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## **Progress in information technology and tourism management: 30 years on and 20 years after the Internet - Revisiting Buhalis & Law's landmark study about eTourism**

### **Abstract:**

“Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research” is reviewed in terms of its significance to academic literature linking Information and Communication Technologies (ICTs) and tourism. Ten years after its publication in 2008, we revisit this paper with a view to observing the main changes in eTourism over these years, analysing the strategic lines that are driving its evolution, and verifying the fulfilment of the tendencies anticipated by Buhalis and Law. Their diagnosis has been very accurate and, given the rapidity of the technological changes, it is appropriate to highlight the changes that this sector has experienced since then.

Keywords: e-Tourism, Buhalis, Law, Internet, digital tourism, ICTs

### **1. Introduction**

Ten years ago, in 2008, Buhalis and Law published a landmark study on digital tourism: “Progress in information technology and tourism management: 20 years on and 10 years after the Internet - The state of eTourism research”. This Progress in Tourism Management article reviewed the literature on ICTs in Tourism (eTourism in short) over a 20 years timeframe, and analysed prior studies in the context of ICTs and tourism. The paper also forecast future developments in eTourism and identified critical changes that might affect the tourism industry structure.

In 2018, this commentary suggests that this progress paper has become a mandatory reference for academics and practitioners. A major contribution made by this paper is its overview of the research and development efforts that have been undertaken in the field, and the challenges that tourism researchers are facing now and will be facing in the future.

This research area undoubtedly was, and still is, timely: it is a well-known fact that the tourism industry has undergone a drastic transformation with the arrival of information and communication technologies (ICTs) since the 1980s, and especially with the advent of the Internet since the late 1990s (Buhalis & Law, 2008; Law, Qi, & Buhalis, 2010; Aldebert, Dang & Longhi, 2011, among others). Increasingly, ICTs plays a critical role in boosting the competitiveness of tourist organisations and destinations (Buhalis and O'Connor, 2005; Berne, Garcia-Gonzalez & Mugica, 2012), as well as shaping the market itself. Digitalisation is changing the structure of the industry by altering barriers to entry, facilitating price transparency and competition, revolutionising distribution channels, optimising costs and improving production efficiency (Kim, Nam & Stimpert, 2004; Assaf, & Tsionas, 2018). In fact, the tourism industry has become the largest category of products and services sold over the Internet (Abou-Shouk, Lim & Megicks, 2013). The Internet penetration rate in the world is 51.7%, and in some regions such as North America or Europe the figure is more than 80% (Stats, 2017). International tourism has been growing more quickly over the past 5 years than the world goods trade (UNWTO, 2017) and it continues to be one of the main online commercialisation sectors<sup>1</sup>.

A growing corpus of literature has been analysing the impact of ICTs on the tourism ecosystem, as reflected in extensive bibliographical reviews. After the studies by Frew (2000) and Leung & Law (2007), Buhalis & Law (2008) conducted their thorough research into the state of eTourism, and analysed the progress of information technology in the management of tourism. Then, following in their footsteps, new research work has also been done and a variety of literature compilations have also been brought together on applying ICT to tourism (Law, Leung & Buhalis, 2009; Law, Qi & Buhalis, 2010; Pesonen, 2013; Leung et al., 2013; Law, Buhalis & Cobanoglu, 2014; Zeng & Gerritsen, 2014; Law et al., 2014; Singh, 2016; Lu & Stepchenkova, 2015; Leung, Xue & Bai, 2015), alongside the literature review by Ukpabi and Karjaluoto (2017), which examined how consumers have adopted ICTs for tourism services. Research into eTourism is currently so fruitful and the tourist industry so vast and covers so many areas (WTTC, 2016), that literature reviews tend to limit the number of journals included, restricting themselves to those with the largest impact (i.e. Pesonen, 2013) or focusing on specific topics (i.e. user-generated content in Lu & Stepchenkova, 2015).

However, we do not intend to carry out a fully canonical literature review, but, following the itinerary marked by Buhalis & Law (2008) and their holistic approach, analyse the changes that tourism has gone through in these ten years, using the new contributions of literature as an instrumental support. We have maintained the three key issues identified

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<sup>1</sup> eMarketer (2017): Worldwide Digital Travel Sales: eMarketer's Estimates for 2016–2021. eMarketer. World online travel sales are still growing year after year at above 7.5% Available on: <https://www.emarketer.com/Report/Worldwide-Digital-Travel-Sales-eMarketers-Estimates-20162021/2002089>

by Buhalis & Law (2008) as fundamental axes in the investigation of eTourism, namely: consumers and demand, technological innovation, plus the state of the industry and its functions, and we have used the same structure as they did in their paper in order to tread the same path, trying to update it, detect new trends not clearly present in 2008 and reflect on their intuitions and projections for the future.

On the basis of the five review typologies established by Grant and Booth (2009), our study can therefore be classified as a critical/narrative review. A critical/narrative review aims to analyse extensively researched literature and conduct a critical evaluation of its quality (Kim et al., 2018). The main purpose of a critical/narrative review is to identify significant items in the field; no formal quality assessment for each study is required, and the review is typically conducted in a conceptual or chronological way; this method is a traditional and frequently used way of reviewing and integrating studies to provide a comprehensive theory to reconcile the findings of each study (Crouch, 1995).

