

Tourism and Big Data in a Post-COVID-19 World: The Utopian and Dystopian Rhetoric

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Abstract: The tourism sector has been significantly impacted by the COVID-19 pandemic, making it one of the most affected economic areas worldwide. Simultaneously, the pandemic created contexts for the expansion and consolidation of trends already experienced in the recent past, namely the increasing adaptation of tourism to the digital society. One prominent example is the use of techniques known as “Big Data”, which carry out a massive mining of data from different sources, in order to define “profiles” of tourist consumption. This paper aims to map the social and ethical controversies associated with the use of Big Data by addressing the “technological optimism” that tends to surround the use of these techniques in the tourism sector. Through a review of literature about Big Data in tourism, we conclude that the rhetoric surrounding the use of Big Data techniques is both utopian and dystopian. On the one hand, according to literature in disciplinary areas related to the development of technology, Big Data is considered an indispensable tool for improving competitiveness in the tourism sector and for helping to understand the tourist more effectively. On the other hand, however, social sciences tend to frame Big Data as an astute representation of Big Brother, challenging the protection of personal privacy in tourism consumption and highlighting the lack of awareness and legal regulations, as well as the possibility of decontextualisation and false correlations that may jeopardize the touristic experience. For this reason, it has become urgent to develop a critical reflection on the ethical challenges posed by the uses of Big Data in tourism and consider routes of an anticipatory governance of these technologies.

Keywords: Big Data, tourism, ethical issues, utopian and dystopian rhetoric

1. Introduction

Throughout the last two decades, digital technologies have been incorporated into several daily practices of society and have become increasingly embedded in the economic strategy of several countries, profoundly changing those economies. In this context, a powerful trend towards the digitisation of society has been growing, having a significant impact at the end of the 20th century, due to the development and maturation of the internet and the transfer of immeasurable offline content to the online world which, little by little, has gained an unlimited capacity to store diverse information at any time, on a global scale (Mayer-Schönberger *et al.*, 2013).

Therefore, we are presently witnessing the “Age of Acceleration” with a massive procurement of devices, both in citizen’s professional and personal lives, who by integrating numerous digital platforms and, especially, social media, have generated an exponential growth of online-produced content (Xiang, 2018). This growth has allowed the accumulation of large amounts of data and information, thus giving life to Big Data techniques. These techniques may be distinguished by their ability to extract value from digitised and stored information in real-time and in an effective and targeted way, thus offering greater competitiveness to companies (Cavanillas, Curry and Wahlster, 2016).

In the particular case of tourism, Big Data technology was initially used by the sector as a marketing-oriented tool but has since become a knowledge-generating tool (Fernandes, 2021). As such, the tourism sector has come to recognise that the commitment to technology and the respective procurement of a large volume of data, allows an in-depth analysis of the needs, preferences and expectations of tourists, thus leading to an adequate targeting of its tourism offer (Höpken and Fuchs, 2016).

However, it was during the pandemic that we witnessed a “technological explosion” and the start of a new era. With both a worldwide ban on people’s movements and national lockdowns, citizens have connected to the outside world from home via technology. With the use of “technologies and connections, virtual reality and remote support”, permanent habits and behaviours in society have been changed (Fernandes, 2021, p. 1).

As a result of the pandemic, the immobility of those who would previously have used their leisure time to travel naturally caused a suspension of all tourist activity. From the first quarter of 2020, the tourist industry saw not only limitations on travel (Araújo-Vila, Fraiz-Brea and Pereira, 2021), but also the desertification of popular

tourist locations (Kontogianni, Alepis and Patsakis, 2022), as well as the need to re-adapt and sophisticate its practices, in order to ensure the industry's survival. Tourism will not be the same in a post-COVID-19 world (Assaf and Scuderi, 2020). Therefore, the time has come to reposition the industry and thus modify its market strategy (Abbas *et al.*, 2021).

The need for this reconfiguration of tourism, based on the use of Big Data, will entail intricate new social challenges. These challenges intercede in social processes and constitute ethical implications that will affect individuals and hence, society (Mittelstadt *et al.*, 2016).

Given the economic and social weight that tourism holds in Portugal, a constant reflection on the application of Big Data in tourism will be essential. At the same time, the techno-optimism imprinted on the use of Big Data obscures the need for the evaluation of results regarding the way it influences the tourist. This paper aims to contribute for further development of reflection about the implications of uses of Big Data. In particular, this paper aims to raise awareness regarding the need to balance the potential of Big Data with the ethical issues related to privacy and proper access to data, and to reflect about ways to encourage different stakeholders to work together for the lasting and sustainable application of Big Data in tourism.

