Región Científica

e-ISSN: 2954-6168
Región Científica. 2024. 3(2), 2024281
doi: 10.58763/rc2024281

ICT incorporation to promote tourism destinations: a systematic review

Incorporación de las TIC en la promoción de destinos turísticos: una revisión sistemática

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ABSTRACT

Information and communication technologies (ICT) are a substantial tool for promote tourism destinations, used with the aim of gaining competitive advantage and assure the sustainability of their urban and touristic areas. The aim of this review was to explore the web-based technologies used for fostering de tourism destinations. This study considered to investigate research articles categorized in indexed journals databases like ScienceDirect¸ Emerald Insights, Taylor & Francis, Scopus, Redalyc from 2017 to 2021. The results reveals that the most used technologies are the social media (38%) and Data Mining alongside Big Data (31%). The finding illustrates that the 91% of authors conduct their research to influence tourists purchase decision using innovates and disruptive technologies, and 9% to improve the tourist human experience during their visit in a particular destination. The contribution of this study expands our knowledge of using TIC to promote tourism destinations to conduct studies in general sense.

Keywords: communication technology, information technology, open data, tourism.

RESUMEN

Las tecnologías de información y comunicación (TIC) son una herramienta sustancial para la promoción de los destinos turísticos, usados con el objetivo de obtener una ventaja competitiva y garantizar la sostenibilidad de sus áreas urbanas y turísticas. El objetivo de esta revisión fue explorar cuáles son las TIC usadas para promocionar los destinos turísticos además del móvil o motivo de su uso. Se optó por una metodología de revisión sistemática de artículos científicos categorizados en bases de datos de revistas indexadas, como ScienceDirect¸ Emerald Insights, Taylor & Francis, Scopus, y Redalyc entre 2017 y 2021. La revisión permitió identificar que las tecnologías más usadas son las redes sociales (38%) y la Minería de Datos, junto al Big Data (31%). Concluyendo que el 91% de los autores conducen su investigación a influenciar la decisión de compra del turista usando tecnologías innovadoras y disruptivas, y el 9% a mejorar la experiencia humana del turista durante su visita a un destino en particular. La contribución del presente artículo de revisión amplia el conocimiento sobre el uso de las TIC para promocionar destinos turísticos con el fin de conducir futuros estudios sobre el tema en un sentido general.

Palabras clave: datos abiertos, tecnología de la comunicación, tecnología de la información, turismo.

Received: 18-03-2024 **Revised:** 12-05-2024 **Accepted:** 15-06-2024 **Published:** 01-07-2024

Editor: Carlos Alberto Gómez Cano

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Cite as: Bartra-Rategui, R., Pinedo, L. y Navarro-Cabrera, J. (2024). Incorporación de las TIC en la promoción de destinos turísticos: una revisión sistemática. Región Científica, 3(2), 2024281. https://doi.org/10.58763/rc2024281

INTRODUCTION

According to Cavalheiro et al. (2021), tourism is the world's largest and fastest-growing economic sector and currently accounts for 10.4% of the global GDP. Thus, tourism destinations are an important resource for growing economies, as visitor arrivals quadrupled in the last 25 years (Goffi et al., 2019). Under this context, tourism represents both a challenge and an opportunity for information and communication technologies (ICT) to meet their needs and desires (Tavakoli & Wijesinghe, 2019).

Tourism is an industry sustained and stimulated by information. ICT is disruptive and reengineering, changing how people communicate, interact, and collaborate (Trunfio & Campana, 2019). The transition to Web 5.0 fostered innovation and enhanced the value of destinations through tools such as big data, virtual and augmented reality, geolocation-based

systems, and many others.

Tourists make decisions under uncertainty to qualify for a particular destination (González et al., 2020), first considering experimental attributes that will not be resolved until they experience the destination, causing the only way to measure the user experience is to evaluate it after their visit. However, for et al., 2020), the paradigm shift originated and promoted by ICTs provides the tourist with an immersive way of getting to know specific vacation destinations; for such reason, tourism entities through ICTs can influence the tourist's purchase decision (Liu et al., 2017).

