

Construction of EU Tourism Data Spaces

Subjects: Others

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Tourism Data Spaces are steering traditional tourist destinations towards smarter, more sustainable models, by playing a pivotal role in improving decision-making and personalizing tourism services. The tourism sector is facing challenges to access to data which could be overcome thanks to the implementation of Tourism Data Spaces. TDSs promote a clear governance, technical standards and balancing diverse stakeholders interests in the tourism industry. The concept of *Smart Tourism Destinations* (STD) has represented a revolution in the management and promotion of tourism destinations, driving the integration of information and communication technologies to improve tourism competitiveness and visitor experience. The emergence of the concept of "Smart Tourism Destinations" has its roots in the creation and evolution of "Smart Cities".

Keywords: tourism data space ; smart tourism ; smart destination ; data sharing DPSIR ; data space

1. Introduction

In the contemporary economic context, the tourism sector emerges as one of the most dynamic and fast-growing areas at the global level ^[1]. This trend is evidenced by the quantitative increase in tourism flows and the qualitative diversification of the services and experiences offered ^[2]. Making a substantial contribution to Gross Domestic Product (GDP) and employment in many nations, tourism has solidified its position as a key driver of economic development and a strategic pillar for generating superior financial returns ^[3]. However, despite these economic advantages, tourism can also have negative effects, threatening the sustainability of tourist destinations by potentially overburdening local infrastructure, causing environmental degradation, and impacting local communities.

Having access to information on tourism is essential to help tourists plan their trips, know what to expect, how to get around, and how to make the most of their experience ^[4]. Information enables travellers to make informed decisions, resulting in more satisfying and safer travel experiences. Tour operators and related businesses also rely on information to design more attractive products, identify emerging trends, improve their services, and make strategic decisions that positively influence their companies. Tourism data is a single raw piece of tourism-related information. It can be qualitative, an individual's review of a hotel for example, or quantitative, the number of people visiting an attraction on a specific day ^[5]. When collected and analysed as a whole, these data provide the basis of the tourism information presented to users. The distinction between information and data is fundamental ^[6]. While data are singular, unprocessed elements, information results from processing, organising and contextualising said data to give it meaning and utility.

In a digital era where the amount of data generated is massive, proper analysis and processing of tourism data is essential to maintain competitiveness in the sector, develop new business models, drive innovation, support decision-making, and ensure sustainability ^[7]. The correct interpretation of data holds the key to a deeper comprehension of tourists' demands and behaviours, facilitating a swift adjustment to their needs and preferences.

Both private companies and public administration have recognised the importance of these data for various functions and purposes. From a private business perspective, tourism data is an invaluable resource providing essential insights to inform strategic decisions. Whether they are hotels, airlines, travel agencies or digital platforms, tourism companies derive immense benefits from understanding their customers' preferences and behaviours. By leveraging data analytics, companies can identify emerging trends, customise their offerings, personalise services, and ultimately enhance the overall customer experience. In addition, data enables these companies to fine-tune prices and promotions, streamline resource management, and adopt a proactive stance, rather than a reactive one, in the fiercely competitive tourism market. For public administration, tourism data is fundamental to the planning and management of tourism within a region or country. Such data helps authorities monitor tourist inflows, understand their geographical distribution, and analyse tourism's economic and environmental impact. This information is crucial for designing tourism policies and strategies that foster sustainable growth, ensuring destinations are not overwhelmed, and that the benefits of tourism are distributed

equitably. Moreover, public administration can use this data to improve infrastructure, promote lesser-known destinations, and ensure the preservation of natural and cultural resources.