Furthermore, from a methodological point of view, our research uses online databases (i.e. Web of Science, ScieDirect), using different combinations of keywords that are related to eTourism. Buhalis & Law (2008) considered that a major limitation in their study was the predominant inclusion of publications from tourism. We have reviewed and included references from journals associated with ICTs (i.e. Telematics and Informatics) that during those ten years have made major contributions and that have already appeared frequently in the most recent bibliographic reviews. To favour methodological transparency the procedure proposed by Aguinis, Ramani & Alabduljader (2018) was taken into consideration, as follows in Figure 1:

Figure 1. Process for identifying journals, articles and content

Step 1	<ul style="list-style-type: none"> <li>•Determine goal and scope of review (period since 2008; quantitative and qualitative studies; fields: hospitality, leisure, sport &amp; tourism, management, business, computer science, artificial intelligence, psychology, information science &amp; library science)</li> </ul>
Step 2	<ul style="list-style-type: none"> <li>•Determine procedure to select journals considered for inclusion (books, reports from international organizations, journals from Web of Science and Science Direct)</li> </ul>
Step 3	<ul style="list-style-type: none"> <li>•Calibrate source selection process through inter-coder agreement (manual search to identify articles directly related to the filelds in step 1, using different combinations of keywords: etourism, tourism, consumer, demand, technology, innovation, industry, business, management, distribution and transport, preferably considering JCR Q1 journal articles and with significant number of citations)</li> </ul>
Step 4	<ul style="list-style-type: none"> <li>• Select sources using process identified in step 3 (the article selection process resulted in a total of 65 journals containing 202 relevant articles, 10 books, 1 doctoral dissertation and 7 reports)</li> </ul>
Step 5	<ul style="list-style-type: none"> <li>•Calibrate and extraction process through inter-coder agreement (final literature review is based on 54 journals and includes 159 references)</li> </ul>
Step 6	<ul style="list-style-type: none"> <li>•Extract relevant content using multiple coders</li> </ul>

Adapted from Aguinis, Ramani, and Alabduljader (2018)

This study poses several research questions:

1. How have the eTourism developments anticipated by Buhalis & Law (2008) ten years ago evolved?
2. What new trends, topics and phenomena have appeared on the digital tourism scene since this fundamental study?

We intend to present the current status of evolution and a holistic diagnosis based on Buhalis & Law's (2008) findings and conclusions. In this sense, our contribution is mainly twofold: firstly, we develop the eTourism literature with an increased and current understanding of the eTourist, by updating sources and research work; secondly, this document reflects development over time, and allows us to understand the diversity of evolution in customers, technology and industry over the 10-year period since the publication of the article we are using for reference purposes.

This study consists of five sections. After the introduction, from Section 2 to Section 4, we develop the three main themes established by Buhalis & Law (2008): consumers and demand, technological innovation, and the state of the industry and its functions. Finally, Section 5 contains the document's conclusions and their effects on the future of eTourism, as well as their limitations and future avenues of research.

## 2. Consumers and Demand Dimensions

Buhalis & Law (2008, p.661) indicate that “the key to success lies in the quick identification of consumer needs and in reaching potential clients with comprehensive, personalised and up-to-date products and services that satisfy those needs. Gradually new, experienced, sophisticated, and demanding travellers require interacting with suppliers to satisfy their own specific needs and wishes”. The concept of personalisation of the offer to the customer is vital (Kotiloglu et al., 2017; Zheng, Liao & Qin, 2017). Every tourist is different, carrying a unique blend of experiences, motivations, and desires. To a certain extent, the new sophisticated traveller has emerged as a result of experience. Internet promotes the large-scale customisation of tourist products, because it enables the industry to pinpoint relatively major market niches in different geographical locations. In this vein, the notions of customer centricity, empowerment and involvement have been highlighted as main driving forces of the new tourist services (Sigala, 2012).

Buhalis & Law (2008) also placed special emphasis on the information search and how ICTs change tourist behaviour. In this context, one way to approach digital tourists and their behaviour is to observe the digital activities that they can perform in relation to their tourist activities. The activities that eTourists can carry out with digital tools could be (Buhalis & Law, 2008, Buhalis, Leung & Law, 2011):

- 1) Consulting and obtaining the information required to build and design their travel experience (Chung & Koo, 2015; Filieri & McLeay, 2014). This also includes online searches and price comparisons (Amaro & Duarte, 2015). The ever-increasing availability of tourist information has been conducive to enabling tourists to find by electronic means, their destination, accommodation, private renting services, etc., thereby enabling them to organise their own tourism packages. Despite the fact that it is possible to study consumers’ online purchase intentions in the academic literature, sufficient in-depth information is still not available for the ways in which travel websites are selected (Qi, Leung, Law and Buhalis, 2010).
- 2) Managing the eTourism services selected, such as booking a hotel, airline tickets and purchasing trips on the Internet or mobile devices (Amaro & Duarte, 2015; Kim, Lee & Chung, 2013; Escobar Rodríguez & Carvajal Trujillo, 2013, Wang, et al., 2016, Suki & Suki, 2017).
- 3) Other activities related to their needs "in situ", once the eTourist is travelling, for example, looking for a restaurant or other specific services when already at the destination (Bai, 2015).
- 4) Post-trip situations, such as proactive recommendations to others (Kim, Qu & Kim, 2009; Morrison et al., 2001) or blogs (Chen, Shang & Li, 2014; Ho & Lee, 2015).

We have also been able to identify a new, emerging category:

- 5) Being actively involved in tourism e-business, introducing their own abilities and services into the market, for example, becoming an Airbnb Superhost (Liang et al., 2017; Ert, Fleischer & Magen, 2016; Gunter, 2018) or taking advantage of the tourist-tourist connection and sharing like in BlaBlacar. This category concerns the arrival of the

*prosumer*<sup>2</sup>, shifting our attention away from creating value for tourists, toward co-creating value with tourists (Rihova et al., 2015). This concept is increasingly widespread in e-business, influencing the process of e-tourism. In general, the hospitality and tourism literature on co-creation and higher-order customer engagement is still in its infancy (Chathoth et al., 2016; Camilleri et al., 2017).

