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# Advancements in technology and digital media in tourism

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## Abstract

This article discusses the concomitant processes of increasing familiarisation, responsiveness and responsibility that digital technology enables in the realm of tourism. We reflect on the influence of the proliferation of interactive digital platforms and solutions within tourism practice and behaviour through a range of lenses, from user generated content and associated interactive digital platforms, the emergence of gamification embedded within these, immersive mixed-reality media (such as virtual reality [VR] and augmented reality [AR]) and the changes in tourist behaviour that have paralleled these digital developments. We also explore the use of AI in tourism, and the methodological potential that digital technology has for tourism studies.

## Keywords

artificial intelligence, augmented reality, digital media, e-tourism, mixed reality, mobile technology, sharing economy, video games, virtual reality

## Introduction

The two decades of Tourist Studies have also, roughly, been the decades in which the Internet and digital technologies have become fundamentally integrated into our lives. The ubiquity of internet-enabled devices and associated mobile mediality have deeply influenced the tourism industry on an infrastructural and communicative level: we book trips online, we talk to our friends back home, we can imagine faraway locations in images, texts, or virtual realities. Beyond that, the interplays of agencies of the human and non-human also connect to fundamental epistemic and ontological transformations

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in our capacity as (potential) tourists. In this contribution, we want to focus on the concomitant processes of increasing familiarisation, responsiveness and responsibility that digital technology enables. In this commentary, we reflect on the influence of the proliferation of interactive digital platforms and solutions within tourism practice and behaviour through a range of lenses, from user generated content and associated interactive digital platforms, the emergence of gamification embedded within these, immersive mixed-reality media (such as virtual reality [VR] and augmented reality [AR]) and the changes in tourist behaviour that have paralleled these digital developments. Lastly, we explore the use of AI in tourism, and the methodological potential that digital technology has for tourism studies.

## **Digital familiarisation**

The idea of travel has traditionally been associated with the sentiment of entering unfamiliar or unknown territory (Arthur and Nuenen, 2019; Ashcroft, 2015). The rise of technology in the past centuries – from the steam train to the automobile to the air carrier – has complicated this epistemic position, having led to an increasing ease of touristic practices (Löfgren, 1999). This development has continued in the last few decades, as the expanding middle classes of the First World's nations have achieved greatly increased access to the world. Many more people than ever before live mobile lives, giving rise to a figurative cosmopolitan mobility or 'cosmobility' (Salazar, 2010). Further, as Franklin and Crang recognise in their seminal publication in *Tourist Studies*, we live in a 'world of flows' (2001: 10), underpinned not only by tourism but by labour migrations, commuting, and economic transference of goods and services. Mobility has become normalised (*ibid.*) and in the last twenty years, it has emerged as a significant area of research across social science disciplines, in which tourism plays a key role (Hannam, 2009; Hannam et al., 2014; Sheller and Urry, 2004; Vannini, 2010).

Simultaneously, the rise of technology-based solutions that foster a hyper-mobility of people, places and spaces, has created seismic shifts in the ways in which tourists and tourism become manifest and, as such, how academic research in this area has progressed. The systems, flows and behaviours associated with tourism, and the research underpinning these, exist as a fusion of 'old' and 'new' imaginings and anticipations. Classic theoretical framings of typologies and models (Butler, 1980; Cohen, 1972) and seminal work on the images, symbolism and representations of tourism (Selwyn, 1996; Urry and Larsen, 2011) provide the foundation for understanding these changes, as thinking moved beyond tourism as a series of circular representations of place, towards systems of presencing and performance (Franklin and Crang, 2001), now embedded in a world of flows and systems – whether social, monetary, or symbolic – themselves inherently mediated by technology-based experiences and interactions (Lester and Scarles, 2013; Thurlow and Jaworski, 2014; Tussyadiah, 2017; Tussyadiah and Fesenmaier, 2009; Wang et al., 2012).

Increased mobility has gone hand in hand with the immediacy of information now routinely available via digital media. Through online travel agencies (OTA) such as booking.com and Trivago, and on peer-to-peer booking sites such as Airbnb, we can curate our travel experiences anywhere in the world at a click of a mouse, or tap on a

smartphone. We can search for package deals, make travel reservations with airlines, train and ferry operators, search out nearby points of interest, check the current weather conditions, and read up on the local news. Our itineraries can be similarly planned: platforms such as Google StreetView enable us to access accurate, high-resolution digital images of locations around the globe, while AI technology present in mapping services uses GPS to provide information on the shortest or most convenient routes to take. Even places that are remote and physically inaccessible are documented by such services, as well as the wide range of travel bloggers, reviewers and reporters on social media (e.g. Azariah, 2016). The result is a remarkable profusion of mediated experiences and vicarious travel possibilities that would have seemed miraculous even a few decades ago. The innumerable previews, evaluations and discussions about travel destinations that exist online imply that physical travel to a 'real' location is only one part of a touristic experience that is increasingly dominated by digital engagement.