Although not all companies present the same level of innovation, in Latin America, enterprises located in tourist destinations are sustained by social relationships with competitors, suppliers, public institutions, and travel intermediaries known as "social capital," according to García et al. (2021). According to Rastroll and Rivero (2019), such capital, in interaction with ICTs, generates innovation in tourism entities.

The recess caused by the pandemic (COVID-19) was an opportunity to reformulate the tourism growth path, offering a product aligned with tourist responsibility and tourism sustainability. This allowed the development of new solutions, such as Geographic Information Systems (GIS) applications to collect data that facilitate the management of cities (Rivera et al., 2021; Schmidtke, 2020), something that we commonly call "Smart City."

A destination will be considered "sustainable" if it achieves a balance between the environmental, economic, and sociocultural aspects of tourism development (Ali & Frew, 2014), since it is inevitable that the places with the highest number of visitors have negative implications on the environment, such as the increase of carbon emissions, despite this, the exploration of ICT for sustainable tourism management has been an area little explored in tourism research. However, they are the best hope for sustainability. The tourism industry had this paradigm shift thanks to the emerging trend of Industry 4.0 (Stankov & Gretzel, 2020), which has developed its framework, Tourism 4.0, which uses technologies focused on elevating the tourism experience. Among many examples, we have the case study of Rahimizhian et al. (2020), in which they use 360-degree videos to give the tourist an inverse experience of a particular destination and influence their intention to visit such destination.

The tourism industry promotes the development of interactive technologies focused on the human experience (Stankov & Gretzel, 2020), from which human ingenuity puts people before the machine, no matter how attractive, valuable, or usable it is. One such example is provided by Saha et al. (2020): from a case study located in Ujjain - India, they make use of a GIS to create tourist routes accessible to visitors of different abilities and ages who come for religious reasons, something that, moreover, minimized the geographical inequalities between the leading regions of India.

The principal value of ICT in the tourism industry is to convert information at different scales, received from different users, to be processed and managed efficiently and transported worldwide instantaneously through electronic devices (Pierdicca et al., 2019; Quezada Castro et al., 2020); no small matter, which allows the tourist to have the ability to self-manage their own decisions and companies to enter the market strategically, improving their efficiency, maximizing their profits, improving services and maintaining long-term profitability.

The purpose of this review is to identify and classify the ICTs currently used to improve the tourism industry through a systematic review in which scientific information is compiled in order to provide the reader with a general overview and summary of the scientific literature on the use of ICTs to promote tourist destinations, as well as to facilitate the search for scientific articles for future projects in the field of research.

METHODOLOGY

Tourism innovation has gained relevance in academic research in recent years; the debate on innovation drivers has intensified, where innovation can be interpreted as something new, processes, markets, products, sources, and organizational forms (Trunfio & Campana, 2019). Innovation occurs when new models of tourism destination governance are introduced and are interpreted as a new collaborative/organizational structure that reorients and empowers the actions of local actors and generates new frameworks. The variety of ICTs used to promote tourism destinations is vast, especially when tourism has as a variable the subjectivity of the user experience (Stankov & Gretzel, 2020); hence, the importance of identifying and classifying the most optimal technologies to promote tourism destinations, taking into account the complexity of the visitor experience.

To facilitate this classification of ICTs, as used to promote tourism destinations, we rely on the framework provided by Trunfio and Campana (2019) and adhere to the attribute of "mobile" since the systematic literature

review allowed us to identify that the tourist experience is an important element to classify ICTs. Mobile use is divided into two attributes: the pre-sale experience (immersive experience), in which, with the use of technologies, the tourist is offered an immersive experience before visiting a destination, and the experience during the sale (human experience), in which ICTs were used to provide the visitor with a pleasant and personalized service during his or her visit to the destination.