In the context of tourism data, two concepts that have gained prominence in recent years are Big Data and Open Data. Both represent revolutionary approaches and techniques that are transforming how businesses and governments understand and leverage information in the tourism sector. Big Data refers to data sets that are so large, fast, and complex that they require advanced tools and methods for storage, processing, and analysis ^[8]. Such data can come from various sources, like social networks ^[9], online bookings, web searches, and sensors, among others. In the realm of tourism, Big Data ^{[10][11]}, among its various capabilities, enables tourism businesses and authorities to gain intricate insights into travellers' preferences, behaviours, and trends. Big Data analysis can unveil patterns in emerging destinations, identify seasonal peaks in demand, and track evolving tourist expectations. By harnessing this information, organisations can quickly adapt to market needs and make more informed decisions.

Open Data refers to data that are openly accessible to the public, and can be used, redistributed, or shared by anyone. In the context of tourism, this can manifest as databases containing information on tourist attractions, visitor statistics, hotel ratings, or public transport routes ^{[12][13]}. When made available by government agencies or companies, these data foster transparency, innovation and collaboration. Startups, developers and other businesses can use Open Data to create innovative tourism applications, planning tools, or market research. At the same time, it empowers travellers to make more informed decisions and improve their travel experience ^[8].

In the last decade, with the evolution of the Smart Cities concept, we have witnessed the emergence of Smart Tourism ^[14]. These destinations, supported by the promise and delivery of rich data, not only make decisions based on greater insights, but also use data-driven indicators to validate their efforts to provide smarter and more sustainable tourism experiences.

In the ongoing evolution of the data-driven economy, the "Data Space" concept is gaining prominence, with the "Tourism Data Space" in particular standing out. The European Union, acknowledging the significance of this dynamism, ratified the European Data Strategy in February 2020 ^[15], establishing the Data Act as the cornerstone of this initiative. This strategy seeks to catapult Europe into the leadership of the data-driven economy, capitalizing on the immense potential of the growing accumulation of industrial data, all in the interest of strengthening Europe's economy and social welfare.

A major challenge in the development of such data spaces lies in the sharing of information, highlighting the imperative need to establish clear governance rules, specify technical requirements and ensure a balance between the different actors involved in each data space. Following the definition proposed by the Data Space Support Centre (DSSC) ^[16], data spaces are presented as frameworks that facilitate the exchange of data within an ecosystem, guaranteeing a secure and reliable exchange, respecting current regulations and promoting equal treatment for all those involved.

Moving in this direction, in February 2022, the European Commission presented a working document on the Data Space, integrating it with the Digital Europe 2021–2027 programme. It is noteworthy to mention that, initially, the tourism sector was not included as one of the central pillars of this programme. However, recognising its importance, it was subsequently included, and is now a key component in the Data Space Work Programme. Following the launch of the European call, in which the DATES ^[17] and DSFT ^[18] projects were approved as Coordination and Support actions to lay out the foundations for what will be the Common European Data Space for tourism, in July 2023, the European Commission published a Communication ^[19]. This Communication was based on the work and activities carried out by both projects, and is titled "Towards a Common European Tourism Data Space: Driving data exchange and innovation across the tourism ecosystem". It underscores the importance of the European Data Space as a key element to ensure the digitisation, innovation, sustainability and competitiveness of the European tourism industry through data sharing.

2. From Smart Destinations to Tourism Data Spaces

The concept of *Smart Tourism Destinations* (STD) has represented a revolution in the management and promotion of tourism destinations, driving the integration of information and communication technologies to improve tourism competitiveness and visitor experience. The emergence of the concept of "Smart Tourism Destinations" has its roots in the creation and evolution of "Smart Cities" ^[20]. Indeed, the notion of "Smart Destinations" began to gain relevance a decade after the popularisation of smart cities, adopting practices and learnings from these optimised urban spaces ^[21].

An instrumental tool in conceptualising smart cities was the "Smart Cities Wheel", proposed by Cohen in 2014 ^[22]. This wheel highlighted six essential dimensions for the smartness of a city, including governance, environment, mobility,

economy, people, and quality of life. The multiple interpretations and extensions of these dimensions have been studied and discussed in academia.

