ICTs, disruptive forces and the production paradox in tourism: Present and future issues in the Visitor Attraction sector

Fedeli, Giancarlo

Giancarlo FEDELI

Glasgow Caledonian University. United Kingdom. giancarlo.fedeli@gcu.ac.uk

ICTs, disruptive forces and the production paradox in tourism: Present and future issues in the Visitor Attraction sector

TIC, fuerzas disruptivas y la paradoja de producción en turismo: Temas presentes y futuros en el sector de atracción

Abstract

Visitor Attractions (VAs) represent a fundamental element of the tourism landscape. The emergence and integration of Information and Communication Technologies (ICTs) in VAs have not only impacted the modus operandi of individual operators but also transformed how the entire sector is distributed and its product consumed. However, the ICT contribution to the sector remains blurred as a concept, which hinders both practical and theoretical implications. This essay analyses the most current literature to illustrate the impact of ICTs in VAs by introducing the concept of *ICT productivity paradox* in tourism and sheds light on current related trends. This is followed by a brief discussion which lays out future technological implications for the sector. The essay further draws attention to the great need for research to inform Visitor Attractions researchers and managers.

Resumen

Las atracciones turísticas (ATs) representan un elemento fundamental en turismo. La aparición e integración de las tecnologías de la información y la comunicación (TIC) en las ATs no solo ha afectado al modus operandi de los operadores, sino que también ha transformado cómo se distribuye la totalidad del sector y su producto consumido. Sin embargo, la contribución de las TIC para el sector sigue siendo borrosa como concepto, obstaculizando las implicaciones prácticas y teóricas. Este ensayo ilustra el impacto de las TIC en las ATs introduciendo el concepto de paradoja de producción de las TIC en turismo, y arroja luz sobre las tendencias relacionadas. A esto le sigue una breve discusión que establece futuras implicaciones tecnológicas para el sector. El ensayo, más allá de ello, resalta la gran necesidad que tiene la investigación de informar a los gerentes e investigadores sobre las atracciones turísticas.

Keywords

Disruptive technolgy; ICTs; ICT Paradox; Tourism; Visitor Attractions.

Palabras clave

Atracciones turisticas; Tecnologías disruptivas; Turismo; TIC; Paradoja de TIC.

1. Tourism and Visitor Attractions

Tourism is one of the global phenomena characterising our age. Modern tourism has gradually become an international service industry and has a significant and growing impact on a wide range of issues including environment, leisure, and transport (UNWTO, 2011). The tourism industry is often cited as one of most important drivers of economy development for many countries as it is labelled as the largest industry in terms of Gross Domestic Product (GDP) globally (Longhi and Rocchia 2015). It is no surprise that for many regions and countries tourism is the most important source of welfare through the creation and retention of jobs. According to the data from the World Tourism Organisation, in 2015 tourism has reached 1.2 billion of international tourism arrivals generating US$ 1.5 trillion in export earnings (UNWTO, 2017). Furthermore, the UNWTO has estimated that by 2030, tourist arrivals will reach 1.8 billion. From this evidence the relevance of the industry as a whole is clearly indicated.

Visitor attractions (VAs) are described as one of the most important components of the tourism industry (Swarbrooke, 2012) as they are defined as the reason of the existence of tourism (Boniface and Cooper 2001). The VA sector is often deemed as the baseline of the entire tourism system relying on the statement from Connel et al. (2015) that without attractions the rest of the tourism services would have no scope to operate. Firstly, VAs predominantly offer unique products and experiences to locals and residents; secondly, VAs serve to entice tourists to a specific destination and promote repeated visitation thus maximising the economic impact of tourism and contributing to economic development of the country or region (Connell and Page 2011). VAs are typically composed of museum and galleries, historical buildings, natural parks but also man-made type of attractions such as entertainment parks, casinos and, is some cases, temporary events. Attractions categories vary according to different features such as ownership, scale, location and catchment area (Swarbrooke, 2012). Despite the importance attributed to the sector, this lacks of an agreed definition which makes the comprehension of the sector fragmentary.

