Progress on Technology Use in Tourism

Abstract

Purpose: With the rapid development and implementation of cutting-edge information technologies in tourism and hospitality, it is necessary to update the progress of technology use in the past 18 years and set up research agenda for future research. Adopting Information Systems (IS) as a reference discipline, this article aims to create a literature review of technology and tourism papers around the theme of use.

Design/methodology/approach: Following the systematic literature review process of Aguinis et al. (2018), 314 papers were downloaded to determine how they applied the concept of technology use.

Findings: Three themes about technology use emerged: types of processing, organisational use, and users. Among various types of technology processing, interactive and online are largely addressed in the tourism and hospitality literature. The organisational use theme explores how the competitive and strategic use of technology provides management support for organisations. There was a large amount of research focussed on direct users, such as individual characteristics, user attitudes, and user behaviour. The theories of TAM and UTAUT have been widely applied in these studies.

Originality/value: This paper provides a review of key issues which has been discussed in tourism research in relation to technology use. By applying the scheme developed in the IS discipline, this study provides new insights into the development of technology in tourism. In addition, it also gives us the opportunity to suggest a research agenda by identifying research gaps and future research collaboration opportunities between these two fields.

Keywords: processing, users, organisational, information systems, tourism, technology use

Article Classification: Literature Review

1. Introduction

Information technology use is one of the most explored areas in tourism technology since the 1980s (Buhalis and Law, 2008). With the rapid development and implementation of cutting-edge information technologies in tourism and hospitality, it is necessary to update the progress of technology use in Tourism in the past 15 years, and set up research agenda for future research. In the past 18 years, there have been other review articles in a similar vein carried out (Buhalis and Law, 2008, Law et al., 2009, Daniel Leung et al., 2013, Navío-Marco et al., 2018). While some reviews
focus on the specific use of mobile technology and social media in the tourism industry (Liang et al., 2017, Daniel Leung et al., 2013) others provide a more generic overview of the advancement of eTourism in this timeframe (Buhalis and Law, 2008, Navío-Marco et al., 2018). In contrast to these review papers, our paper specifically focuses on the technology use in tourism. Technology use has been recently touted as among the most central constructs in the Information System (IS) discipline (Straub and del Guidice, 2012). Subsequently, we believe a similar approach can be taken from a tourism technology perspective. Adopting IS as a reference discipline (Baskerville and Myers, 2002) enables a rigorous and comprehensive understanding of the progress on tourism technology use. Therefore, in this article, we aim to create a literature review of technology and tourism around the theme of use. The next section introduces the systematic literature review process followed in this research. The subsequent sections outline the key findings of the literature review process. Finally, the conclusion summarises the key research gaps and suggests opportunities for future research.

2. Methodology

We followed the systematic literature review process of Aguinis et al. (2018) as detailed below.

Step 1: Determine Goal and Scope of Review

The aim of this literature review focuses on the technology use, which has been recently touted as among the most central constructs in the Information System (IS) discipline (Straub and del Guidice, 2012). We apply this in the context of tourism research.

Step 2: Determine Procedure to Select Journals Considered for Inclusion

We downloaded papers from the following journals: Journal of Travel Research (JTR), Tourism Management (TM), Annals of Tourism Research (ATR), and the Journal of Sustainable Tourism (JST), These tourism journals were selected based on their high rankings (4* Academic Journal Guide 2018) within the Association of Business School’s (ABS) journal rankings. We also selected two key specialised technology and tourism journals, the Journal of Hospitality and Tourism Technology (JHTT) and Information Technology & Tourism (ITT). We also reviewed 6 review papers in this domain.

We downloaded papers based on a keyword search of “technology” within the title, abstract, or keywords for each journal using Scopus. We acknowledge that this keyword search may not retrieve all relevant papers, but it is the most widely used keyword and is often part of other terms such as “Information and Communication Technology”. Using this keyword also provided a more manageable sample. We downloaded papers from the years 2000 to October 2018 from Scopus (to ensure the most current research was included). The total number of papers downloaded for each journal is illustrated in table 1.
Step 3: Calibrate Source Selection Process through Inter-coder Agreement

Downloaded articles were then imported into NVivo for analysis. We ran a keyword query of the papers using the ‘use’ keyword list from Barki et al. (1993) and use terminology from (Burton-Jones et al., 2017). Based on the keywords discovered by the query, we then manually checked to see if the keyword was used in the correct context. If the context was incorrect, then the paper was disregarded. The authors discussed the keywords and the context to ensure that we were in agreement for a paper to be included or disregarded. The list of keywords used, and the number of codes matched to them, can be found in the appendix.