In Spain, the shift towards “Smart Tourist Destinations” has been driven by the Spanish Standardization Norm (UNE) 178501 standard [23]. This standard establishes key criteria including governance, accessibility, sustainability, innovation, and technology. This standard recognises that a smart destination goes beyond merely implementing technologies; it is about transforming the territory as a whole, promoting sustainable and efficient management systems that benefit both visitors and residents.

In the field of STD, several initiatives have been launched to capitalise on information technologies to enrich the tourism experience and strengthen destination management. [24]. These initiatives have ranged from implementing smart signage systems and interactive mobile applications to data management platforms and IoT sensors for environmental and visitor flow monitoring [25][26][27].

One of the most significant initiatives has been the incorporation of data analytics to better understand tourism dynamics. The analysis of large volumes of data—or “big data”—allows tourism destinations to identify behavioural patterns [28][29] predict trends [30][31][32] and make evidence-based decisions [33]. Notable examples include the use of geolocation data to analyse tourist mobility [34][35] and leverage social networks to understand visitors’ preferences and sentiments [36][37][38][39][40].

The integration of augmented reality systems and mobile applications [41][42][43][44] has further enriched the tourism experience, by providing contextual information and improving accessibility to tourism services. These technologies enable visitors to interact with their surroundings in innovative ways, thereby increasing the added value of destinations.

Another prominent area has been the development of data communication infrastructures [45], such as open data platforms, which foster transparency and stimulate innovation by providing access to a wide range of tourism datasets [46]. The commitment to open standards and interoperability has been essential for collaboration between different actors and for the creation of customised services [47].

These and other initiatives have laid the foundation on which smart destinations have begun to move towards creating tourism data spaces. Building these spaces involves orchestrating technologies, policies, and practices to ensure the collection, integration, management, and analysis of data in a way that is secure, efficient, and beneficial to all stakeholders. This paradigm shift is grounded in the acknowledgement that the true intelligence of a destination lies not only in the technological infrastructure, but also in the ability to integrate, analyse, and apply data from both public and private sources to inform decision-making.

Tourism data spaces are presented as dynamic ecosystems where information flows and is shared between different actors: public administrations, companies in the tourism sector, and tourists themselves. This symbiosis of data opens new avenues for the personalisation of services, the development of more effective public policies, and the creation of enriching tourism experiences [48][49].

The concept of the tourism data space is framed within the European Data Strategy, and its recent calls defined in the Digital Europe programme. This strategy envisages the definition and development of data spaces in various areas, including tourism. Specifically, twelve areas are defined: “Green Deal, mobility, manufacturing, agriculture, finance, health, skills as well as smart communities, language, cultural heritage, media and tourism”. At the beginning of 2022, preparatory actions aimed at establishing a design and roadmap for the foundation of data spaces in each sector emerged.

3. Legal Context of Data Sharing in Tourism and Perspectives

Creating a tourism data space poses particular challenges, especially when considering the legislation and regulations affecting providers of tourism products and services. This complexity arises from the multitude of regulations existing at European, national, and regional–local levels. In addition, it is vital to recognise that the geographical area is a determining factor in the framework of tourism data spaces.

Also important are the issues of user privacy and security and the need for standardisation and governance of tourism data. In this context, collaboration between different actors and interoperability commitment are fundamental to building a robust tourism data framework.

The main rules and regulations in this area are listed in **Table 1**.

Table 1. Rules and regulations in the context of developing a tourism data space.