The effect of these changes in understanding how we travel today is that the hypermobility of virtual spaces creates a proximity of possibility as (re)presentations of distant and 'exotic' regions become folded into our everyday, collapsing temporal and spatial boundaries. Such reflections are not new; within critical tourism studies and mobilities, such discourse is well-rehearsed (e.g. Jansson, 2007; Scarles, 2009; Van Nuenen, 2016). Indeed, metaphors of movement ('surfing' the Web, the 'information superhighway') emerged in the 1990s to describe the experience of traversing the new domain of cyberspace, and when Microsoft launched its Windows 95 operating system, its catchphrase was, 'Where do you want to go today?' Today, that question is asked by travel platforms of all sorts, which offer spaces for tourists to connect and co-create experiences. Hannam et al. (2014), in this context, refer to a 're-articulation of tourism' brought about by cultures of pervasive connectivity and the ubiquity of technology in multiple forms. The authors argue that 'the emergence of cyberspace has reconfigured and mobilised the concept of space itself, where virtual spaces are configured based on human interest rather than physical proximity' (ibid, p. 178).

These spatial transformations contribute to the rise of cultures of co-creation and the emergence of the 'prosumer', as power relations between producers and consumers are increasingly conflated (Campos et al., 2018; Lester and Scarles, 2013; Neuhofer et al., 2012). Tourism has emerged as a series of performances of pseudo-independence as mobile technology (such as smartphones, tablets and laptops) pervade our everyday lives and provide access to information and data that drives decision-making in real-time purchasing and engagement (Lamsfus et al., 2014). One example is the so-called 'silent traveller'; a 'digitally savvy and self-reliant consumer' who 'shun[s] human interaction, and know[s] their way around everywhere they go' (Ali et al., 2014). Despite this alleged independence of the digitally-aided tourist, as Germann Molz and Paris (2015) suggest, tourism emerges as a series of complex assemblages as multiple agents come together in dynamic, fluid possibilities of technologies, infrastructure, virtualities and materialities. Much research has been undertaken to further understand the ways in which technology has driven change in tourist practice, in the service infrastructures and relationships underpinning these and changing tourist preferences and behaviours (Disztinger et al., 2017; Gursoy et al., 2019; Kim et al., 2020; Molz, 2012; Tussyadiah and Wang, 2014; Wang et al., 2012).

Contemporary tourism, in sum, emerges as a fusion of socio-technological relationships; a ubiquitous co-presence of technologically mediated relationships. Virtuality blends with physicality as tourists and tourism emerge through complex webs of pervasive socialisation and authentication – maintaining connection with friends and family, influencing the choices of other tourists through online reviews, sharing social media content, influenced by experience providers that drive decision-making and purchasing practices through personalised content and supported by peer recommendation (e.g. Van Nuenen, 2019). Yet, with such techno-social opportunity, research recognises that such desire to become more ‘connected’ and ‘experience’ more destinations also impacts the economic and social fabric of visited communities and destinations (Cheng et al., 2020; Heo et al., 2019; Lin et al., 2019).

In the context of tourism, all of this activity – and the new possibilities for analysis that are emerging – is fundamentally connected to a shifting concept of what digital technology is and how people use it. How we think about and use the Internet, for instance, has gradually shifted in the past two decades: from a mentality that emphasised the seemingly boundless online possibility of democratisation, and the potential for ‘becoming’ someone else, to a projection of real-world relations, effects and causes in an online space (Varis and Van Nuenen, 2015). It is telling, then, that the use of digital media in tourism settings still carries a stigma. For example, selfies – perhaps the most notable development in touristic photography in the past decades – are still routinely the object of ridicule, disgust and condemnation (Rettberg, 2014), questioned for their appropriateness (Von Schuckmann et al., 2018) and the narcissistic tendencies they imply (Barry et al., 2017; Pearce and Moscardo, 2015; Tribe and Mkono, 2017). At the same time, these new forms of networked photography offer insights into the ideologies of how to perform and consume place, as choreographed by the politics and aesthetics of self-presentation (Gretzel, 2019; Magno and Cassia, 2018).