Step 4: Select Sources using Process Identified in Step Three

Each author took a sub-section of the keyword list and reviewed all papers within that section across all years and all journals:

- Author 1: Organizational Use of IS
- Author 2: Type of Support, Type of Processing
- Author 3: Users

Note: our keyword query did not find any papers from the sub-section Type of IS Access.

Step 5: Calibrate Content Extraction Process through Inter-coder Agreement

All authors read samples of the other authors’ codes and discussed and compared notes from the selected articles, and to ensure that we addressed the evidence of our codes within the correct context.

Step 6: Extract Relevant Content using Multiple Coders

Each author read the full text of each paper coded within their sub-section and made notes about how to ensure the code was being used correctly. Based on themes emerging from the coding process, each author re-structured and grouped their codes to ensure papers with a similar context and code were considered together. For example, we found that some papers within the ‘Type of Support’ category were better suited in the ‘Organisational Use’ or ‘Users’ category, based on the focus of each paper. All authors then reviewed the coding structure and agreed on the recommendations made by each author. All authors agreed on the common themes found in the paper and used this to structure the literature review.

3. Type of Processing

Information Systems can facilitate information processing, which includes data collection, processes for data analysis, knowledge transfer, and information display for organisations and consumers. In our
sample, we found tourism papers predominantly explored this from an interactive, online and real-time processing perspective.

3.1 Interactive

Interaction, among other factors, is an important issue for tourism, for example, e-commerce hotel bookings (Bilgihan et al., 2014), and social media marketing efforts (Tatar and Eren-Erdogmuş, 2016). In an early study of the use of the Internet in travel agents, Buhalis and Licata (2002) argued that tourism intermediaries must reengineer their business processes to remain competitive. Many of the studies examined interactivity from a tourism marketing perspective. Özturan and Roney (2004) examined the Internet use of travel agencies in Turkey, and found that their websites did not have the interactive features required for Internet marketing. Young Chung et al. (2011) explored the use of interactive thematic maps on tourist perceptions, using a network analysis. They found that interactive maps can play an important role in tourists’ planning behaviour, and for online tourism marketing.

Online interactive processing of information as used by marketers can also apply to other technologies such as virtual worlds used for building destination images (Yu-Chih Huang et al., 2013), or to knowledge-based network participation in destination and event marketing (Breukel and Go, 2009). Interactive reservations received through direct channels and online travel agencies, cause tourism service providers to interface with new intermediaries (DiGiorgio, 2016), while smart tourism destinations improve the co-creation of tourism experiences, and encourages greater interaction with tourists, and sharing of experiences (Buonincontri and Micera, 2016).

Other uses of interactivity were studied by image research and mobile devices. From the differences and commonalities between images of destinations, Govers et al. (2007) presented an interactive measurement approach for image research. From a study of mobile device use in private clubs, Morosan and DeFranco (2014) linked club members’ demographic and behavioural characteristics to their use of mobile devices in clubs. There were a number of differences between the types of clubs, as well as the origins of the participants. More recent studies of interactivity have focussed on interactive decision-making tasks to find a destination to travel as a group (Delic et al., 2018), and the impact of digital technology on public governance processes for destination management (Kalbaska et al., 2017).

3.2 Online

Online was by far the most common type of processing in our sample, and from a very wide range of topics. We were able to categorise our sample into further, but related, categories:

Information sharing – in the earliest research, electronic word of mouth (eWoM) was considered as a cost-effective means for tourism and hospitality marketing, but ethical issues must be considered to engage with eWoM technologies (Litvin et al., 2008). However, it is useful for targeting new
customers and planning effective marketing strategies (Rong et al., 2012). User-generated content (UGC) has increasingly been considered a credible form of eWoM (Stepchenkova and Zhan, 2013), and the sharing of videos has become more popular as a means to mediate tourist experiences (Tussyadiah and Fesenmaier, 2009). Photos are also a popular means of information sharing. People who post photos online tend to have higher incomes, are better educated, and from younger generations (Lo et al., 2011). Other forms of UGC include blogs, which can be used to help build a destination image (Tseng et al., 2015). Online information sharing can also be considered to model behavioural intentions to follow online travel advice from online communities (Lee and Hyun, 2015). These sources of information online can be further categorised in terms of specialization, endorsement, and other users’ star ratings (Choi et al., 2018). Two other examples of information sharing in tourism focussed on interoperability solutions for online tourism distribution (Reino et al., 2016), and the effect of management response in engaging customers (Chunyu Li et al., 2017).