A wide range of studies have flourished that are devoted to understanding the attitude and behaviour of tourists in relation to all these activities. Some studies examine the emotional profiles of tourists and their post-consumption assessments of satisfaction and intention to recommend (Hosany & Prayag, 2013). There are also examples of research on eTourism examining the role of personal factors affecting the eTourist (Szopiński & Staniewski, 2016), such as gender (Kim, Lee & Chung, 2013) or sexual orientation factors (for example, homophily in Ayeh, Au & Law, 2013a), age (for example, senior travellers who use ICTs in Pesonen, Komppula & Riihinen, 2015) or previous experience (Crouch, Huybers & Oppewal, 2016). New studies have been published about the specific nature of the new generations of tourists: silent Generation, Baby Boomers, Generation X, and Generation Y (Li, Li & Hudson, 2013). Bilgihan, Okumus & Cobanoglu (2013) and Parsa & Cobanoglu, (2011) highlight the pivotal role of affective commitment for developing and maintaining long-term relationships in tourism with Generation Y. Research into the behaviour and impact of the millennials on the tourism business is still very limited (Ramsay et al., 2017). In his literature review, Pesonen (2013) states that Internet has changed segmentation by providing new bases to be applied to segment tourists instead of well-established segmentation variables such as socio-demographics or travel motivations, and he stresses that a lot of work still has to be done in this research area. Some authors (for example, D'Urso et al., 2016) suggest that the most successful way to communicate to “postmodern” consumers and to analyse their behaviour is through micro marketing, neo-marketing or database marketing as these techniques allow the researcher to detect specific individualities and to create tailored-made responses.

Inspiring trust in online consumers is still a challenge for the organisations and has not yet been sufficiently well examined, probably owing to the very nature of the differential characteristics of the services, for example, the difficulties involved in measuring the quality of the services prior to consumption (Martinez & Rodríguez del Bosque, 2013). Growing dependence on the Internet as a source of information when making decisions about tourism products has meant that further research into the Electronic Word-Of-Mouth (eWOM) is necessary (Sparks and Browning, 2011, Filieri and McLeay, 2014).

Buhalis & Law (2008) also stressed the growing importance of virtual communities that are gradually becoming extremely influential in tourism as consumers show greater trust in their peers, rather than in marketing messages (Munar & Jacobsen, 2014). Two kinds of community websites: photo sharing sites (Flickr, Panoramio Instagram) and review/opinion sites (i.e. Tripadvisor, hotels.com) have been increasingly attracting not

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<sup>2</sup> The term was coined by Toffler in his book “The Third Wave”, where he refers to a new agent of the global village who is not limited to the role of consumer, but can also provide other goods or services to the network.

only users' attention but also the researchers' attention over the past ten years (Deng & Li, 2018; Ganzaroli, De Noni & van Baalen, 2017, as recent examples). In the case of the review/opinion sites, several new questions have arisen: credibility and influence over the users (Ayeh, Au & Law, 2013b; Filieri, Alguezaui & McLeay, 2015), behaviour patterns (Banerjee & Chua, 2016), the decision-models below them (Zhang et al., 2017), and the commented content, such as reference to destinations (Kladou & Mavragani, 2015), hotels (Xie, Chen, & Wu, 2016), restaurants (Ganzaroli, De Noni & van Baalen, 2017) or museums (Carter, 2016).

ICTs also provide a very effective mechanism for consumers to air complaints as indicated by Buhalis & Law (2008), and this mechanism now involves more sophisticated techniques like sentiment-analysis technologies for extracting opinions from unstructured human-authored documents (Xiang et al. 2015).

The content generated by the consumers on the Internet has inspired and boosted the development of the large amount of data generated (Xiang et al. 2015) and this information explains how one currently extracts this data and transfers it to the tourist industry, and how decisions are taken both by the companies and the consumers. New market opportunities are emerging to commercialise data tailored to comply with the interests of the tourist organisations: data concerning the consumption and expenditure of tourists and residents calculated from credit card payments; prices, occupation, estimated online demand and reputation via online travel agencies (OTAs); online semantic analysis and reputation via OTAs located at the destinations or rival destinations; predicting attendances at events through the average social environment (CASE); analysis of tourist and resident mobility by means of sensors, are just a few examples that bring to light the opportunities and threats involved in making the most of the information being generated about tourists and by tourists. Traveller decision-making is a complex and multi-dimensional process, and the sources of the data generated by users and based upon Internet technology are being used increasingly, in order to be able to help to improve knowledge about purchasing behaviour (Li et al., 2017; Sun et al., 2016).

#### Implications:

The tourist is still the centre of attention for the tourist ecosystem. Tourist-centricity and the customisation of the tourist experience are still concentrating the efforts of all the stakeholders in the sector, so it is necessary to better understand their wishes, what prompts them and, finally, how they behave. However, the latest options made available to tourists by technology have caused tourists to change: they show proactiveness regarding contents, relations with other tourists and reveal that tourists are active managers of their own business model, not only as consumers, but also as producers or developers of tourist activity with an economic impact. Little by little it modifies their behaviour as their digital literacy increases; from incorporating practices associated with pairs to obtain information, for example, to becoming a genuine prosumer. Furthermore, the arrival of the new generations (i.e., millennial) can bring about disruptive changes in the tourist business, hitherto unforeseen, and of course no research has been conducted into them as yet. The millennials have the potential to disrupt the tourism sector's mode

of operation and to contribute to the transformation of global tourism due to their strong digital skills, high degree of permanent connectivity, search for experiences and altruistic behaviour. We foresee tourist requiring memorable experiences, immersion in destinations lifestyle, peer-to-peer initiatives and altruism. As digital natives, chatbots and new solutions for immediate satisfaction will be required.