2. COVID-19 effects: Working towards a reconversion of the tourist industry in Portugal

In Portugal, tourism stood out in 2019 as the country's largest export economic activity. In the same year, this activity made up 8,5% of the Gross Domestic Product (GDP) (PORDATA, 2021a) and the tourist industry represented 51,8% of the total export services in Portugal (PORDATA, 2021b), providing more than 1 million jobs and creating new infrastructures (Almeida and Silva, 2020). In 2020, however, due to the crisis that set in and the ban on circulation, Portuguese tourism saw its revenues decrease by 57,6% (TravelBI, 2021), significantly altering its weight in the Portuguese economy.

The pandemic has virtually paralysed the tourist industry and, for that reason, all stakeholders must work together in order to respond to the crisis in a resilient manner, earn the market's trust and respond to the UN's 2030 Agenda. Although a digital transition has been part of the national strategy since the establishment of the "Tourism Strategy 2027" (announced in 2017), which aimed to be articulated with different agents, this is the key moment for its implementation (Fernandes, 2021).

For this reason, it is in a post-pandemic period and in a context of digital transformation that tourism needs to thrive. In a race alongside competitiveness, innovation and sustainability, "Big Data will be the fuel" that helps in the development of tourism and, in a sustainable way, allow us to both understand the tourist and respect the territory (Araújo, 2021).

The involvement of destinations, local communities, governments, tourism professionals, companies directly and indirectly linked to the sector, technological innovation companies and academics can help to rethink the *modus operandi*, and ensure a sustainable reconstruction based on innovation (Assaf and Scuderi, 2020; Sharma, Thomas and Paul, 2021). For this, it will have to establish more selective and inclusive practices, implementing proactive policies and reconverting practices that have discredited the activity. In this way, "tourism intelligence, cooperation and rigorous planning" may be successful long-term solutions (Pardo and Ladeiras, 2020, p. 678). In short, it will be necessary to totally ignore the guidelines of traditional tourism and think about hitherto unimaginable scenarios from before the crisis, all the while having to address the issues of fundamental tourist rights (Baum and Hai, 2020).

Both the pandemic period we are currently traversing, and the expected post-pandemic period, are and will continue to be, a time of challenge for all structures allied to the sector, with disruptive movements in the tourism market that will require constant adjustment (Almeida and Silva, 2020). In line with international expectations, the tourist offer should be less massive, guarantee social and environmental sustainability and accelerate the digitisation of tourist operations (Almeida and Silva, 2020). More than that, it is vital to assertively align emerging technologies with the digitisation of the companies involved, since due to the pandemic context "e-learning/work" and "e-commerce/business" has seen intensive acceleration (Fernandes, 2021 p. 10). Together with current European goals, such as the example of the project launched by the European Commission "A Europe fit for the digital age" (Fernandes, 2021, p. 10), these social imaginaries are moving towards effective digital innovation.

Note that the sociotechnical imaginaries are in short “collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects” (Jasanoff and Kim, 2009, p. 120) and “project an image of the kind of society that sociotechnical innovation can bring into being and the kind of society that is needed for innovation to happen” (Tutton, 2021, p. 418).

3. Imaginaries and expectations of a post-pandemic world: Tourism, Big Data and social transformations

The expectations of the future are essential to drive research and emerging issues (Brown and Michael, 2003). Therefore, it is essential to map and understand visions, dynamics and power relations between different social actors (Konrad, 2006), whose consensuses or divergences will allow for the continued success of certain projects, depending on the legitimacy that is recognised in them (Borup, Brown, K. Konrad, *et al.*, 2006). This is the case of the use of Big Data in Portuguese tourism.

Indeed, expectations will mediate relationships between different types of actors and if expectations are mutual, legitimation will hardly be necessary. It is at an initial moment of uncertainty that shared expectations increase the possibility of success by involving a wider range of stakeholders. Actors will not only be guided by their own expectations, but also by the expectations of others, resulting in the mobilisation of even more actors through “social pressure” (Konrad, 2006).