Rules/Regulations
<p>Proposed Data Act 2020/0767 https://digital-strategy.ec.europa.eu/es/policies/data-act https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0767 (accessed on 12 November 2023)</p>
<p>Data Governance Act 2022/0868 (B2B, B2C, B2G) https://digital-strategy.ec.europa.eu/es/policies/data-governance-act https://eur-lex.europa.eu/legal-content/ES/TXT/PDF/?uri=CELEX:52020SC0296&from=ES https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R0868 (accessed on 12 November 2023)</p>
<p>Proposed Interoperability Act for Europe 2022/0720 https://eur-lex.europa.eu/legal-content/ES/TXT/HTML/?uri=CELEX%3A52022PC0720 https://eur-lex.europa.eu/legal-content/En/TXT/?uri=CELEX%3A52022PC0720 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0710&qid=1697381191732 (accessed on 12 November 2023)</p>
<p>Artificial Intelligence Act (2021) https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf (accessed on 12 November 2023)</p>
<p>Open Data and Re-use Directive (2019) https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L1024&rid=1 (accessed on 12 November 2023)</p>
<p>Public Sector Information (PSI) Directive (2019) https://digital-strategy.ec.europa.eu/es/policies/public-sector-information-directive (accessed on 12 November 2023) Directive 2003/98/EC</p>
<p>High Value Data Directive C/2022/9562 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.019.01.0043.01.ENG (accessed on 12 November 2023)</p>
<p>Directive Inspire 2007/108 https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:108:0001:0014:en:PDF (accessed on 12 November 2023)</p>
<p>Data Protection Regulation (GDPR) https://eur-lex.europa.eu/eli/reg/2016/679/2016-05-04 (accessed on 12 November 2023)</p>
<p>Regulation on the free movement of non-personal data (FFD) 2018/1807 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R1807 (accessed on 12 November 2023)</p>
<p>Cybersecurity Act (CSA) Cyberresilience Act (CSA)</p>
<p>Digital Content and Services Provision Directive 2019/770 https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX%3A32019L0770 (accessed on 12 November 2023)</p>
<p>EU Regulation on relations between platforms and companies (P2) https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX%3A32019R1150 (accessed on 12 November 2023)</p>
<p>Digital Services Act (DSA) 2019/770 https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX%3A32019L0770 (accessed on 12 November 2023)</p>
<p>Digital Markets Act (DMA) 2022/1925 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R1925 (accessed on 12 November 2023)</p>

The European Commission has articulated a robust regulatory framework for data exchange, including the following laws and directives:

- The Data Governance Act, adopted in May 2022, aims to promote data availability, boost intermediaries' trust, and strengthen data-sharing mechanisms across the EU. Its rules of procedure address the following issues:
 - The reuse of certain categories of protected data held by public sector bodies.
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Encouragement of the emergence of neutral data intermediaries to facilitate data sharing by connecting data supply and demand.

- The creation of a harmonised framework to encourage data altruism, whereby individuals and companies give their consent or permission to make the data they generate available—voluntarily and without reward—to be used for purposes of general interest.
- The establishment of the European Data Innovation Board, an advisory body to assist the Commission in all matters related to the Regulation.
- The Commission adopted the proposed Data Act on 23 February 2022 to ensure a fair distribution of value in the data economy. It establishes new data access and usage rights for Business to Business (B2B), Business to Customer (B2C), and Business to Government (B2G) exchanges, and sets out a framework for efficient data interoperability. The European Interoperability Act, introduced on 18 November 2022, ensures a coherent EU approach to interoperability, allowing public administrations to collaborate on cross-border data transfer.
- The Artificial Intelligence Act, proposed in April 2021, focuses on using AI systems and associated risks, proposing risk-based definitions and classifications. It is relevant for the tourism sector, where AI and generative models, such as ChatGPT, are gaining traction.
- The Open Data Directive, which came into force in July 2019, strengthens the rules on data formats and has led the EC to publish a list of high-value datasets, many of which are relevant to the tourism data space.

In addition, regulations such as the GDPR, the FFD, and the CSA also deal with data protection and flows. Other regulations include the Digital Content Directive, which empowers individuals by introducing contractual rights, and the P2B Regulation, which seeks a transparent and predictable online trading environment. The Digital Services Act, introduced in 2020 and adopted in 2022, clarifies the responsibilities of online businesses and promotes a safe environment for the provision of digital services. The DMA, also introduced in 2020 and adopted in 2022, aims to level the playing field between large and small platforms in the digital market, addressing unfair practices and ensuring competitive markets in the EU.