In response to the shifting norms surrounding digital media, destinations have begun to counteract the detriments of social media exposure (Gretzel, 2019). The Vienna Tourist Board, for instance, recently introduced an ‘anti-hashtag’ campaign encouraging visitors to stay offline and see the city without their smartphones or the use of social media (Buckley, 2018), with the accompanying advertisement slogan of ‘See Vienna, not #Vienna’ (Siegel et al., 2020). These developments are in line with a growing resistance against technology and media (‘techlash’), evidenced by phenomena such as ‘digital detoxing’ – a periodic disconnection from social or online media, or strategies to reduce digital media involvement (Dickinson et al., 2016; Fan et al., 2019; Syvertsen and Enli, 2020).

Syvertsen and Enli argue that such practices tap into a nostalgic construction of authenticity, when people perhaps had more time on their hands, and a more conventional spatial sense of ‘hereness’ and belonging. The call for authenticity points to a liberal sense of responsibility, self-dependence and agency, which are opposed to the allegedly cynical relations, emotional deception and fake personas that accompany online socialising (Ellison et al., 2006). With the complexities of digital assemblage at the forefront of our thinking, we turn our attention to four key areas of digital transformation within tourism over recent times: the sharing economy, digital gaming, mixed-reality and immersive experiences, and algorithms and AI.

## Sharing economy

The changing relations of power, authenticity, community and practice through digital advancement pervade all aspects of tourism, but the rise of the sharing economy in particular. The sharing economy, made up by peer-to-peer (P2P) platforms for collaborative consumption, involves the 'subversion' of large industries by digital infrastructural platforms which facilitate direct contact between hosts and guests (Guttentag, 2013). The sharing economy is commonly associated with the rising importance of co-creation in tourism; that is, the creation of process-oriented, participative consumption experiences (Campos et al., 2018; Gretzel et al., 2006; Grisseman and Stokburger-Sauer, 2012). However, the socioeconomic changes that P2P platforms foster are often accompanied by expressions of value and solutionism in which computer-based communications and experience creation become a universal metaphor for thinking, biology, identity, and technological utopians; as well as being harbingers of liberation, democratisation and peer-to-peer adhocracy (Lanier, 2013; Turner, 2006).

Holding the power to subvert the position of dominant corporations and brands, peer-to-peer platforms can mobilise and empower local, small-scale agents within the socio-economic systems of tourism. This approach provides a form of hosting and guesting characteristic of 'network hospitality' (Germann Molz, 2014) involving a system of advertisements, recommendations and instructions about potential experiences. The last decade has seen an overwhelming rise of new multinationals such as Airbnb and Uber now outsourcing many traditional conglomerates (Gerdeman, 2018; Stone, 2017). Often referred to as disruptive innovation and advancements (Guttentag, 2013; Veijola et al., 2014), P2P democratisation, however, also mobilises an understanding of these new multinationals as potentially problematic with sparsely regulated, technological plutocracy (Lee, 2016).

The introduction of tourists into residential areas has also, at least in part, contributed to the issue of 'overtourism', an experiential issue in which residents, and perhaps visitors, perceive a location as receiving too many tourists (Dodds and Butler, 2019: 78). Indeed, within the complex assemblages of the sharing economy, the lived experiences of such disruption bring both opportunity and impact. Local entrepreneurship, gentrification and economic gain (Dogru et al., 2020; Mermet, 2017) become intertwined with challenges of temporary rental investment, and the associated flows of tourists can negatively impact the social fabric of communities (Cheng et al., 2020; Veijola et al., 2014), leading many places to re-evaluate the capabilities of their host capacities, and criticising the deterioration in the quality of life of local communities as a result of tourism (Dodds and Butler, 2019; Pechlaner, 2020).

Such complexities and impacts necessitate deeper critical reflection on the qualitative insights of behaviours and practices within the production and consumption systems of the sharing economy. Reflecting on early conceptualisations of sustainable tourism (e.g. Wheeler, 1991) and contemporary critiques of sustainable tourism consumption (e.g. Sharpley, 2020) allows for deeper insights into the redistribution effects of co-created, peer-to-peer experience creation. This involves not only the political motivations underpinning such practice and experience, but also into the socio-technical agencies of tourists, service providers and communities, and the implications of the sharing economy on

destination infrastructure and capacity. The emergence of alternative manifestations of agency within the sharing economy, such as the silent traveller we mentioned above, implies that the co-creativity and co-responsibilities of production and consumption agents within the sharing economy continue to blur.