Tourists have high expectations for efficiency and a low tolerance for barriers to global mobility, different regional agreements must be adapted to the needs of 21st century tourists. Today's technology and data analysis allows customization of the service and the tourist experience, but it must be ensured that automation does not lead to a disconnection between online and in-person exchanges. This last aspect highlights the importance that the consumer's privacy and data have to preserve throughout this process. The tourism industry must commit to generating trust with the consumer.

### **3. Technological Innovation**

Information and Communications Technologies (ICTs) in general, and the Internet in particular, have been developed as one of the most effective tools for boosting tourism (Qi, Leung, Law and Buhalis, 2010), being conducive to the transition from monologue to dialogue between supply and demand. Consumers trust the Internet to obtain advice. As users increasingly put across their opinions via Web 2.0 applications, the role of the platforms as tools for large-scale influence is gradually improving (Banerjee & Chua, 2016) and they acquire great power on the market. The online social networks (OSN) are generating collective awareness and are becoming one of the main sources used by tourists for compiling information when they make decisions about travelling and purchasing products and services associated with journeys. The various stakeholders in the world of tourism and catering open and manage accounts on numerous platforms, such as Twitter, Facebook, Instagram, Pinest, Vine, Snapchat, Twitter and Google+ (Bilgihan et al., 2016) making social network communication one of the main communications strategies.

We have identified four main areas of research from the numerous works that study the different ways of linking ICTs and tourism in the sphere of the consumer; they form a continuum between the digital tools or devices, and the tourist, in terms of technology:

1) Where the technologies used and devices employed are concerned, Buhalis & Law (2008) listed and reviewed the main technologies applied in tourism and their popularisation. Research into these technologies continued to increase in the following years: Internet (i.e. Xiang, Magnini & Fesenmaier, 2015; Standing, Tang-Taye & Boyer, 2014; Garín-Muñoz, & Pérez-Amaral, 2011), mobile phones and mobile technologies (Kim, et al., 2015; Kim, Park & Morrison, 2008), social networks (Harrigan et al., 2017, Chung & Koo, 2015), virtual and augmented reality (Kounavis, Kasimati, & Zamani,



2012) or geolocation (Salazar, 2005; Rodríguez, 2015). A sense of presence during VR leads to a positive attitude change towards destination (Tussyadiah et al., 2018).

In recent years we have witnessed the development and introduction of wearables in tourism (Jhaharia, Pal & Verma, 2014; Tussyadiah, 2013) and Internet of Things (IoT) applied to tourism (Kaur & Kaur, 2016) including their application to smart cities/smart destinations (Guo, Liu & Chai, 2014; Buhalis & Amaranggana, 2013; Garau, 2015). Smart tourism is not only a matter of applying techniques to the key concept of tourism informatisation (Li et al., 2017; Della Corte, D'Andrea, Savastano, & Zamparelli, 2017), it also helps to solve various problems and difficulties facing tourism information services that seek to maximise the value of current tourism resources to achieve a qualitative change in the ways, channels and means of a tourism information service.

These new technologies make possible the biggest change: the convergence between the physical and digital worlds supported by sensors that collect data arising from mutual interactions between tourists and the environment. Short-range wireless communication technologies, such as Radio Frequency Identification (RFID) and Near Field Communication (NFC) (Kim & Kim, 2017) promote ubiquitous connectivity and real-time synchronisation to create new experiences for users. Furthermore, the utilisation of beacons located on top of the traditional physical signages turns them into authentic digital tourism offices when connected to the tourists' devices via Bluetooth.

Therefore, the rapid evolution of technology and its applications to tourism is unstoppable. Robots are also appearing on the tourism and hospitality scenario (Murphy, Hofacker & Gretzel, 2017; Kuo et al., 2017).

2) The information retrieved and exchanged, including its accuracy, relevance, quality and reliability (Filieri & McLeay, 2014). As has already been pointed out, we have observed the emergence of data-related technologies that include new methods for compiling data, data analysis, data exchange, data sharing, and communication in tourism (Gretzel et al., 2015) and that make it possible to reach sophisticated conclusions, for example, detecting atypical behaviour and characterisation and detection of communities (Bello-Orgaz, Jung & Camacho, 2016). Where the management and retrieval of information is concerned, the use of ontological technology for managing tourism information enables the relation to be aligned with numerous sets of information, retrieval and representation to be performed more accurately and in short time (i.e. Tachapetpaiboon & Kularbphettong, 2015, for cultural tourism). In addition, future enhancement can also be achieved by applying it to tourism-based semantic search and querying related systems. With regard to the relationship with Internet searches, while the Bayesian SEM approach is now receiving considerable attention in the literature, tourism studies still rely heavily on the covariance-based approach for SEM estimation (Assaf, Tsionas & Oh, 2018).

Since it was unveiled in 2011, schema.org has become the *de facto* standard for publishing semantically described structured data on the web, typically in the form of website annotations. A large-scale study on the usage of schema.org in the tourism

domain (Kärle et al. 2016) shows that the schema.org vocabulary is generally used incorrectly or lacking fundamental properties (e.g. many hotels do not have address information in their annotations) and its usage is still in its infancy. A lot of work is required in this field, not only from practitioners, but also from researchers.

3) The interaction and flow between the tool or application and the tourist, involving such aspects as complexity (Amaro & Duarte, 2015), novelty (Chen, Shang & Li, 2014), navigability (Herrero & San Martín, 2012), informativity (Lai, 2015), enjoyment (Chung & Koo, 2015) and security as the main preoccupation already identified in Buhalis & Law (2008) and that continue to concern (Kim, Chung, & Lee, 2011; Escobar-Rodriguez & Carvajal-Trujillo, 2014). The design and usability of the tool or application has a major impact on customer actions. By way of example, and regarding the web design, Dedeke (2016) indicated that website design had an effect upon perceived product quality and upon online purchase intentions.