2. ICTs in tourism and disruptive forces

Technology advancements in the field of Information and Communication Technologies (ICTs) have certainly impacted the multifaceted tourism industry as well. ICTs are described as the processing and transferring of information through technology (Blurton 1999). ICTs are composed of a broad range of communication devices and applications to record, generate and broadcast information such as: the World Wide Web, online media, personal digital assistants (PDAs), video games, distance learning and videoconferencing, Near Field Communication (NFC) systems and Quick Response (QR) codes (IGI Global, 2015).

The connection between ICT and the tourism industry backdates to the early stages of computing and the post 1960-s mass travel development (Becker, 2008). In tourism academia, large amount of research identified the importance of ICT and its integration in the tourism industry (Buhalis and O'Connor 2005; Frew 2000). Several authors identified the diversity and information-intensive characteristics of the tourism product and suggested that tourism represents an ideal environment for the integration and development of ICTs (Benckendorff et al., 2014; Law et al. 2009; Werthner and Klein, 1999; Poon, 1988). Furthermore, the unique characteristics of tourist behaviour and their mobility also make tourism an ideal environment for experimenting ICT applications (Buhalis and Foerste, 2015: 159).

Since the ICTs introduction in the tourism industry in the 1960s with reservation systems in the airline sector, the role of these technologies has changed dramatically. Initially ICTs were employed to foster and improve efficiency by storing and sharing large amount of data while today, in the new tourism, ICT interacts with humans and with one other (Werthner et al. 2015; Anderson 2013). It can be stated that technology advancements in tourism have been fully integrated with each other so that are used with the aim of networking, communication and value creation. Overall, ICTs and the Internet have enabled tourism operators in reducing costs, both administration and production ones, and improving service to customers (Xiang et al., 2015).

One of the most transformative innovations brought by this set of developments is represented by the Internet; this is also reflected in academic research as the majority of the studies in tourism technology focus on the growth of the Internet. The Internet is widely recognised as one of the most influential factors that generated a new distribution system and led to the rise of new business models and operational and strategic practices in travel and tourism (Xiang et al., 2015; Buhalis and Law, 2008). In support of the significance of this ICT in the tourism industry, the Internet has driven the reorganisation of the tourism product offer as it enhances the interaction between stakeholders for the design and promotion of more specialized products and services to consumers (Buhalis and O'Connor, 2005). Furthermore, the Internet has endorsed typically smaller organisations to directly promote their offer as well as connect with partners

as barriers are reduced. For instance, the Internet has lowered the barriers of entry for businesses which do not have to rely anymore on expensive global distribution systems (GDS) to reach their audience. Likewise, consumers are benefitted from this ICT as they can access directly the supplier not only on at the final phase of purchase but also for accessing information to compare, get inspired and share. As a result, consumers and operators have the ability to avoid third parties' intermediation; tourism demand and supply are bridged in a flexible and interactive way (Cooper et al., 2013). All in all, the Internet serves as a platform that enables continuous technological innovations and nurtures new business practices as its trends are constantly evolving (Xiang et al., 2015).

Figures 1 below clearly shows the central role the Internet plays in tourism. Visibly, the Internet connects suppliers, operators, intermediaries and consumers in the tourism scene while supporting Internet technologies built on its technological and ideological foundation, namely, websites, E-commerce and information sharing platforms.

Figure 1: The central role of the Internet in the tourism landscape
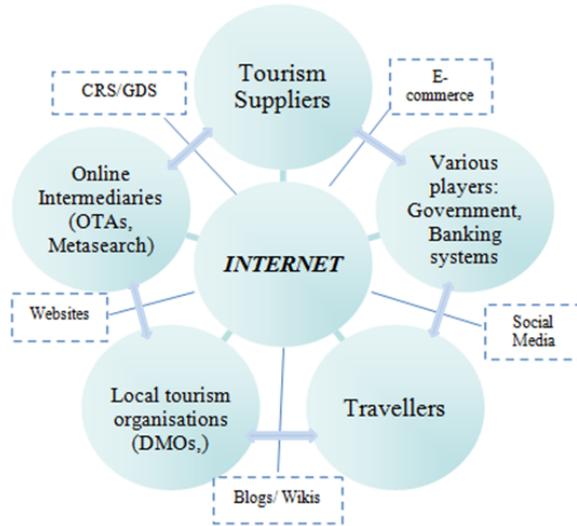
Source: Author