According to the literature, banking on the future will possibly involve: more comfortable travels, more personalised service, affordable prices, reformulation of infrastructure (*e.g.*, hotels), higher quality of professionals in the sector, simplification of processes and practices, and effective adaptation of digital technologies (Abbas *et al.*, 2021). For that reason, technological convergence has produced a large amount of data that enhance interactions and support decision-making, allowing for a more adequate forecast of the future (Fernandes, 2021).

Using the calculation analysis and respective combination provided by Big Data, the tourism sector will gain value by integrating better experiences for consumers and providing greater productivity and profitability to companies such as airlines, restaurants, hotels and other sectors related to the area of tourism and hospitality (Song and Liu, 2017). It is considered that, with the increasing amount of tourist data made available online, recommendation systems will be a solution.

However, managing accurate recommendations is still a challenge (Kontogianni, Alepis and Patsakis, 2022). In fact, there are several challenges already highlighted in the literature. Challenges regarding the protection of personal privacy in tourism consumption, between software and tourism organisations, pointing out the lack of awareness, supervision, and regulation of laws (Wang, 2019). These are challenges derived from the concerns of professionals who analyse Big Data on a daily basis and who question the real benefits of discourse-based analysis of social media. Just as tourism professionals, or those linked to the sector, question the longevity of their functions, given their replacement by machines for data analysis thus avoiding the human hand (Cheng, 2018).

Much information is diffuse and contradictory and produces undesirable effects when compared to reality (Lloret-Climent *et al.*, 2019). It has therefore become indispensable to develop algorithms in order to avoid traps, decontextualisations and false correlations (Gandomi and Haider, 2015). Often, data analysis itself can inherit prejudices and bias or exacerbate patterns of exclusion and inequality (Barocas and Selbst, 2016). It can also be dangerous to try to imagine and identify the potential usefulness of the data, rather than beginning the data analysis process from an initial question and a real need, which can lead to unlikely futures and unintended consequences (Perng, Kitchin and Evans, 2016). Identifying these risks and biases in advance will facilitate responsible development supported by the best practices.

In summary, in this scenario of technological innovation, we found two imaginaries: a technological imaginary that privileges data correlation as a corrective measure; and a socio-critical imaginary that contests the effectiveness of this technological correlation. But, if we unite these two imaginaries, we will be able to reformulate, not only the intrinsic capacity of data but also reformulate the ethics and future of data (Lehtiniemi and Ruckenstein, 2019). We believe that this venture will create new opportunities around the identified

expectations (Borup, Brown, K. K. Konrad, *et al.*, 2006), especially in the Portuguese case, when it is at an embryonic stage of investment in Big Data techniques in tourism.

Thus, an urgent and open discussion with citizens about the advantages and disadvantages of Big Data and privacy is needed in order to build trust, taking into account the different points of view. In particular, this is due to the pressing commitment to a single European market for digital data, which should guarantee both consumer and civil liberties (Becker *et al.*, 2016), taking into account the update of the legal framework for data protection (Mantelero and Vaciago, 2015), which is also in a discussion phase.

The link between technology and tourism allows us to imagine the future, not only through the ability to acquire an endless diversity of data in real-time but also to understand consumer purchasing behaviour (Weaver, 2021). We argue that the ideal moment to foresee and assess all possible scenarios is the still primary phase of uses of Big Data in tourism. Imagining the future, by looking into other social areas in which the Big Data technologies are in a more advanced stage, allows us to anticipate benefits and risks emerging from technological and touristic transformation, insomuch as social beings have become “data generating devices” (Xiang, 2018, p. 148). By combining the extracted data with situated knowledge sensitive to social and cultural local contexts, Big Data will become a more refined tool, both in the tourist experience and in the innovation of new products. Therefore, tourism is at the ideal time to expand this possibility of combining technological advances to ensure social well-being and economic prosperity in a sustainable way (Xiang, 2018).

However, technology will be constantly changing, as it has been until today. The relentless pursuit of innovation will continue to challenge the predictions we are trying to replicate. Hence, inherently new problems will arise, relating, in this specific case, to the “interactions between humans, data, networks and machine intelligence”. As a consequence, problems will arise related to “the quality, trustworthiness and ethics of the applications of Big Data, social knowledge and machine intelligence” (Xiang, 2018, p. 149).

4. Sociological reflections: What the future may hold

Society has struggled over time with the social consequences of technology. In the words of Lindgren and Holmström (2020, p. 7) “we need more knowledge about what the pervasive use of these human-software hybrids, and black-boxed and sometimes discriminatory algorithms behind them, mean to future societies”.