Furthermore, we are witnessing the arrival of artificial intelligence (AI) in the tourism ecosystem, where neural networks and machine learning techniques are especially important. These models mathematically emulate the neurophysical structure of the human brain and the decisions that it makes. By way of example, Hadavandi et al. (2011) present a hybrid artificial intelligence model to develop a Mamdani-type fuzzy rule-based system to predict tourist arrivals with high accuracy. The hybrid model uses a genetic algorithm as a learning rule base and for tuning the fuzzy system database.

4) The consumer's profile, attitude and intentions (Agag, G., & El-Masry, 2016) and behaviour (Amaro & Duarte, 2015). This also includes the consumers' acceptance of technology (Ukpabi & Karjaluoto, 2017), their own technical perceptions of self-efficacy, and their ability to deal with the related technologies (Srivastava & Dhar, 2016). In this context, the role of ICTs as triggers for desired tourist behaviour is especially interesting. Sigala (2015) addresses the use of gamification and fun factors in the adoption and use of technology for the achievement of business benefits and customer value.

Finally, while the literature has acknowledged the validity of the recent impact of technology on experiences, empirical exploration in this field remains scarce. Only a few studies have attempted to discuss tourism experiences and the impact of technology from a more comprehensive perspective (Neuhofer, Buhalis, & Ladkin, 2014), despite the fact that experiences constitute the essence of the tourism industry. Authors such as Boz, Arslan and Koc (2017) explain how scientific disciplines such as neurophilosophy, neuroeconomics, neurofinances or neuromarketing are emerging thanks to technological development. Numerous studies are being published in the scientific that try to explain consumer behaviour, and the wishes and expectations of consumers, when faced with the new digital reality.

#### Implications:

ICTs applied to tourism advance rapidly, and it is possible to discern an outstanding union between the physical and digital world. Data are becoming increasingly available about the tourism business, and an analysis of this information is having major

repercussions on this business. We can see that the major changes and breakthroughs since the Buhalis & Law (2008) study have perhaps taken place in the technological field. Buhalis & Law (2008) considered as the major revolution the Ambient Intelligence, implying a seamless environment of computing, advanced networking technology and specific interfaces which should be aware of the specific characteristics of human presence and personalities to adapt to the needs of users; but did not fully foresee the implications of “everything connected” (Internet of things, “smart phenomenon”), making possible the biggest change: the convergence between the physical and digital worlds. ICTs advance at such a rate that it is difficult for the sector to assimilate them, and as a consequence they take longer to appear in the academic literature and the research work in the sector. In addition to the new technologies (sensors, wearables, etc.) and data management techniques, it is worthwhile highlighting the role of the work done on ontology and semantics, which could open up new paths of the development in the tourism business. However, academic research applied to these disciplines is still in its infancy. The rapid evolution of technology and its applications to tourism is unstoppable and a 10 years period could be a good framework for analysis.

#### **4. Industry and Business Functions**

Ten years ago, the strategic and operational dimensions of the ICTs for the strategy of tourism organisations were emerging in the literature (Buhalis and Law, 2008). Even so, the incorporation of the ICTs into top-level decision-making processes is often still a rarity in many hotel and tourism organisations (Law, Buhalis and Cobanoglu, 2014). The academic literature has already informed (Law, Leung and Wong, 2004) that maybe marketing and distribution were the commercial functions to be most widely affected by the technological revolution, and subsequent research work has backed this up (Amaro and Duarte, 2015; Berne, García-Gonzalez & Mugica, 2012). Progress has brought about a rapid change in tourism distribution plus a proliferation of products, new channels and innovative methods (Baek, 김민화, and 이슬기, 2017) and effectively these have been proactively incorporated in order not only to improve the quality of the service the customer is provided with, but also to improve operating efficiency and, ultimately, to increase profits (Law, Buhalis and Cobanoglu, 2014).

In spite of this, we can observe a great difference between the interest that academics have shown in studying the distribution channels (Jeeva and Tran, 2014; Jorgensen, 2017), and the abundant scientific literature about the changes that have been brought about by communication between the various agents that operate on the market. The Internet has changed the entire value chain for creation, marketing, distribution and consumption where tourism is concerned (Minghetti and Buhalis, 2009; Salavati and Hashim, 2015).

According to Jorgensen (2017), the distribution of tourism is dynamic in nature and involves the constant negotiation and exchange of goods and information between tourists, agents and suppliers, who may be connected up in a variety of non-linear ways. These ways may even vary during the distribution process, bringing to light how the

scientific literature has tackled the distribution of tourism through ontology, administrative epistemology and from a traditional "channel approach", limiting their usefulness because of their static nature, so it is necessary to recognise the importance of the untidiness and multiplicity, the distribution is neither linear nor static and must consider the context of tourists, suppliers and agents. Tourism distribution must be interpreted as a dynamic relational process of mediation, which occurs in networks of activity systems, rather than a linear process of economic exchange.

