changing locations in the same way that a stationary bicycle stays in place while allowing users to ride at various speeds and intensities and providing the same experience as a conventional bike.

A third way is represented by the new frontier of phygital tourism. This term refers to an innovative way to connect with the environment in which physical and virtual locations are combined to complement and reinforce one another. In phygital tourism, the intersection of digital data with physical objects and landscapes forms the foundation of the visitor experience. The process can also work in reverse: a physical action might prompt a search by interacting with sensors or machine-readable milestones that provide users with pertinent information through digital interfaces [32].

From this perspective, the Metaverse can further expand the range of possibilities for practicing 'stationary tourism', providing a good opportunity for destination marketers and scholars who intend to advance knowledge in the tourism industry by exploiting the potential of simulated environments [33]. Through virtual reality, augmented reality (AR), mixed reality (MR), telepresence, and immersive storytelling, tourism experiences in the Metaverse could indeed affect consumers' decisions in the real tourism environment. In particular, several pioneering immersive experiences have highlighted how the Metaverse is already contributing to the creation of shared value in the tourism field, especially in situations in which potential tourists are asked to express their expectations and preferences as part of research on territorial branding and the launch of new tourism services [34,35].

In the same vein, some hospitality players have already begun to create immersive and interactive hospitality spaces within the Metaverse to allow their customers to simulate the experience of their stay, with the goal of receiving feedback that can be used to improve offline offerings. In 2022 the hotel company CitizenM became the first to enter the Metaverse, creating a hotel in the Sandbox platform. In this virtual hotel, people can interact with each other and purchase goods and services, such as an exclusive collection of non-fungible tokens (NFTs), thus influencing the construction of real hotels based on their feedback. CitizenM monitors avatar behaviour to increase brand awareness and positioning and to co-design, test, and then launch real hotels in the physical world, in line with the brand's democratic approach. Similarly, the hotel chain Italian Hotel Group also entered the Metaverse to offer users the chance to experience and learn about its property before they stay there. Once they connect with the hotel in the Metaverse, users can meet staff avatars who can converse with them in real time. The staff members lead users on a

tour of the rooms and hotel facilities, showing them the customisation options available in the real facility, the spa, and other services offered. Such interactions help the hotel to understand potential travellers' new and different needs and to intervene in any critical issues reported by avatar visitors.

A further field of research is also beginning to study tourists' behaviours in the Metaverse using an ethnographic perspective [36–38].

These activities represent an opportunity for tourism players to develop tourism spaces, offers, and services to be marketed in a more targeted and informed way. Similarly, these activities enable people moving through the Metaverse to become more prepared and aware consumers, encountering in advance through their simulated enjoyment the goods, products, and services that may be of interest to them during their travels [39–42].

Because of its inherent potential, the use of the Metaverse for marketing can target not only individual customers but also travel professionals, such as travel agencies, influencers, and other intermediaries.

3. Potential Metaverse Applications in Food and Wine Tourism Experiences

Gastronomy in the Metaverse may sound paradoxical, as food is strongly linked to sensory and tangible experiences. Currently, if a restaurant or a winery opts to open a store through NFTs on the Metaverse, the goal may seem purely promotional, since it would not be possible to exploit the most important senses involved in tasting, smelling, and enjoying food and/or wine. However, food and wine are much more than simply the act of eating and drinking: they involve connecting with communities, cultures, and different territories.

The recent COVID-19 pandemic represented an unprecedented crisis for the hospitality industry. Due to health and social distancing measures, many hotels, restaurants, wineries, and bars have had to close. In addition, following the financial crisis resulting from the containment measures, several hospitality companies worldwide permanently ceased their activities. Thus, innovation must be given top priority in looking for potential solutions for hotel and oeno-gastronomy businesses. In more practical terms, innovation in the food sector is not just about physical food; it is also a matter of the phygital food experience. Oeno-gastronomy in the Metaverse must extend beyond the sense of taste to enhance the enjoyment of dining through immersive experiences, even incorporating gamification technologies into the custom of eating at a table. During the pandemic, evidence of such innovation appeared in the key role played by (virtual) technologies [43,44], from instant text messaging for food orders [45–47] to the ghost, cloud, and dark kitchens initiatives, virtual wine tasting experiences [48], and virtual tours of cellars and vineyards.

Particularly in oeno-gastronomic tourism, sharing experiences with friends, family, followers, and peers became one of the most important aspects of travelling across territories. To expand such experiences, food and wine in the Metaverse may open up novel and unconventional possibilities, such as the opportunity to visit production sites, breweries or farms in different states or nations and to interact with influencers and chefs.