In order to provide a comprehensive view of ICTs to promote tourism destinations, the present review adopts the process of systematic review of existing knowledge. We conducted a database search in Scopus, ScienceDirect, SpringerLink, Taylor&Francis, GoogleScholar, Redalyc, and Emerald Insight, as they are accessible databases that have a search engine that includes the use of conditionals, in addition to providing reliable and accurate information. Articles older than five years (2017 - 2021) were excluded, in addition to what is commonly known as "gray literature".

From the totality of articles shown by each search engine, only empirical articles and case studies were taken into account, as they show the ICT they used and their purpose. To locate suitable articles, a keyword search was carried out in English and Spanish since it was considered that most of the articles dealing with the topic in question were published in those languages. The search criteria were as follows: "ICT" OR 'tourism destination' OR 'promote' OR 'tourism' OR 'web' OR 'technology.'

LITERATURE REVIEW

ICT and economic growth

ICTs have three characteristics: all companies have some form of ICT; they considerably reduce communication costs; and they stimulate innovation to create new disruptive technologies, which have a positive influence on the economic sector in which they are applied. The effects of economic growth caused by ICTs are divided into direct and indirect effects; direct effects are related to the production of technological products, which, in turn, can be categorized into software and hardware production. Indirect effects are related to the economic growth induced by ICT production (Kumar et al., 2019).

The adoption of the Internet has accelerated economic growth in all sectors where it has been applied. It has facilitated the creation of new jobs and new technologies while accelerating the dissemination of ideas, centralizing information, and increasing competition for the expansion of new products, which supports economic growth (Kurniawati, 2020).

Other studies claim that ICT significantly influences economic growth (Bhaduri and Pandey, 2019; Erumban and Das, 2016; Salahuddin and Gow, 2016). Their results indicate that there is a noticeable positive relationship between ICT use and economic growth, and even more so when innovative paradigm-shifting strategies are used with new systems to improve production, communication, and decision-making processes.

Tourism and economic growth

In the last 7 years, the literature addressing the relationship between tourism and economic growth has clearly warned that tourism positively impacts economic growth in the sector, region, or country where it is applied (Bassil et al., 2015; Liu et al., 2018). That is, tourism is the primary driver of economic growth, accounting for 9% of global GDP and 6% of total world exports, in addition to helping small countries achieve sustainable economic growth, as it creates jobs and generates revenue for the government.

RESULTS

The results revealed that magazines are classified according to the technologies used to promote tourist destinations into two classes, each with subclassifications. The first classification has seven, which are described below.

Classification 1. Technologies used to promote a tourist destination

The systematic review allowed us to identify seven technologies used to promote tourism destinations: Big Data and Data Mining, Geographic Information Systems (GIS), Virtual and Augmented Reality (VR, AR), recommender systems, social networks, web information systems, and Tourism Satellite Accounts (TSA).

Data Mining (DM) and Big Data (BD)

The use of data mining (Data Mining) converges with Big data; it is being recognized as a key source of value creation, providing tourists with accurate and intelligent tourism information recommendation services while also creating a good image for the tourism destination brand, showing tourists' preferred local characteristics, opinions, needs, attitudes, and other indicators. (Cillo et al., 2019; Meng et al., 2021; Park et al., 2021; Vecchio et al., 2018; Zhang & Dong, 2021). Such information is obtained from Trip Advisor, Booking, or community sites.

Geographic Information Systems (GIS)

Geographic information systems (GIS) can represent, store, manage, analyze, analyze, update, and visualize spatial and non-spatial data in a single integrated platform (Albuquerque et al., 2018; Du and Hu, 2018; Kang et al., 2018; Silva & Mattos, 2020). The information displayed includes graphical components of spatial data and attributes describing the location property. It is used for tourism management and planning; it shows the tourism resources and products of a region or country, in addition to generating customized routes for each type of tourist.