There is, therefore, a complex regulatory landscape to consider when developing tourism data spaces. Indeed, the multitude of new legislation can be overwhelming for smaller companies. Many new and existing bodies at the EU level, such as the European Data Innovation Board and the European Data Protection Board, give guidance related to data exchange. Some existing or new authorities will monitor EU data laws nationally. Over time, data exchange between different parties will also require specific rules, architectures, standards, etc., to complement legislation.

In the specific context of tourism data, it is also essential to recognise a wide range of regulations and rules that establish the environment for inter-institutional collaboration and citizens' rights. **Table 2** outlines the main regulations in this field.

Table 2. Regulations in the framework of sharing tourism data.

<p>Code of Conduct on data sharing in tourism https://etc-corporate.org/uploads/2023/03/Code-of-Conduct-on-Data-Sharing-in-Tourism_Final.pdf (accessed on 12 November 2023)</p> <p>Passenger Rights Directive https://www.europarl.europa.eu/factsheets/en/sheet/48/los-derechos-de-los-pasajeros (accessed on 12 November 2023)</p> <p>Package Travel Directive 2015/2302 https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32015L2302 (accessed on 12 November 2023)</p> <p>Directive on patients' rights in cross-border healthcare 2011/24/EU https://eur-lex.europa.eu/legal-content/En/TXT/?uri=celex%3A32011L0024 (accessed on 12 November 2023)</p> <p>Consumer Rights Directive 2011/83/EU https://eur-lex.europa.eu/legal-content/En/TXT/?uri=celex%3A32011L0083 (accessed on 12 November 2023)</p> <p>Unfair Commercial Practices Directive 2005/29/EU https://eur-lex.europa.eu/legal-content/En/TXT/?uri=celex%3A32005L0029 (accessed on 12 November 2023)</p>
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Within this regulatory framework, the Code of Conduct on Data Sharing in Tourism highlights some relevant regulations in this context. These include initiatives concerning access to data in specific areas and how these particularly affect the tourism sector. While European legislation directly influences all European citizens and businesses, it is crucial to understand the European legislative process and the different types of legislation that the EU produces. Being inherently about free movement, tourism requires special consideration at the EU level to mitigate distortions and ensure the sector's efficiency. Furthermore, it is essential to consider certain key pieces of legislation, such as Passenger Rights, the Package Travel Directive, and the Directive on applying patients' rights in cross-border healthcare, among others. All these laws and directives have an impact at the EU level and implications at regional and local levels.

The regulatory landscape is not only vast in terms of data sharing, but also exhibits significant depth in the realm of tourism. When considering the Consumer Rights Directive and the Unfair Commercial Practices Directive, we see a concerted effort by the EU to ensure transparency and fairness in business-to-consumer interactions. These laws not only seek to protect consumer rights, but also to establish a level playing field for businesses, ensuring that commercial practices are fair and transparent.

As an initial conclusion drawn from the work carried out in relation to data spaces, significant advantages are identified in their implementation across various areas: interoperability and data management, data sovereignty and security, integration of emerging technologies, privacy and regulatory compliance, and value creation from data, resilience in the value chain, facilitation of research and development, support for informed decision-making.

The creation of a dedicated data space for tourism could significantly enhance tourism management and the overall tourism experience, offering enhanced personalization, resource optimization, improved customer experience, data-driven decision making, and other additional values.

The development of a tourist data space would also have a significant impact on social, economic, and environmental sustainability. It could enhance inclusion and provide equitable access to tourist services, promoting a more inclusive and diverse tourism; encourage a more balanced economic growth in the tourism sector, distributing benefits more fairly among different regions and communities; contribute to a more responsible and sustainable tourism, involving the efficient management of natural resources and a reduction in tourism's ecological footprint. It would favour better coordination among different stakeholders in tourism, improving decision-making and the implementation of effective tourism policies.

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