**Information gathering** – initial research of technology use in tourism focussed around the apprehension toward Internet use (Susskind et al., 2003) for gathering information for tourism purposes, i.e. trip planning. In 2005, an analysis was completed to understand how information search for travel information behaviours evolved (Beldona, 2005). Earlier research also focussed on the accessibility of information online for disabled tourists (Shi, 2006), and how to identify the challenges and potential solutions for online marketing of travel destinations (Xiang et al., 2008). Another stream of research focused on the representation of information online and the understanding of travellers’ information needs as expressed through search engine queries (Xiang et al., 2009), and the effects that online information search had on tourists’ destination image development (Xiang Li et al., 2009), destination image formation (Llodrà-Riera et al., 2015), and how tourists’ search for information through alternative channels for more authentic and profound experiences (Xiang et al., 2015). More specific types of information are also sought, for example for the promotion of sustainable tourism for visiting world heritage sites (Garbelli et al., 2017), and for exchanges between hosts and guests in the sharing economy, for example couchsurfing (Germann Molz, 2013). While all of these studies focussed on the tourist or manager perspective, one study focused on the gathering of information by using advanced information technology for fire detection systems for protecting cultural heritage tourism resources (Joo et al., 2009).

**Websites** – an important tool related to information sharing and information gathering is the website. We found examples of tourism research from our sample which specifically discussed issues relating to the influence of website characteristics for planning a trip, (Kaplanidou and Vogt, 2006), how the design of a hotel website influences appeal and likelihood to purchase (Bender Stringam and Gerdes Jr, 2010), and how tourism websites influence consumer innovativeness for information search, purchasing, and communication (Couture et al., 2015).
3.3 Real Time

Real time processing is another, although less researched area of technology use in tourism, but is an important issue, especially regarding the use of mobile travel services (Bouwman et al., 2011). From the perspective of creative tourism, Ihamäki (2012) explored the use of geocaching in adventure tourist destinations, and provided broader implications for adventure tourism. Joo et al. (2009) examined a real time fire detection system for protecting cultural heritage resources. Daigle and Zimmerman (2004) described visitor characteristics using real time bus information, to address transportation problems. Zheng et al. (2017) focussed on the prediction of a tourists’ next location using GPS. Their research contributes towards tourist attraction administration and real time crowd control. Recognising the importance of this area, Hardy et al. (2017) developed a methodological approach for tracking tourists’ movements through smartphones and global positioning systems.

4. Organisational Use

Recently, a paper manifesto arising out of a JITT conference identified pivotal research topics in eTourism (Werthner et al., 2015), in this paper the authors paid special attention to the increasing strategic use of ICTs in Tourism. For this reason, in this paper, we also include organisational use of IT as one of our key topic areas. From our analysis of the organisational use of IS, we found research relating to support, competitive IS and strategic IS. Organisations, regardless of the industry they operate in, their location or size, depend on the strategic use of IS to become and remain competitive. In particular, technology affects competitive advantage as it determines the relative cost position or differentiation of organisations (Buhalis, 1998, Arvidsson et al., 2014).

4.1 Corporate or Management Support

The number of papers which focussed on corporate support or management support for ICT was sparse, and from a wide range of technologies and domains. Technology adoption that entails the commitment of substantial resources is typically viewed as a strategic decision by top management (Cheng and Lok, 2015). In their study, the authors found that the recognition of the ability of IT to generate revenue and reduce costs was vital before management support could be sought for any investment in new IT (Cheng and Lok, 2015). In a comparative study, Reino et al. (2011) found there were differences in inter-firm technology adoption in rural and urban accommodation establishments in Scotland. They use their study to theoretically explain different levels of adoption between the two settings. Additionally, from a corporate level of support, travel intermediaries can use ICT to maintain a competitive advantage, obtain information capabilities, and focus on their critical success factors to enhance travel supply chains through inter-organizational collaboration (Lin, 2016). In the food service industries, managers use multiple ICT innovations, and differing rates of diffusion stages than was previously thought. IT adoption and implementation in this industry also related to significantly sufficient capital (Ismail et al., 2013). Tourism managers may use Internet-based marketing
decision support systems. The use of these systems is highly dependent on a manager’s perceived ease of use, perceived usefulness, their experience in using similar systems, their attitude to ICT in general, and the complexity of the task and time pressures in the work environment (Woeber and Gretzel, 2000).

4.2 Competitive IS

There is a dual focus in the competitive use of IS, that of the enhancing the guest experience and of improving the revenue of tourism organisations through the more innovative use of technology.