The transformational process enabled by the Internet has been further enhanced by the emergence of other disruptive innovations, from the progression of the Web, to the rise of the peer-to-peer economy and mobile technologies (Longhi and Rochhia, 2015). The term disruptive innovation is attributed to Clayton Christensen (1997) who described the phenomenon of the introduction of a technology that creates a new market and value network and eventually disrupts the existing conditions of that market and network. Hereof in tourism, the concept of 'long tail' has been borrowed from Anderson (2013) and utilised to express the impact on the markets of the disruptive innovation associated primarily with the Internet. The term *long tail* denotes the effect of the democratisation of distribution and production which have facilitated the creation of a cornucopia of products and specialisation in offer, increased segmentation and lower profit margins (Papathanassis, 2011).

In the tourism industry, several examples can be cited as result of the technological disruptive phenomenon occurring in the industry. The most well-known are for instance Tripadvisor " … an example of a niche innovation that has disrupted the dominant practices of accommodation providers at the regime level" (Benckendorff et al., 2014: 29). Other cases are offered by online travel agencies such as Expedia and Priceline which revolutionised the distribution of travel and the way this is purchased; similarly, the on-line flight consolidator Skyscanner and the accommodation portals Booking.com and Trivago, a metasearch website. The emergence of the so called collaborative or sharing economy also led to the growth of on-line portals such as Couchsurfing, Airbnb and HomeAway disrupting the accommodation sector. Finally, the rise of global companies such as Uber and Lyft in the transportation sector and OpenTable in catering suggest the proportion of the impact that ICT advances have brought in the tourism industry (Stamboulis and Skayannis, 2003).

Although the majority of the studies recognise ICT advances have brought more choice, efficiency and opportunities to the tourism distribution system, other authors suggest that these innovations have contributed to increase complexity and intensify competition in the tourism system (Kracht and Wang, 2010). Xiang et al. (2015) stated that the Internet created new models of disintermediation but consequently also of re-intermediation, suggesting the elimination of the initial advantage. According to Buhalis and Law (2008), the new forms of ICT driven business in the tourism industry find themselves to confront a whole range of opportunities and threats for all stakeholders. Hsu et al. (2016) draw attention to the vulnerability of businesses in the context of major digital transformation for both demand and supply sides as cited in Dawson et al. (2016).