Since 2022, companies have begun to experiment with phygital food experiences by opening virtual outlets in which customers may place their orders by logging in using VR goggles and have food delivered to their homes. Another example is represented by the Flyfish Club, which only allows access to its physical location in New York through NFTs supported by blockchain technology.

The wine sector might also add interesting phygital features to customise wine lovers' experiences by, for instance, using VR devices to explain the wine-making process during a wine-tasting session [49]. Concerning wine tourism, some companies have proposed immersive virtual tours of the world's finest wineries, assuring that the experiences are so real that by the end of the tour, virtual tourists can smell the wine.

Currently, it is difficult to predict whether oeno-gastronomic phygital experiences will gain any interest over physical ones. Certainly, however, VR, AR, MR, and the Metaverse offer significant potential for destination promotion. Firstly, they may make it possible to erase physical barriers for those who do not have the opportunity to travel around the

world, even though, at least at first, such experiences will be accessible only to a certain niche of customers. Secondly, on the one hand, tourism experiences in the Metaverse could be criticised as amplifying a stationary lifestyle, which could worsen the trend in place since the 21st century; on the other hand, immersive virtual tourism experiences may lessen the perceived risk associated with intangible services, enabling visitors to make more knowledgeable choices and have more realistic expectations for their real visit [50,51]. According to several scholars [52–54], in the post COVID-19 era, people consider their health and safety as top priorities, even if it means organizing their travel experiences differently than in past, by, for instance, leveraging virtual potentials.

Finally, adding artificial intelligence (AI) features would make it possible to customise individual travellers' experiences to new levels.

4. Discussion

The rapid spread of the Metaverse has stimulated numerous discussions about its potential to transform society. Supporters of the Metaverse describe it as an innovation that will have major impacts on people's lives in the long run, as the internet has had already [55,56]. Likewise, with the Metaverse still in its early stages, some have shared concerns about governance, ethics, privacy protection, and data reliability and accuracy.

In terms of research applications, the pioneering experiences reviewed in this article indicate that the Metaverse holds a number of possibilities for research. In the context of food marketing and tourism research, one advantage that has already emerged is the possibility of creating objects or arranging activities that are unrealistic or that are not yet available in the marketplace, thus allowing users to experience goods and services that cannot be experienced in reality. This feature expands the possibility of allowing potential customers to evaluate multiple prototypes of the same product or service at a lower cost than creating them in reality for use and evaluation [57].

However, testing vineries, hotels, and restaurants on the Metaverse might be different from the real experience, generating a sense of dissatisfaction induced by the mediated simulation. Moreover, the anticipation could affect the originality and freshness of tourists' experiences and relationships with territories [53]. In this regard, the attractiveness of real destinations could be undermined when users develop an unhealthy level of attachment to the Metaverse, due to the possible feeling of addiction, as virtual reproduction could become increasingly addictive and captivating.

The new possible forms of interaction between players and users foreshadow a scenario in which, for data and information collection, traditional channels are giving way to interactive, anthropomorphic AI agents that engage in personalised interactions with customers, such as virtual 3D AI agents in VR or holograms in AR [58]. Moreover, as a space that can be used freely, the Metaverse makes participation in research more accessible and inclusive in several respects. First, all subjects can ideally take part in such research, overcoming the physical limitations that exclude certain people, such as those with mobility impairments. In the Metaverse everyone can create their own avatar and explore simulated environments freely. Similarly, distant or hard-to-reach places can be reproduced in the Metaverse. As a result, research can benefit from the participation of those who otherwise would have opted out due to distance or travel costs. This circumstance also makes research more sustainable. The Metaverse can help reduce carbon emissions by making travel by plane, train, and personal transportation unnecessary for activities that were previously only feasible in person [59]. Additionally, access to the Metaverse provides a strategy to decongest certain areas, freeing them from seasonal over-tourism [60]. Finally, the trend of people purchasing fewer physical items in favour of digital ones hints at a more sustainable dematerialised future [61–63].

However, some scholars [64–66] urge caution regarding the benefits for environmental sustainability, since the Metaverse, along with the growth of its user base, could result in the need for significant computing power and high bandwidth speeds, consequently increasing energy consumption, mainly through non-renewable sources. In addition, further critical

considerations appear to be necessary, as certain limitations in the field of research could be identified.