As Buhalis and Law (2008) already predicted, changes have affected the tourism distribution channels, particularly the disintermediation resulting from the evolution of electronic commerce and from access to information about tourism products via the Internet, as well as verticalisation, the trend among tour operators to purchase travel agencies in order to enhance their market position (Macedo and da Silva, 2016). Thanks to the Internet, travel companies were able initially, and for the first time, to dispense with powerful intermediaries, like traditional Tour Operators (TO) or Global Distribution Systems (GDS), but in the race towards disintermediation, new operators emerged with higher network profiles, such as Online Travel Agencies (OTAs), for example, or metasearchers, making it necessary to redesign proactive or reactive online marketing strategies where the channel becomes the intermediary and catalyst between the product and the consumer (Baek, 김민화 and 이슬기, 2017). The term Funnel Revolution (Rauch et al., 2017) has come into usage after it has been observed how the reserve companies are purchasing search companies to be able to launch products, and how there has been an increase in the number of ecosystems sealed by loyalty, mobile devices, applications, chats, etc., which aim to obtain a demand that undermines the strength and control that the search engines currently have. However, even so we do not yet have available sufficient research material to establish how all those changes have improved the overall performance of organisations (Berne et al, 2015); despite the efforts to maintain strong direct distribution, online distribution by intermediaries is growing year after year. The interest in the possibility of buying a tourist service in an OTA's single web page with thousands of proposals and customized packages continues to grow. While it is true that online distribution is becoming increasingly complex, everything points to the fact that high competitiveness is going to be maintained. A multi-channel strategy is imposed, supplying companies must learn to properly manage their mix of distribution: take advantage of ICT to strengthen its direct channels, improve loyalty programs and customize its offer, but without forgetting its presence in other intermediaries.

As Buhalis and Law had already pointed out in 2008, web marketing communication processes have become a main current of interaction where customers are dynamic objectives to whom promotional messages can be sent. The Internet encourages the re-engineering of the entire production and delivery process for tourism products, and also enhances interactivity between members who can devise specialist products and promotion with a view to maximising the added value given to individual customers.

Organisations are increasingly trying to engage consumers in online conversations, and the main reason for this is usually to create a sense of trust, improve brand image and to strengthen commitment to the customer (Dijkmans, Kerkhof & Beukeboom, 2015; Van Noort & Willemsen, 2011; Mintz & Currim, 2013). The role of customers has gone beyond the idea of jointly creating value to become joint owner of the brand and its potential success (Kandampully, Zhang and Bilgihan, 2015). We could consider eWOM as a sort of communication that provides a mechanism for transferring power from firms to consumers (Mauri and Minazzi, 2013; Hennig-Thurau et al., 2004.) and vice-versa. The social networks develop a communications channel that makes it possible to contact users who would otherwise never have been contacted (Palacios-Marques, Merigo and Soto-Acosta, 2015; Xiang, Gretzel, 2010; Lim and Palacios, 2011). These days, social networks, blogs or virtual technology also play a useful role in domestic communication, skills and knowledge management within the firm (Leung, Law, van Hoof and Buhalis, 2013).

Relationships with the customers, and especially relational marketing, have been the subject of attention from academics and professionals alike. Relational marketing seeks to construct long-term, trusting and mutually-beneficial relations with valuable customers (Su, Swanson and Chen, 2016; Kim and Cha, 2002), and the organisation's reputation is a key factor in achieving this. In 2008, Buhalis and Law already stressed the importance and transcendental nature of reputation. Now, ten years later, academics have thoroughly analysed many aspects of corporate reputation, such as: how reputation can be a decisive factor in purchasing decisions (Agag & El-Masry, 2017); how the reputation of tourism destinations affects the demand for the destination (Albaladejo, Gonzalez-Martinez, Martinez-Garcia, 2016); reputation management (Dijkmans, Kerkhof & Beukeboom, 2015; Pollak, et al., 2016); how it favours certain price strategies and improves the competitiveness of the organisation and serves as a stimulus for making improvements among suppliers (Schuckert, Liu & Law, 2015); or how interactive platforms should be designed to increase the community of users, improve travellers' experience and increase their purchases (Bae, Lee, Suh & Suh, 2017).

Proper management of the price and pricing strategies are still among the main challenges faced by the directors of tourist firms, especially in the accommodation sector. The intangible and perishable nature of the services means the consumer ends up attaching considerable importance to the price of the services and conditions their daily management. Yield management or revenue management software is still extensively applied and successfully so, in such sectors as airlines or accommodation, whereas the restaurant sector would appear to be reluctant to apply prices based on demand. Nevertheless, tourism firms still make an effort to develop pricing strategies, measurement systems adapted to the investment in marketing, balancing the financial and non-financial performance indicators, yet all this effort has proved insufficient to back up the comprehensive measurement of the marketing return for most of the tourism organisations (Bruni, Cassia & Magno, 2017).

In spite of the fact that some studies have appeared that focus on e-metrics (Michopoulou and Buhalis, 2008), the measurement of the general performance of tourism firm marketing activities has not yet been dealt with in sufficient detail, either from an

academic or an industrial perspective (Bruni, Cassia & Magno, 2017). The major tourism firms are currently making great efforts to devise Marketing Performance & Measuring Systems (MPMS) that can provide them with useful information about the implementation of the commercialisation strategy (Homburg, Artz & Wieseke, 2012). To be specific, MPMS are useful to companies that operate in a very dynamic market situation (Homburg et al., 2012), as is the case with tourism firms (Dwyer et al., 2009).

Access to large amounts of data also allows analysing with greater precision patterns and segments, optimizing marketing strategies not only for organizations but also for tourism policy makers.