2.1 The ICT productivity paradox

It is widely accepted that tourism businesses have turned to the exploitation of ICT solutions in search of more productive and efficient ways of managing their businesses. Nevertheless, empirical evidence have not convincingly showed a relation between organizational performance and productivity both in general and in the tourism sector (Sigala et al., 2004). This lack of indication leads to the concept of 'IT productivity paradox' firstly introduced by Brynjolfsson in 1993 to describe the shortfall of evidence of the benefits in spending in ICT technological assets by organisations. Sigala et al. (2004) concluded their study on the hotel sector by stating that "productivity gains accrue not from investments per se, but from the full exploitation of the ICT networking and informationalisation capabilities" (Sigala at al. 2004, p.180). Also Torrent-Sellens et al. (2015) showed that mere investments in ICTs do not inevitably create an advantage or increase of productivity unless such investments are complemented by organisational and business process changes within the organisation.
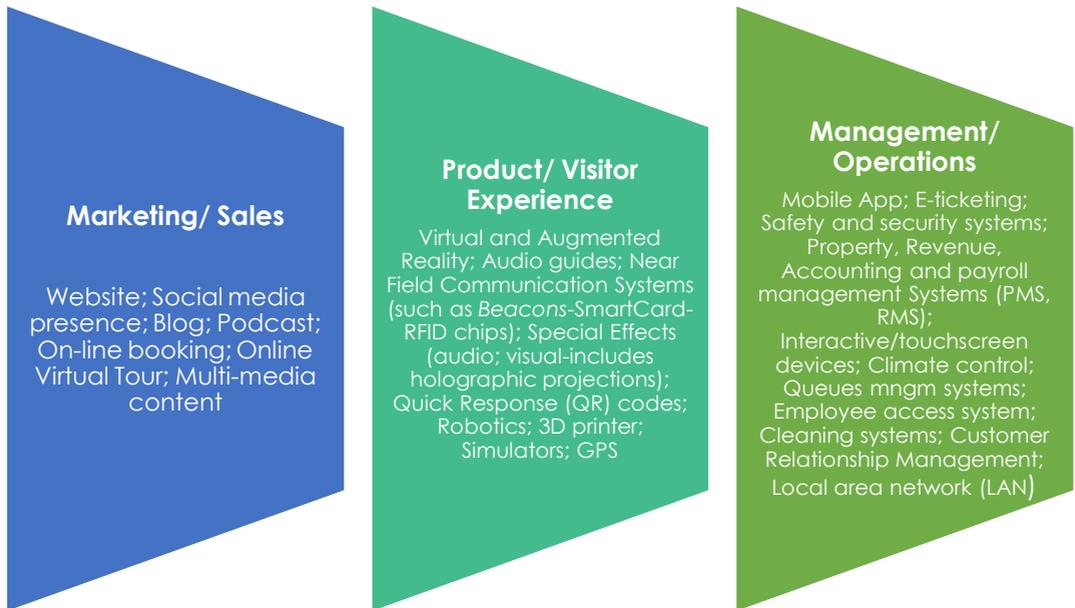
These views are reinforced by Buhalis and O'Connor (2005) who observed that "successful ICT deployment requires innovative management to constantly review developments and adopt suitable technological solutions in order to maximize organisational competitiveness" (Buhalis and O'Connor 2005: 11). Luo and Bu (2015) suggested that ICTs are a critical investment as they improve their productivity and enhance firm performance, by serving as an important channel and enabler of effective knowledge-

sharing and integration. Finally, Vukadinović et al. (2016) advised that the issue of impact of ICT on operational productivity is one of the more important issues in tourism.

3. ICTs and the Visitor Attraction sector

Several ICTs are also employed by numerous visitor Attractions. Benckendorff et al. (2014) identified three main organisational areas within a VA where ICTs are present. Firstly, ICTs are used as tool for communication, sales and distribution to reach out visitors through the different electronic information channels with marketing and sales functions. Secondly, ICTs are utilised to shape the tourism product to support visitor experience with entertainment purposes. Thirdly, ICT applications are used to manage VAs with the aim of increasing efficiency of the several operations such as admissions and coordination of visitors as well as security and maintenance functions. In Figure 2 below, some of the tools and applications are presented.

Figure 2: The employment of ICTs in the Visitor Attraction sector

Marketing/ Sales

Website; Social media presence; Blog; Podcast; On-line booking; Online Virtual Tour; Multi-media content

Product/ Visitor Experience

Virtual and Augmented Reality; Audio guides; Near Field Communication Systems (such as *Beacons*-SmartCard-RFID chips); Special Effects (audio; visual-includes holographic projections); Quick Response (QR) codes; Robotics; 3D printer; Simulators; GPS

Management/ Operations

Mobile App; E-ticketing; Safety and security systems; Property, Revenue, Accounting and payroll management Systems (PMS, RMS); Interactive/touchscreen devices; Climate control; Queues mngm systems; Employee access system; Cleaning systems; Customer Relationship Management; Local area network (LAN)

Source: Author

Although the ICT applications identified within the specific VA sector have been categorised by organisational area as in Figure 2, in some case ICTs can be found across several areas as they may fill multiple functions. For instance virtual reality tours may be integrated in the marketing strategy to entice visitors to an attraction, but they also could be used as part of the product, as element of creation of visitor experiences on-site.