## **Mixed realities**

The second area of reflection on the complex assemblages and socio-technological relationships embedded within tourism, brings us to mixed-reality and immersive technologies. From VR headsets (e.g. the Oculus Quest and Valve Index) to 360-degree videos or augmented reality applications on mobile devices (e.g. tablets and smartphones), an increasing array of mixed-reality possibilities is emerging within tourism, generating the opportunity for creativity and innovation.

As Jung et al. (2017) suggest, the adoption of immersive technologies has received increased attention in recent years, and never more so than during the current global pandemic. Tourism is no exception: there has been a rise in mobilising destinations in virtual realms, enabling tourists to experience virtual simulations as if they were real (Martins et al., 2017). Experiences such as EverestVR, for instance, enable tourists to 'climb up' the titular mountain through images stitched together from hundreds of thousands of real photographs (Sólfar Studios, 2016). Nevertheless, where immersive technologies such as VR or augmented reality (AR) have been adopted in tourism, their primary function has been to enrich the on-site visitor experience. These technologies provide multiple layers of media content to 'immerse' visitors in destinations and attractions (Bec et al., 2021; Corrigan-kavanagh et al., 2019; Jung et al., 2017; Scarles et al., 2020; tom Dieck and Jung, 2017; Tussyadiah et al., 2018). Marketing and promotion through VR enables prospective tourists to interact with destinations online prior to their booking (Yung and Khoo-Lattimore, 2019).

However, while debates surrounding the role and function of immersive technologies and our understanding of the opportunities and challenges associated with these has increased at pace, research has yet to attend to the opportunity such technology affords to address wider issues of accessibility and inclusion in society. This could include a deeper study of the benefits afforded by such immersive technology to bring virtual mobility opportunities to those with limited mobility and high levels of social isolation, who are unable to physically reap the benefits of travel. This avenue develops the initial premise of authors such as Williams and Hobson (1995) who proposed that VR, and arguably now alternative immersive, mixed reality experiences, provide a substitute to travel itself, as well as the suggestion by de Greef et al. (2016) that telepresence tourism creates opportunities for increased engagement in recreational activities for mobility-restricted participants (see also Scarles et al., 2020).

To be clear, we do not advocate virtual travel as a replacement for physical travel in its entirety. Far from it. Rather, in ensuring a holistic insight into the socio-technological opportunities that exist, it seems crucial to develop and deploy immersive experiences in a myriad of ways that facilitate an enriched, deeper and more personal connection to tourist sites for society as a whole – especially in our current times when actual physical travel has become more difficult. Such insights can also bring attention to the importance of



social presence and interactivity in immersive experiences, and the need to learn from examples such as *Play Melbourne Live* (Clemenger, 2015) – among many others – to create opportunity for social connection through interactive communication in real-time.

## Digital gaming

The third area of development we attend to is digital gaming, not least because many of the platforms and technologies discussed above have been developed within a context of gaming. The influence of games in tourism reaches far beyond virtual environments: one of the most notable expansions of gaming culture into tourism comes by way of gamification or ‘funware’, which refers to typical elements of game playing (e.g. point scoring, competition with others, rules of play) being introduced into other areas of activity (Deterding et al., 2011; Morozov, 2012: 296–301; Sigala, 2015). Such systems are increasingly more widely used to motivate and nudge tourists to engage with online platforms or services, either before they embark (Dubois and Gibbs, 2018), as well as during their trip (Xu et al., 2016).

One example of gamification in tourism is the point-based system used by TripAdvisor, implemented to encourage desired actions such as leaving reviews (Zichermann and Cunningham, 2011). Besides scoring points, TripAdvisor offers a diversified range of gamified features, such as a ‘Passport’ badge which gamifies the number of miles one has logged, and the number of cities and countries one has visited. These different gamified systems essentially act as hypernudges (Yeung, 2017), a form of choice architecture set up to alter people’s behaviour without explicitly prohibiting options or changing economic incentives. Powered by big data analytics, which allows them to be dynamically updated, hypernudges are a particularly potent ‘soft’ form of design-based control characterising algorithmic tourism platforms, necessitating critical approaches on their socio-technical embeddedness (Lugosi, 2016).