Virtual and Augmented Reality (VR, AR)

Technically, Virtual Reality (VR) is a computer-generated 3D environment that escapes reality. It is also known as "environment" or "virtual world". It is used to navigate and interact with a real-time simulation with one or more of the five senses, where the key elements are visualization to have a complete picture of the virtual environment, immersion to appear or simulate a new environment or reality, and interactivity to have a degree of control over the simulation (Kim et al., 2021; Schiopu et al., 2021; Varnajot, 2020; Yung & Khoo, 2019).

Augmented Reality (AR), on the other hand, is not the simulation of a new reality if not an interactive platform in which virtual objects and the real world coexist simultaneously, using elements such as cell phones, tablets, or a pair of glasses (Cranmer et al., 2021; Han et al., 2019; Karadimitriou, 2020; Tsai, 2019). Through software, it creates 2D and 3D images, texts, videos, sounds, and shapes at predetermined points, creating an illusion that these objects exist in the real world.

Recommendation systems

Planning a route or itinerary is costly for tourists since when planning a visit to a destination, it is necessary to select several preferred points of interest and organize them according to their budget or time (Bin et al., 2019). Therefore, to solve that problem, a recommender system should be made that incorporates the personal content of the tourist and attributes of tourist destinations to recommend a valuable and/or personalized itinerary.

As stated by An and Moon (2019), Arce et al. (2021), and Sertkan et al. (2019), recommender systems make use of technologies such as DM and BD, which combine data collection and processing, learning and assignment of classifications to derive a recommendation system for the tourist, such as tourist points of interest or routes personalized by each type of tourist.

Social Networks

Tourism promotion involves communication and transmission of information (Bonilla et al., 2021; Huertas et al., 2017; Matikiti et al., 2017; Schivinski et al., 2020). Information is shared between responsible agencies or companies, stakeholders, and tourists through a technological medium, for example, on social media platforms (Facebook, Twitter, Instagram, YouTube, Booking, TripAdvisor). These platforms have evolved from an online tool to share content to an interactive platform that changes the tourist's purchasing decision through sharing photos or videos created by the same community of travelers or companies.

Web information system (Web-based system)

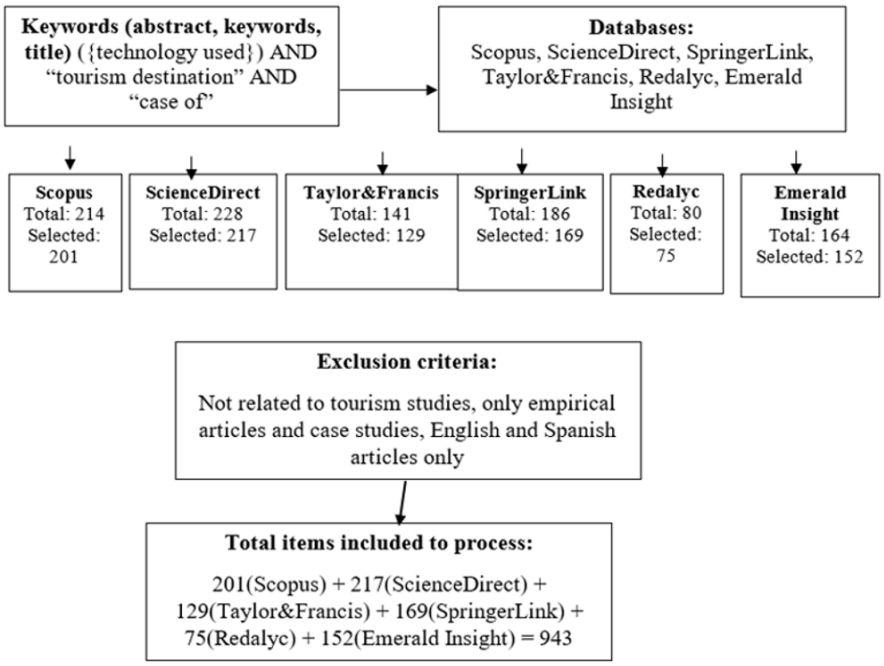
Although the tourism sector has indeed adopted web-based information systems as an indispensable tool to improve its processes, in this case, what matters is innovation. Companies that understand their target market are the ones that understand, incorporate, and use ICT services strategically (Mohammad Arif and Du, 2019; Pierdicca et al., 2019; Tiamiyu et al., 2020): something that undoubtedly allows reaching a wider audience of different scales, thanks to a wide variety of web platforms and mobile applications incorporating modern and/or innovative ICTs that in turn allow reorienting the tourism industry towards a multichannel approach.