Bennet (1999) indicated numerous potential incentives to invest and embrace technology in heritage visitor attractions, although the statement can be extended to other categories of VAs. These advantages can be identified in the areas of: interpretation, enhancing the visitor experience, reducing competition, cost savings, authenticity and, lastly, management efficiency. In the recent years a large body of work was developed on the impact, role and value of ICT in the tourist experience (Kounavis, 2012; Neuhofer, 2015). In fact, ICTs are portrayed as the key enabling tool to connect and enhance tourists' experience. As it has progressively occurred in other sectors, attractions are increasing their use of ICT, not only confined to support management operations (Sheldon, 1997) but also to be used primarily by tourists with the aim of enriching their own visitor's experience. Evidence of the synergy between ICT and attractions is offered in the exhibition industry which has used smart information innovations also known as beacons, part of near field communication (NFC) technologies, which allow attendees to acquire information and access various services in an attempt to increase their involvement and satisfaction throughout the whole experience. Mobile devices and applications are increasingly being used by museums to guide and inform visitors; virtual and augmented reality can immerse visitors recreating and visualizing past or imaginative environments and events with edutainment purposes (Reino Pardinas et al., 2007); audio-guides supported by GPS based systems, QR codes and podcasts; merchandising and souvenirs created on the spot by 3D printers.

From the review of the literature on the topic of VAs, it results that while areas such as marketing, revenue management, human resources and social issues related to the sector have been extensively researched, a shortage on the technological aspect of VAs, and specifically ICTs is extant. Nevertheless, there are individual research studies undertaken which focused on either specific cluster of attractions such as heritage or parks, looking at the specific implementation of ICT applications and the use of electronic devices for heritage interpretation (Grinter et al., 2002). Heritage and culture specifically appear to have received more attention; in 2014, an entire collection has been dedicated to the topic of 'Cultural tourism in the digital era' (Katsoni, 2014) followed by two more publications in the following years in the same line

of research. It has been also identified by the author that the type of research here described primarily focus on the demand side, namely the point of view of users is considered to investigate technology acceptance, user's attitude, preferences and satisfaction levels of consumers towards ICT applications (Benckendorff et al., 2005; Reino Pardinas et al., 2007; Wang et al., 2016). Mitsche et al. (2008) reaffirm that the insights from the studies conducted on heritage interpretation are very limited.

3.1 Future and prospects for the VA sector

The VA sector is a sector extremely susceptible to both global and local trends related to societal and economic conditions. VAs typically face challenges such as increasing internal and external competition and seasonal issues. The sector is also fragmented and characterised by a very diverse composition of organisations ranging in scale, ownership type, nature and business model. The risk for the sector is to lag behind other tourism sectors such as the accommodation and transport in terms of research consideration on the topic of smart tourism. The smart tourism ecosystem implies that operators use ICTs to their advantage to create, manage and deliver products and services (Hsu et al., 2015). In view of the fast changes that ICTs have been subject to in the past two decades, the question how VAs fit in the contemporary smart tourism ecosystem seems plausible to be posed.

Several players such as technological companies with their core business being non-tourism related (for instance Google) have progressively become very active in the tourism distribution chain and largely integrated into the purchasing decision (Papathanassis, 2011). From a marketing and sales perspective, the trend of globalisation and agglomeration dictated by resourceful and well established providers deserves particular attention. Both non-tourism and tourism players such as Google as well as Tripadvisor and local tour providers have increasingly expanded their operations and established their dominant positions. Such players are in the condition to determine their own set of rules to reinforce their businesses, i.e. applying commission rates and other fees for their services. As previously described, the attempt of many operators to become independent from third parts' booking channels has resulted in an illusion for many small and medium operators. Unless the organisation already holds a strategic position in its respective market, it becomes difficult for operators to reach prospective clients relying on direct booking channels and promote themselves independently.