One of the aspects to which Buhalis and Law did not make reference in their 2008 article, was the boom in what came to be known as collaborative economy models. Ten years have passed since P2P platforms burst onto the market, and especially business models such as Airbnb. A lot has been written about this, but what is still lacking in the growing corpus of literature on collaborative economy is a study of the trends and culture of consumer preferences (Brochado, Troilo & Sah, 2017). The Internet, and more specifically Web 2.0, has allowed for the growth of P2P platforms in the accommodation sector (Gutierrez, et al., 2017; Russo and Quaglieri, 2014). In recent years, this growth has gone hand in hand with strong criticisms from traditional industry and from the different stakeholders, such as those who are residents in a tourist destination for a variety of reasons. The criticism concerns insufficient control or no control by the Authorities over accommodation, which encourages the submerged economy, increases tourism pressure in certain areas of the destinations and is conducive to gentrification, amongst other reasons. In the hotel industry, stars and membership of the chain have been pinpointed as quality indicators (Wang and Nicolau, 2017; Becerra, Santaló and Silva, 2013; Masiero, Nicolau & Law, 2015), whereas for the rented accommodation available via Airbnb or P2P platforms, stars and membership of the chain are irrelevant. By contrast, the host's attributes are considered to be important and even the deciding factor where price is concerned (Wang and Nicolau, 2017). The so-called "collaborative economy" has come to stay, but it should regulate and safeguard the quality of services that are provided so that the different operators can work in equal conditions for the benefit of the different affected stakeholders. Given that transformations in the tourism industry go faster than academic research, it is advisable to investigate the new phenomena that occur in the sector, especially those related to regulation and the impact on destinations.

The challenges we have to face in the next few years include encouraging a change process that helps to manage the resources more efficiently, more effective management, making the most of the technology, promoting changes in tourism policy and lobbying for international tourism legislation that is consistent with sustainable development. In recent years research works have appeared that denounce the short-sightedness of the type of marketing that tourism organisations are involved in regarding the communication of environmental performance (Villarino and Font, 2015). The messages

from the hotel chains tend to be objective and descriptive, in terms of the product and not of the need that is satisfied, without understanding the value that constructing messages based upon emotions or benefits obtained can contribute. This omission presents clear opportunities in the tourism industry to favour a persuasive message about environmental questions, social and economic concerns (Bridges and Wilhelm, 2008; Mitchell, Wooliscroft and Higham, 2010; Villarino and Font, 2015), which could even enhance commercialisation. The challenge consists of improving training professionals with regard to the way in which to market the offer, something that has changed little in the course of time (Arnold, 2009; Belz and Peattie, 2012; Crane, 2000; Villarino and Font, 2015).

#### Implications:

Developments in ICTs and, especially, the use of web technologies, have made the world a much smaller place and paved the way for new kinds of commitment and relationship. Nowadays, technology is at the very heart of the tourism and travel industry (Drosos et al., 2017). Ratings, comments on the web, rankings, etc., are shaping the reputation of tourism organisations and business success, are closely linked and are inseparable (Ögüt & Onur Taş, 2012). Yet as the pressure for reputation has grown, ethically questionable practices for improving the reputation online have also been appearing (Gössling, Hall, and Andersson, 2016). A growing dependence upon the online platforms has increased the pressure exerted by directors where economic performance is concerned, leading to dishonest practices being utilised in global tourism. Producers, distributors and consumers are starting to show a certain amount of frustration and are becoming suspicious of the company managers with respect to network rankings and comments (Gössling and Lane, 2015).

Only a few years ago, Buhalis and Law (2008) suggested that the Internet would challenge the role of the intermediaries, given that an increasing number of people would book directly via the hotel websites. This prediction has partly come true, but opposing forces have been detected on the market that are trying to maintain the status quo. Most tourism commercialisation (mainly accommodation and airlines) depends on a limited number of world intermediaries that operate online. This has caused especially the small firms to choose a “partner” on the network in order to benefit from the visibility that they cannot obtain for themselves (Gössling, 2017).

Technological development has forced the tourism industry to completely transform a large part of organizations and their brands. We are witnessing alliances between companies to reduce investment costs in technology and innovation and even creating own investment funds to develop emerging technologies. This transformation will generate not only more income but greater profitability (Crotti and Misrahi, 2017). This transformation affects and will affect the work force of the industry. Intelligent automation changes the nature of some jobs and eradicates others completely. Although tourism is a labor-intensive sector with low skills, opportunities are being created for highly skilled professionals.

## 5. Conclusions and Future Research

Buhalis & Law (2008) is amongst one of the most cited individual review papers in the tourism journals (Kim et al., 2018). Their paper demonstrated the contribution to knowledge, theory, and professional practice resulting from the analysed publications as well as explored prospects for the research area and the interdisciplinary contributions.

Along the same lines as the Buhalis and Law's paper, this contribution provides a review of the key ICTs in tourism themes and aims to illustrate the principle aspects of the research enquiry. Buhalis & Law (2008) themselves make an invitation to continue developing their study: "future attempts can extend the time period of publications, and critically analyse the findings in a progressive way" (Buhalis & Law, 2008, p. 620).

Our paper set out to be a narrative literature review. It would be impossible to approach it in a different way without somehow limiting the scope of the revision, given the large number of themes and approaches that enrich current research into the close links between ICTs and tourism in the recent years. We merely attempt to reflect this in the light of the literature on the findings and contributions compiled in Buhalis & Law (2008) and point out the role they have played in identifying and bringing to light key trends in e-tourism research, while maintaining their holistic and comprehensive approach.

Furthermore, our study has made some contributions that, amongst others, highlight the major changes that technology has undergone, where new and different trends have been detected, and technology seems to be the area where most of these changes have taken place since Buhalis & Law (2008) put forward their research. Human-device interaction is now enriched with the arrival of the Internet of things' technologies and wearables, where sensorisation promotes new usages and experiences in tourism. The data generated are likewise sources of innovation and new opportunities.

Security, the arrival of new participants on the market, collaboration agreements with other companies, customer loyalty, data integrity or reputation will become key questions both with regard to organisations' strategic and operational aspects. The consumer, the undisputed centre of the tourism business, is also developing and incorporating new ways of behaving and new customs that will carry on changing more forcefully, as the new digital natives emerge as the central characters in 21<sup>st</sup> Century tourism; although we can see that the rapid technological changes require a period of adaptation before they bring about clear and widespread changes in the tourism sector.