Tourism Satellite Account (TSA)

The Tourism Satellite Account (TSA) is a standard method for calculating the contribution of tourism to the primary economic aggregates of a region or country. The accounts refer to national accounts: a set of internationally recognized standards for measuring a country's economic performance through macroeconomic aggregates, such as GDP: employment; agrarian value, consumption, or per capita income (Antolini & Grassini, 2020; Artal et al., 2020; Frenț, 2017; Kronenberg & Fuchs, 2021; Pham et al., 2021; Tohmo, 2018). It should be emphasized that for TSAs, tourism is not an industry but an activity carried out by visitors and defined by the demand for goods and services, i.e., only purchases made by visitors are calculated.

Therefore, the search criteria changed according to the type of technology and to have an exact count of each one for each database; this count has the following format: ({technology used}) AND "tourism destination" AND "case of", as can be seen in figure 1. As table 1 reports, the articles were published in Science Direct (n=217), Scopus (n=201), Springer Link (n=169), Emerald Insight (n=152), Taylor & Francis (n=129), and Redalyc (n=75).

Figure 1.
Study selection process



Source: own elaboration

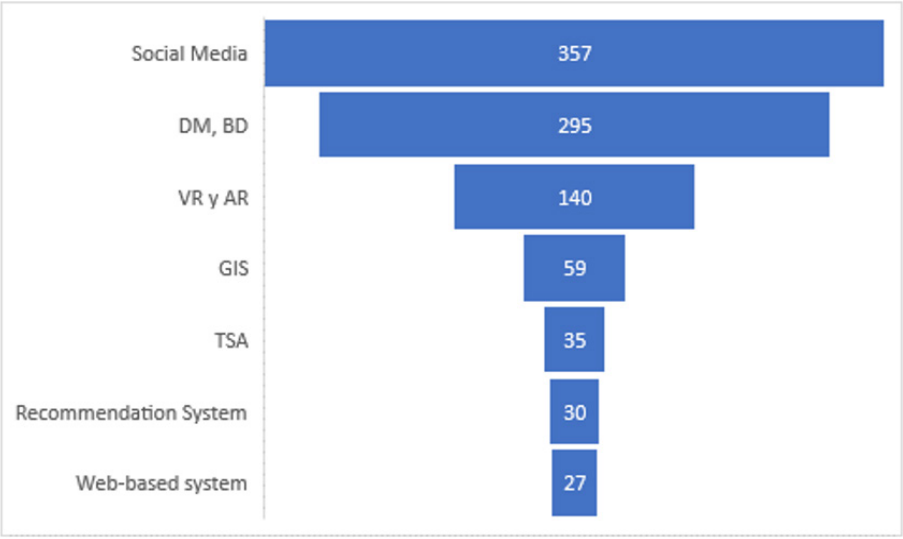
Table 1.
List of technologies sorted by journal covering the systematic review

Journal	Technology	Articles
Scopus	DM, BD	60
	VR y AR	21
	GIS	10
	Recommendation system	5
	Social media	97
	Web-based system	5
	TSA	3
Science Direct	DM, BD	63
	VR y AR	26
	GIS	13
	Recommendation system	6
	Social media	99