As a result, while internal resources of VAs such as finance and knowledge will continue playing a key role in determining the success of the organisation, it is believed that external factors such as the direction of the development and strategic decisions of leading technology companies will represent a predominant element. As shown in Figure 2, there are several ways of making use of ICT applications in the sector yet, therefore finding the most suitable and accessible ones for each organisation represents a major task particularly for organisations with limited resources.

4. Conclusion

This essay recognises that little research has been undertaken in the field of VAs in relation to the increasingly relevant field of ICT. As a result, it becomes arduous to delineate important concepts such as the *ICT productivity paradox* described in the course of this document, when applied to the VA context. The lack of empirical evidence in the body of literature advises that future research could utilise the DEA (Data Envelopment Analysis) model, which consists of a nonparametric technique that compare the ratios (of multiple inputs to multiple outputs) of similar units taken from the observed dataset -as applied in Sigala et al. (2004). The DEA model is well-recognised within academia as well as management practice. Further research to better and more systematically identify, capitalise the positive and tackle the negative effects of disruptive ICTs is needed in this field. In order to gain a clearer understanding and provide a theoretical framework to shed light on strategic and managerial issues concerning the latest ICT-trends and the effects in the sector, a more comprehensive approach to the subject is thus required.

Furthermore, the challenges introduced by other leisure activities such as shopping, recent trends of decreasing interest in historical sites and heritage in the younger segments would represent an opportunity of research to investigate how to tackle these issues by using ICTs. Such research would offer not only an interesting field of study but also provide practical implications for experts and VA managers. ICTs have the potential to bring benefits to VAs as it has already occurred in the other tourism sectors and widely in other industries. What remains unknown is to what extent this is achievable in the VA sector and what the measurable variables, the strategic necessities and associated implications are.

5. Bibliographical references

[1] Anderson, C. (2013). *Makers: The new industrial revolution* (1st ed.). London: Random House.

[2] Becker, A. (2008). *Electronic Business: Concepts, Methodologies, Tools, and Applications*. New York.

[3] Benckendorff, P. J.; Sheldon, P. J. & Fesenmaier, D. R. (2014). *Tourism Information Technology*. CABI.

[4] Benckendorff, P.; Moscardo, G. & Murphy, L. (2005). High Tech versus High Touch: Visitor Responses to the Use of Technology in Tourist Attractions. *Tourism Recreation Research*, *30*(3), 37–47. http://doi.org/10.1080/02508281.2005.11081485

[5] Bennett, M. (1999). The role of Technology. In Leask, A. & Yeoman, I. (Eds.), *Heritage Visitor Attracions* (pp. 83–93). London: Cassel.

[6] Boniface, P. & Cooper, C. (2001). *Worldwide Destinations: The Geography of Travel and Tourism*. Butterworth-Heinemann.

[7] Brynjolfsson, E. (1993). The Productivity Paradox of Information Technology: Review and Assessment. Disponible en https://goo.gl/kUI7CZ

[8] Buhalis, D. (1998). Strategic use of information technologies in the tourism industry. *Tourism Management*, *19*(5), 409–421. http://doi.org/10.1016/S0261-5177(98)00038-7

[9] Buhalis, D. & Foerste, M. (2015). SoCoMo marketing for travel and tourism: Empowering co-creation of value. *Journal of Destination Marketing and Management*, *4*(3), 151–161. http://doi.org/10.1016/j.jdmm.2015.04.001

[10] Buhalis, D. & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research. *Tourism Management*, *29*(4), 609–623. http://doi.org/10.1016/j.tourman.2008.01.005

[11] Buhalis, D. & O'Connor, P. (2005). Information Communication Technology - Revolutionising Tourism. *Tourism Recreation Research*, *30*(3), 7–16. http://dx.doi.org/10.1080/02508281.2005.11081482

[12] Christensen, C. M. (1997). *The innovator's dilemma : when new technologies cause great firms to fail*. Harvard Business School Press.