The technologies still need to be perfected, the governance and rules for recruiting study participants have yet to be defined, no shared navigation standards exist, and the multiple Metaverses that current exist differ from each other in some respects.

Another concern involves regulation. Organisations and nations are not yet prepared to address privacy and security issues related to the Metaverse. More specifically, data privacy and cybersecurity regulations lag behind innovations in the Metaverse [67–69]. For example, because the Metaverse is borderless, in Europe it is still unclear how the clauses of the European Union's General Data Protection Regulation (GDPR) regarding the transfer and processing of data outside the EU can be applied.

A final issue concerns possible disparities in access to the Metaverse and its associated infrastructure and technologies. Indeed, certain populations (or parts thereof) are currently unable to access the infrastructure needed to obtain entry into the Metaverse [70]. Moreover, since access to the Metaverse is stratigraphically linked to ICT skills, using the Metaverse requires a range of technical knowledge not currently possessed by everyone. Without actions to mitigate this gap, those who cannot adapt to this change or who lack sufficient resources will be excluded from the new levels of connection and collaboration fostered by the Metaverse, and consequently, from new forms of communication, interaction, and research [71,72].

As a result, further insights into how to handle the challenges and opportunities of the Metaverse for research are needed, but these must be balanced by further research into potential new forms of social exclusion, the reliability of data, and the many ethical, behavioural, and negative impacts on vulnerable users.

5. Conclusions and Future Research Perspectives

In the transition from the pandemic to the post-pandemic era, a memorable long-term change in the way that people interact through technological applications is taking place and it will affect all domains of (virtual) life.

Starting from recent developments, reflections, applications of digital innovations, and the new frontier of the Metaverse, this paper has outlined the main tendencies in the domains of tourism and food and the consequences for research applications.

In the short term, it will likely be possible to experience unconventional and unexpected possibilities in tourism, such as walking in the ancient Roman forum as part of the initiative known as Time Machine Europe, which uses AR/VR applications to simulate hypothetical spatiotemporal 4D reconstructions with the aim of 'mapping the European social, cultural and geographical evolution across times' (Time Machine Europe website, https://www.timemachine.eu/about-us/, accessed on 12 January 2023).

From a more critical standpoint, many open questions linked to the social acceptance, economic accessibility, and environmental sustainability of such technologies remain unanswered. Tourism experiences reflect intricate socio-psychological processes, including a multisensory performance. The quality, authenticity, and sustainability of the travel destination are just as important as the social, demographic, economic, and cultural characteristics of the traveller in determining value, significance, and level of satisfaction. In this framework, digital innovation and immersive virtual practices can provide further opportunities to explore and to advance research on customers' and travellers' desires, needs, expectations, and satisfaction.

Nevertheless, while the (re)construction of immersive environments, goods, and services is becoming increasingly sophisticated, the Metaverse still proposes unrealistic objects, which may mislead users or challenge the validity of results through their lesser sense of reality [73]. For example, while sound and visual aspects tend to be relatively realistic, limitations exist in relation to atmosphere, smell, and perceived tactile sensations. Based on these considerations, research on the ability of the Metaverse to reduce or mitigate hypothetical bias in choice experiments is needed. For instance, scholars should pay attention

to the reliability and validity of the evaluations of virtual experiences using psychometric scales able to capture the psychological complexity and the hidden dimensions of consumers' willingness to welcome tourism experiences in the Metaverse. Indeed, the individual perception could be biased, since it is mediated by a virtual tool and may not correspond to the possible evaluation of the real experiences. Similarly, a discussion on how to appropriately design digital environments so that they can more accurately simulate real face-to-face experiences must be advanced [74,75]. Other research directions, currently unexplored, could focus on how the Metaverse could affect the decision-making behaviour and consumption habits of tourists, and/or explore whether such technologies are applicable in other tourism niches.

In addition, further research must focus on people's perceptions, attitudes, acceptance, and willingness to pay for AR/VR/MR experiences, while also considering cross-country and multi-cultural aspects, as noted by several scholars [44,76,77].

Another critical issue is related to the management of the large quantities of sensitive data that will travel through the Metaverse until clear and shared procedures and policies are defined within the scientific community.

To conclude, the Metaverse can become an important tool for promoting and advancing tourism research through the implementation of some initiatives, such as facilitating virtual collaboration among researchers, allowing them to work together on projects and share data in real time. In encouraging cross-disciplinary collaboration, the Metaverse can bring together researchers from different fields to work together on tourism research projects.

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