Connectivity is also a necessary requirement for the development and sustainability of tourism business. One of the great challenges facing the tourism industry will be to ensure the sustainability of tourists destinations, the sector still has difficulties in finding the formula that allows it to achieve the triple bottom line (economic, social, environmental).

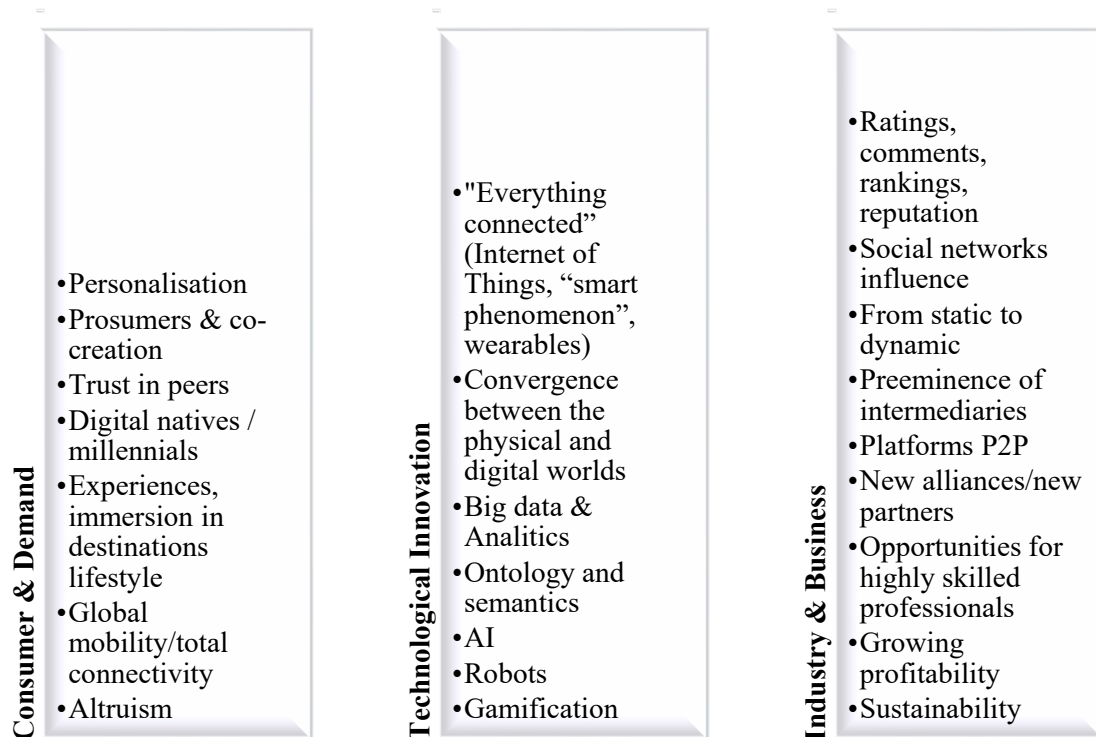


In this sense, we observed that the journals of the technological and ICT spheres gather these technical changes more quickly, and this includes their impact in the field of tourism, because of their transversal nature, whereas tourism journals take longer to echo these issues. A clear example of this is the current research into smart destinations and the tourist implications of smart cities. There is also a delay in such aspects appearing in the tourism literature reviews, where emphasis is placed only on the contributions made by the sectoral literature. When the purpose is to detect trends, observing developments and setting future lines, there is a great risk of not picking up fundamental aspects motivated by the technological change and leaving out aspects of utmost importance for the tourism market. We are therefore critical towards approaches that, in order to narrow the scope of work for the researcher, omit critical aspects in their conclusions. We defend more holistic and all-encompassing approaches.

This research paper has certain limitations, mainly because it is obviously very difficult to be comprehensive when tourism research has expanded so much in ten years. As did Buhalis & Law (2008), we adopt an unsophisticated method for grouping the published articles, and we do not include empirical data from industrial practitioners and academic researchers. In this sense, we have included some articles and books (for example, in the case of schema.org, geolocation or wearables) that could be excluded in order to guarantee impeccable methodological rigour but which would omit certain aspects, especially in the technological field, which were required if our intention had been to include certain future subjects that we considered it to be important not to leave out. They are the only cases where we have been flexible, even though this is a methodological limitation, because for the rest we have only used high-impact indexed journals and adhered to the principles of stability, reproducibility and accuracy that must form the basis of any good literature review (Baron, Warnaby & Hunter-Jones, 2014). Furthermore, this approach is justified by the need to provide as comprehensive a view as possible, because as Kim et al. (2018, p.56) state in their “review of reviews” of the academic literature on tourism, “future research endeavours could address the gap created by the uneven distribution of subjects covered by review studies in our disciplines”.

The new trends and implications put forward open up new avenues of research, especially in the areas where we have found ourselves lacking in academic research to refer to: new behaviour, microsegmentation, millennials, wearables, smart tourism, AI, ontologies, reaction of the major intermediaries or peer-to-peer (P2P) platforms are still uncharted territories where the academic literature of tourism is concerned. The potential replacement of much of the human labour in travel, tourism and hospitality industries and the immediate satisfaction through digital technologies that the new millennial tourists are requesting have consequences that is worth to investigate (See figure 2).

Figure 2. Revisiting Buhalis & Law (2008): New Trends.



Future research initiatives will have to look into how these technologies will fit into the public's mind with regards to acceptability of new technologies and how companies can incorporate them new technologies into their operations.

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