[13] Connell, J. & Page, S. J. (2011). Visitor attractions. *Tourism Management*, *4*, 215-240. http://dx.doi.org/10.1016/B978-0-08-096932-9.10008-0

[14] Connell, J. ; Page, S. J. & Meyer, D. (2015). Visitor attractions and events: Responding to seasonality. *Tourism Management*, *46*, 283–298. http://doi.org/10.1016/j.tourman.2014.06.013

[15] Cooper, C.; Fletcher, J.; Fyall, A. et al. (2013). *Tourism: Principles and Practice*. Pearson Education, Limited.

[16] Frew, A. J. (2000). Information and Communications Technology Research in the Travel and Tourism Domain: Perspective and Direction. *Journal of Travel Research*, *39*(2), 136–145. http://doi.org/10.1177/004728750003900203

[17] Gretzel, U.; Sigala, M.; Xiang, Z. et al. (2015). Smart tourism: foundations and developments. *Electronic Markets*, *25*(3), 179–188. http://doi.org/10.1007/s12525-015-0196-8

[18] Grinter, R. E.; Aoki, P. M.; Szymanski, M. H. et al (2002). Revisiting the visit: Understanding How Technology Can Shape the Museum Visit. En Proceedings of the 2002 ACM Conference on Computer Supported Cooperative Work. New Orleans, Louisiana, USA. http://doi.org/10.1145/587078.587100

[19] Hsu, A. Y.; King, B.; Wang, D. et al. (2016). In-destination tour products and the disrupted tourism industry: progress and prospects. *Information Technology & Tourism*, *16*(4), 413–433. http://doi.org/10.1007/s40558-016-0067-y

[20] IGI Global (2015). What is Information and Communication Technology [ICT] [Blog]. Disponible en https://goo.gl/wje9rY

[21] International Telecommunication Union (2014). *Contribution from the United Arab Emirates Working definition of the term "ICT."* Disponible en https://goo.gl/Q993a4

[22] Katsoni, V. (2014). *Cultural Tourism in a Digital Era*. Wien: Springer.

[23] Kim, M. J.; Chung, N. & Lee, C. K. (2011). The effect of perceived trust on electronic commerce: Shopping online for tourism products and services in South Korea. *Tourism Management*, *32*(2), 256–265. http://doi.org/10.1016/j.tourman.2010.01.011

[24] Kirk, D. & Pine, R. (1998). Research in hospitality systems and technology. *International Journal of Hospitality Management*, *17*(2), 203–217. http://doi.org/10.1016/S0278-4319(98)00016-4

[25] Kounavis, C. D.; Kasimati, A. E. & Zamani, E. D. (2012). Enhancing the tourism experience through mobile augmented reality: Challenges and prospects. *International Journal of Engineering Business Management*, *4*(1), 1–6. http://doi.org/10.5772/51644

[26] Kracht, J. & Wang, Y. (2010). Examining the tourism distribution channel: evolution and transformation. *International Journal of Contemporary Hospitality Management*, *22*(5), 736–757. http://dx.doi.org/10.1108/09596111011053837

[27] Law, R.; Leung, R. & Buhalis, D. (2009). Information Technology Applications in Hospitality and Tourism: a Review of Publications From 2005 To 2007. *Journal of Travel & Tourism Marketing*, *26*(5–6), 599–623. http://doi.org/10.1080/10548400903163160

[28] Longhi, C. & Rochhia, S. (2015). Long Tails in the Tourism Industry : Towards Knowledge Intensive Service Suppliers. *International Journal of Leisure and Tourism Marketing*, *4*(3-4). https://doi.org/10.1504/IJLTM.2015.072119

[29] Luo, Y. & Bu, J. (2015). How valuable is information and communication technology ? A study of emerging economy enterprises. *Journal of World Business*, *51*(2), 1–12. http://doi.org/10.1016/j.jwb.2015.06.001

[30] Mitsche, N.; Reino, S.; Knox, D. et al. (2008). Enhancing Cultural Tourism e-Services through Heritage Interpretation. In O'Connor P.; Höpken W. & Gretzel U. (Eds.), *Information and Communication Technologies in Tourism 2008* (pp. 418-429). Vienna: Springer. http://doi.org/10.1007/978-3-211-77280-5_37