Many of the game mechanics used on digital tourism platforms have a history in video games, which are interesting to consider in their own right. Whereas games of the 1980s and 1990s constructed relatively abstracted, two-dimensional worlds of experience, today’s virtual environments are arguably more immersive, brought about by the vastly increased rise in computational power. The result is the promise of a level of realistic involvement that follows similar principles of constructing a sense of space for exploration, discovery and wish fulfilment as we find in corporeal travel. This manner of involvement also accounts for the rise (and fall) of immersive innovations such as 3D televisions and virtual reality technology. It is no doubt due to this increasing graphical sophistication that tourism is becoming an increasingly obvious commercial framework to advertise videogames. For example, Microsoft recently ran a touristic campaign called ‘Visit Xbox’ to highlight the graphical capacity of its Xbox One X console (Tuttle, 2019). The campaign involved a 70-second film in the style of a tourist board advertisement, demonstrating the sun-soaked beaches, mountain ranges, and cityscapes to be found in its games.

Conversely, game engines have been used by tourism operators to engage potential or on-site tourists. Virtual environments have been used to perform commercial transactions such as booking a trip, or getting advice from virtual travel agents (Berger et al., 2007). Pervasive games, in which the gaming experience is extended out in the physical

world, have also been used to have tourists engage with history while moving across a site or city, by completing quests and scoring points (Walz, 2008). Throughout these activities, as we saw above, there is a focus on increasing ‘immersion’ as a form of experiential consumption (Carù and Cova, 2006; Holbrook and Addis, 2001).

## **Algorithms and AI**

Zooming out further, we now attend to the final area of reflection. The digital media we have been discussing are part of a broader movement towards algorithmic culture, in which the sorting, classifying and hierarchising of people, places, objects and ideas is increasingly delegated to computational processes (Galloway, 2006; Striphas, 2015). As such, work in tourism studies on these processes needs to be situated within critiques of the larger regime of computer-based monitoring and control (Dourish, 2016). One thread we want to pick up on concerns the possibilities of personalisation and prediction that the aforementioned peer-to-peer, virtual and gamified systems allow for.

Algorithmic personalisation, which we find throughout the platforms mentioned in this paper, is a paradoxical phenomenon: on the one hand, recommendations and classifications are founded upon the importance of individuality in personal experience creation. Yet, they also function within a framework of collective, preformatted experiences, products, and services, in which individuals are decomposed into predictable features. Deep Learning and Neural Networks, for instance, use granulated input data that represents objects from the outside world, which is processed through layers of neurons processing input signals. Statistical correlations between inputs and outputs entail new modes of calculating the social in high-representational space, and are demonstrative of complex socio-technical relations that tourism studies needs to attend to (Lugosi, 2016).

In doing so, we should not forget that the existence, designs, and implementations of algorithmic systems are a product of social forces (Beer, 2017), integrating human biases at many levels (e.g. Benjamin, 2019; O’Neil, 2016). This necessitates a view on the politics and power relations that AI and algorithms produce. Such criticism needs to go beyond a blanket call for more transparency in algorithmic systems, as different stakeholders require different types of AI explanations (Van Nuenen et al., 2020). For instance, when a chatbot or virtual assistant in a tourism platform turns out to be biased, technical engineers will want to explore the statistical nature of this bias, while tourism scholars might be more interested in the social embeddedness of such biases – whether within the platform or in the wider industry (e.g. Edelman and Luca, 2014).

We ought to note that the developments in AI described above are increasingly integrated in digital tourism research itself. Digital technologies do not only make for new case studies or sites for analysis (Karlsson et al., 2017; Safaaa et al., 2017); they also enable new forms of research strategies in media studies, which need to deal with the ephemeral and unstable nature of online data (Rogers, 2019). Discursive analyses of the language of tourism in such settings may involve Natural Language Processing, for instance, to investigate the language of tourism as it proliferates online (Stepchenkova et al., 2008). Further, machine learning methods allow for a wide range of prediction and classification tasks, including image recognition and language modelling, which tourism scholars may be interested in.



These datafied methods stand in a long tradition of quantitative research in tourism studies. However, and to conclude, we should be careful of an overreliance on these methods for their potential to produce positivist answers. The value of tourism studies in the past decades has been precisely to offer critical analyses and thick descriptions of the semiotic, social, behavioural and technological particularities found in touristic settings. Digital methods ought to be both complemented with (digital) ethnographies, and – as we noted – to be seen ethnographically themselves, as heterogeneous and diffuse socio-technical systems, rather than rigidly constrained and procedural formulas (Seaver, 2017). Such a reflexive attitude will ensure that tourism studies retains its critical scope in the decades to come.

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