	Web-based system	5
	TSA	5
Springer Link	DM, BD	31
	VR y AR	15
	GIS	21
	Recommendation system	8
	Social media	76
	Web-based system	10
	TSA	8
Taylor&Francis	DM, BD	56
	VR y AR	35
	GIS	5
	Recommendation system	4
	Social media	17
	Web-based system	4
	TSA	8
Emerald Insight	DM, BD	68
	VR y AR	25
	GIS	7
	Recommendation system	6
	Social media	35
	Web-based system	2
	TSA	9
Redalyc	DM, BD	17
	VR y AR	18
	GIS	3
	Recommendation system	1
	Social media	33
	Web-based system	1
	TSA	2

Source: own elaboration

Figure 2.
Most commonly used technologies



Source: own elaboration

As shown in figure 2, the most used technologies to promote tourist destinations are social networks. According to some tourists, social networks are the best way to get information about a particular destination (Schivinski et al., 2020). In second place are DM and BD because they allow knowing in real time the preferences and hobbies of tourists or their points of interest, which is relevant and accurate information to sell a tourist destination (Zhang & Dong, 2021).

Classification 2. Mobile for ICT development and use

During the review, we identified that the filtered articles could also be classified according to the reason for ICT use, i.e., each ICT was always intended for a specific purpose, as each one solves a different problem in terms of providing an immersive or human experience to the tourist. Accordingly, we were able to identify two items, which are summarized as follows.

Presales (Immersive experience)

The immersive experience or digital tourism encounter results in the emergence of the digital tourist, in which the tourist can produce, consume, and interact with a specific destination through an increasing number of technological solutions (Stankov & Gretzel, 2020), which will only be memorable if it generates an emotional connection with the tourist (Martins et al., 2017). As argued by Pestek and Sarvan (2020), ICT applied to tourism marketing promotes a positive image of the destination, which helps the tourist search and purchase products and services with a high degree of personalization and innovative ways.

During the sale (Human experience)

The technological innovations of Tourism 4.0 work best if it is developed for the benefit of the tourist, considering their well-being and focused on improving their experience (Stankov & Gretzel, 2020). Human and social capital is a critical element for the creation of smart tourism destinations, as it requires the interaction between people, companies, and organizations for the creation of a tourism experience, in which the tourist grants value to the destination that is materialized during the service consumption process (Kelly & Lawlor, 2019). This way, ICTs are introduced so tourists can have an innovative and satisfactory experience.

As table 2 reports, GIS technologies and Web Information Systems provide a human experience, while DM, BD, recommender systems, social networks, TSA, VR, and AR technologies provide an immersive experience.

Table 2.
Classification of technologies by mobile

Mobile	Technology
Human experience	Geographic information systems (GIS)
	Web information systems
Immersive experience	Data Mining, Big Data
	Recommendation systems
	Social networks
	TSA
	Virtual reality and augmented reality