[31] Neuhofer, B.; Buhalis, D. & Ladkin, A. (2015). Smart technologies for personalized experiences: a case study in the hospitality domain. *Electronic Markets - The International Journal on Networked Business,* *25*(3), 243-254. http://doi.org/10.1007/s12525-015-0182-1

[32] Papathanassis, A. (2011). The Long Tail of Tourism. En Papathanassis, A. (Ed.), *Inclusive tourism* (pp. 201–211). Gabler Verlag. http://doi.org/10.1007/978-3-8349-6231-7

[33] Poon, A. (1988). Tourism and information technologies. *Annals of Tourism Research*, *15*(4), 531–549. http://doi.org/10.1016/0160-7383(88)90048-5

[34] Reino Pardinas, S.; Mitsche, N. & Frew, A. J. (2007). The Contribution of Technology-Based Heritage Interpretation to the Visitor Satisfaction in Museums. In Sigala M.; Mich L. & Murphy J. (Eds.), *Information and Communication Technologies in Tourism 2007* (pp. 341–352). Vienna: Springer. http://doi.org/10.1007/978-3-211-69566-1_32

[35] Sigala, M. (2004). ICT Paradox Lost? A Stepwise DEA Methodology to Evaluate Technology Investments in Tourism Settings. *Journal of Travel Research*, *43*(2), 180–192. http://doi.org/10.1177/0047287504268247

[36] Sigala, M.; Airey, D.; Jones, P. et al. (2004). ICT Paradox Lost? A Stepwise DEA Methodology to Evaluate Technology Investments in Tourism Settings. *Journal of Travel Research*, *43*(2), 180–192. http://doi.org/10.1177/0047287504268247

[37] Stamboulis, Y. & Skayannis, P. (2003). Innovation strategies and technology for experience-based tourism. *Tourism Management*, *24*(1), 35–43. http://doi.org/10.1016/S0261-5177(02)00047-X

[38] Swarbrooke, J. (2012). *The Development and Management of Visitor Attractions*. Oxford: Butterworth-Heinemann Ltd.

[39] Torrent-Sellens, J.; Ficapal-Cusí, P.; Boada-Grau, J. et al. (2015). Information and communication technology, co-innovation, and perceived productivity in tourism small and medium enterprises: an exploratory analysis. *Current Issues in Tourism*, *19*(13), 1295-1308. http://dx.doi.org/10.1080/13683500.2015.1029878

[40] Vukadinović, P.; Knežević, G. & Damnjanović, A. (2016). The Impact of ICT in Business in Tourism-Improving Efficiency, Productivity and Business Performance. En International Scientific Conference On Ict And E-Business Related Research (pp. 550–558), Sinteza, Belgrade, Serbia. http://doi.org/10.15308/Sinteza-2016-550-558

[41] Wang, X.; Li, X. R.; Zhen, F. et al. (2016). How smart is your tourist attraction?: Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach. *Tourism Management*, *54*, 309–320. http://doi.org/10.1016/j.tourman.2015.12.003

[42] Werthner, H. & Klein, S. (1999). *Information technology and tourism: a challenging ralationship*. Austria: Springer-Verlag Wien. Disponible en https://goo.gl/l0phpw

[43] World Tourism Organization [UNWTO] (2011). *Technology in Tourism* (Vol. 1). Disponible en https://goo.gl/Tzqay1

[44] World Tourism Organisation [UNWTO] (2017). *Why Tourism?* Disponible en https://goo.gl/hcE0c5

[45] Xiang, Z.; Magnini, V. P. & Fesenmaier, D. R. (2015). Information technology and consumer behavior in travel and tourism: Insights from travel planning using the internet. *Journal of Retailing, 22*, 244–249. https://doi.org/10.1016/j.jretconser.2014.08.005

Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect those or the position of the employer and the organisation associated to the author.