For these reasons, that different areas of study, such as computer science and social science, must be combined with the area of tourism and its destinations, to cooperate, in order to reconstruct different contexts and solve social problems by examining and criticising (constructively) the digital (Fuchs, 2017).

Faced with a transition from a scarcity of data to an overabundance of data (Weaver, 2021) imbued with techno-optimism around the use of Big Data in tourism and an “enduring belief” that the use of technology supports the economic development of the area, “governance techniques” are combined to “produce feelings of change and hope for justice” (Avle *et al.*, 2020, p. 250). It should be noted that despite an opposite point, allied to an optimistic view there remains a pessimistic view (Vydra and Klievink, 2019) that tourism will not be able to survive without digital technology. It is important to bring to the debate the fact that all companies and infrastructures form various parts of a whole that make up the tourism sector, and that each company will have to follow this trend, according to its business capacity and differentiating value, when wishing to demarcate itself in the market, not having to depend exclusively on technology, or at least having the possibility of choice.

Campolo and Crawford (2020) were inspired by Max Weber’s theory of the “disenchantment of the world”, to highlight the discourse about artificial intelligence wrapped in an “enchanted determinism”. Big Data is a turbo engine for the dynamics of artificial intelligence software, which values technical precision and calculation of data. This, often without assessing the aggregate social and political risks, and without considering that an in-depth contextualisation can differentiate the final result. This “enchanted determinism” excludes the responsibility of its creators and exposes instrumentally empty notions of governance and ethics, in order to respond to adjacent social expectations (Campolo and Crawford, 2020) of sociotechnical imaginaries as is the case with the dynamics of Big Data and tourism.

To guide tourism, taking into account the expectations of investment in innovation and technology which the various social discourses and literature have been reiterating, an assessment of technological usefulness will be

essential. For this, we must resort to what Jasanoff defined as “technologies of humility”. This definition “complements the predictive approaches: to make apparent the possibility of unforeseen consequences; to make explicit the normative that lurks within the technical; and to acknowledge from the start the need for plural viewpoints and collective learning” (Jasanoff, 2003, p. 240). When we intend to change something in society, we must also try to identify what the purpose will be, indicate who may be vulnerable and also privileged and determine how we can obtain knowledge about these possibilities. With maximum social involvement, analysis and reflection skills can greatly improve (possibly) harmful effects and improve long term decision-making (Jasanoff, 2003).

Tourism can indeed excel with a responsible and cautious development which analyses and assesses in advance the various inherent risks, the countless daily practices and the intended strategies. In fact, a leadership based on anticipation and precaution, which analyses information and forms reflections in harmony with the various stakeholders, will be able to respond more easily and robustly to circumstances of uncertainty and risk, as well as make more sustained long-term decisions with the foresight, participation and integration that good “anticipatory governance” enables (Guston, 2014).

5. Conclusion

The review of literature about Big Data shows that the rhetoric surrounding its actual and potential uses is both utopian and dystopian. If, on the one hand, it is seen by many as an indispensable tool in solving numerous social problems in various areas, on the other hand, some critical voices consider that Big Data is an astute representation of Big Brother, which invades privacy and chases, controls and ignores citizen freedom (Boyd and Crawford, 2012). Thus, the rhetoric on Big Data applied to tourism can provoke ambivalences between dystopian discourses and the optimistic views that highlight the capabilities of Big Data in promoting the increase in travel, thereby supporting the progressive economic recovery of the touristic sector, while instilling a discourse of environmental and social sustainability (Weaver, 2021).

In verifying that neither scepticism nor concern about the use of Big Data have been topics for discussion in the areas of tourism study (Weaver, 2021, p. 3), especially in Portugal, we found a knowledge gap that needs further study. The uncritical acceptance of the use of Big Data techniques may obscure a complete prediction of what will happen in the long term. As a provisional solution to address this problem, we propose an approach based on the principles of responsible innovation, which Wienroth summarises as the principles of “reliability, utility and legitimacy” (Wienroth, 2020). This approach aims to provide the opportunity to develop an awareness of the benefits and risks and engage all stakeholders in the debate. Responsible innovation also aspires to increase transparency and foster more accessible communication, while promoting the sharing of experiences and views from different groups of interest. This type of solution should be implemented at an early stage in the process and, even during a development cycle, should ensure that the responsibility for the benefits and risks is divided among all the stakeholders (Wienroth, 2020; see also Sismondo, 2004).

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