Source: own elaboration

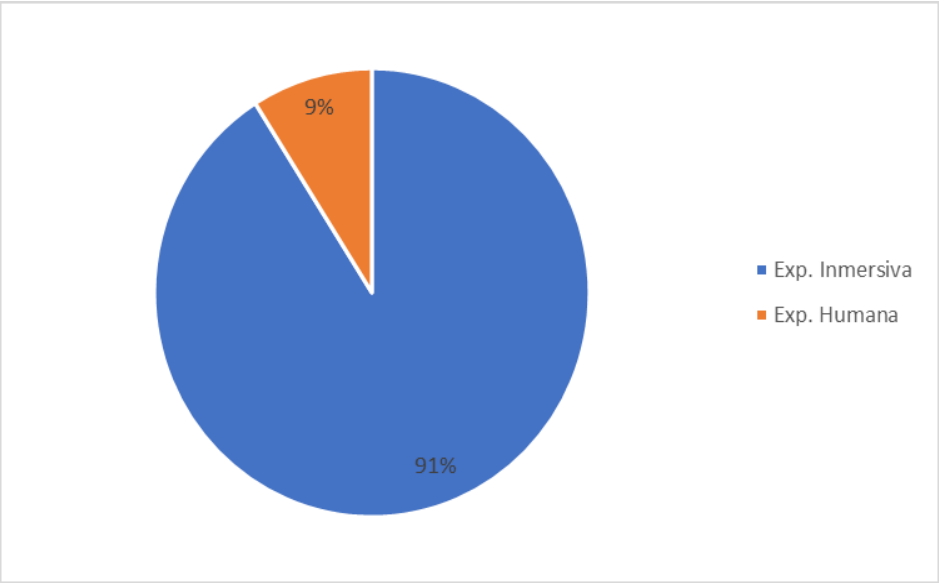
As depicted in figure 3, most of the studies focused on studying or offering an immersive experience (n=857), and the understanding and analysis focused on a more business and marketing aspect to influence the tourist's purchase decision. The studies dedicated to the human experience (n=86) focused on satisfying the tourist with innovative and personalized elements to increase the value of the destination selected in the study.

ICT in Tourism 4.0, which is focused on delivering a human experience, is limited, covering only 9%. According to Stankov and Gretzel (2020), there is a shortage of collaborative and innovative research and knowledge transfer models that evaluate user experiences of emerging Tourism 4.0 technologies as tourism end products.

Developing a system that is automatic and dynamic depending on tourists' preferred tastes is relatively complicated, even more so when development models are scarce. Undoubtedly, developing a system that retrieves

information that tourists provide daily to process it and offers effective branding to attract tourists and influence their purchase decision is more effortless.

Figure 3.
Studies classified by motive or motive



Source: own elaboration

CONCLUSIONS

Many studies have employed ICT as a necessary tool for the tourism industry. However, there is a relative paucity of empirical studies dedicated to providing a human experience. In this pseudo-study, we counted and demonstrated the reasons for using different ICTs to promote tourism destinations. Through a systematic analysis of studies related to the promotion of tourism destinations using ICT, 943 empirical articles related to the topic were filtered out, as well as other information, such as the motive or reason for using that technology.

Ninety-one percent of these studies focus on influencing the tourist's purchase decision by offering an immersive experience of a particular destination. There is a notable gap concerning offering a human experience focused on providing relevant information that the visitor requires at the time and offering personalized services that facilitate or enhance their stay; this is because there is a paucity of models for research and knowledge transfer that evaluate the experience of tourists who make use of Tourism 4.0 technologies. Also, it is relatively more straightforward to develop and/or use an ICT that retrieves information on tourists' tastes and preferences to promote specific tourist destinations.

This review made it possible to classify the ICTs used to promote tourist destinations, showing that the most used technology (with 38%) are social networks because they allow the exchange of information with tourists or stakeholders quickly and effectively; in second place (with 31%) is data mining and Big Data, because they are systems that allow retrieving information with a minimum margin of error, about the tastes and preferences of tourists to improve the value and branding of a particular destination.

The development of innovative and disruptive ICTs influences the interaction with tourists and other Tourism 4.0 stakeholders, changes the structure of their social capital, and creates new ways to create value and drive new models of tourism destinations. Emerging innovations focused on the human experience can open scenarios where stakeholders create new ways of interacting with tourists and boost tourist destinations.

This review thus contributes to understanding the importance of ICTs in promoting tourism destinations. We analyze the solutions used to solve complex problems in the industry to shed light on the opportunities of using ICTs in tourism and provide suggestions for future research on the use of ICTs redirected to destination promotion in particular.

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FINANCING
The authors did not receive funding for the development of this research.

CONFLICT OF INTEREST STATEMENT
The authors declare that there is no conflict of interest.

ACKNOWLEDGMENTS
To the Universidad Nacional de San Martín.

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