In the first instance, Bilgihan and Wang (2016) interviewed vice presidents, CTO/CIOs of hotels, CEOs of hospitality technology vendors and academics who focus on hospitality technology research. They found that IT-induced competitive advantage is possible when hotels choose to integrate all the possible technologies in the organization with a harmony that creates synergy. Similarly, another study announces a paradigm shift away from away from management-facing technology to the new customer-facing technology, where the customer’s expectation of technology is at the forefront (Anne Coussement and J. Teague, 2013). Another study examined the use of interactive mobile technologies in enhancing the experiential value of guests (Wendy Zhu and Morosan, 2014). Tajeddini and Trueman (2014) provided a slightly different view, they investigated the role that national culture can play in using innovative technologies to retain competitive advantages.

The uptake of e-commerce has been well accepted as a means of gaining competitive advantage in the tourism industry (Hong-bumm Kim et al., 2009, Tsai et al., 2005). In terms of new technologies enhancing competitiveness from a management perspective, Buhalis and Licata (2002) discussed how traditional eMediaries must reengineer their business processes in order to survive and remain competitive by embracing the 3 new ePlatforms - the Internet, interactive digital television and mobile devices. Similarly, Höpken et al. (2015) discuss a novel way to utilise business intelligence to increase the competitiveness of a Swedish mountain destination. Fevzi Okumus (2013) discussed how organizations can facilitate knowledge management (KM) and thus gain a competitive edge through information technology (IT) tools. In order to achieve this, hospitality organizations not only need to create a supportive organizational culture and structure, but also train and motivate their team members to manage knowledge through IT applications. Another study investigated how social networks can become the primary tool for promoting tourist destinations and reaching a wider range of potential visitors to create competitive advantage in the market (Di Pietro et al., 2012).

A study based in Taiwan found different types of travel operations have different evaluation considerations for an application service provider (ASP) adoption. Travel intermediaries can devote to their core competencies, and acquire information support services through an ASP. On the other hand, ASPs can use differentiation strategies and allocate limited resources by focusing on these critical success factors to enhance inter-organizational collaboration in the travel supply chain (Lin, 2016).
Further studies focus rather more on more explanatory factors that relate to improving competitiveness, for example, why do tourist organisations adopt e-Marketing (El-Gohary, 2012), why are internet based marketing decision support systems successful (Woebér and Gretzel, 2000). Interestingly, the majority of these studies rely on the Technology Acceptance Model (Davis, 1989) to provide theoretical support for their studies.

4.3 Strategic IS

The continuing development and widespread adoption of information technology (IT) have deeply influenced the tourism and hospitality industry, especially on a strategic level (Tae Goo Kim et al., 2008, Garces et al., 2004).

Cabiddu et al. (2013) examined how IT enables value co-creation and strategic advantage in tourism and why some players appear to appropriate the value co-created in the partnership more successfully compared to others. Similarly, Buonincontri and Micera (2016) discuss how involving tourists as active co-creators of their own experiences has given rise to a new kind of destination, a smart tourist destination, where technologies are so embedded in all tourist experiences that leads to the increased competitiveness of the destination. The importance of maintaining a successful network of actors is important for this to occur, Breukel and Go (2009) suggested that modern ICT may offer support to establishing hospitality networks that shape a physical and virtual environment for the delivery of services to developing client demands. Some studies indicate the importance of using technologies in a strategic manner especially in terms of social media and online presence. For example, Xi Y Leung et al. (2017) and Wozniak et al. (2017) examined the importance of strategic social media message strategies while Baggio et al. (2011) focused on general online web presence strategies. Also important are other IT solutions such as the adoption of interoperability solutions for online tourism distribution (OTD) (Reino et al., 2016), the vast number of applications that near field communication technologies have for the tourism industry (Egger, 2013), the use of intelligent context-aware recommender system that takes into account temporal and social context in tour guide applications (Meehan et al., 2016) or the strategic use of Customer Relationship Management systems in tourism as a whole (Vogt, 2011, Mohammed et al., 2017).

The use of ICT to promote sustainable tourism has garnered some attention from scholars too (Ali and J. Frew, 2014, Garbelli et al., 2017, Isacsson and Gretzel, 2011, Ali and Frew, 2014). Ali and J. Frew (2014) talked about the ability of ICTs to provide novel ways of approaching marketing, energy monitoring, waste management, and communication for destinations, while Garbelli et al. (2017) suggested how ICTs could be used in order for a destination to offer a proper and complete online communication, to educate travellers about the several implications of being a WHS and about a sustainable and responsible behaviour in case they choose to visit it. Finally, Isacsson and Gretzel (2011) discuss how Facebook can be used to engage students in learning about sustainable tourism.
On the other hand, we only found a few studies that looked at the use of ICTs for strategic purposes in destination marketing (Buhalis, 2000, Ali and Frew, 2014, Gon et al., 2016, Dickinger and Lalicic, 2016).

Another thread in this area of research was exploring what kind of firms are more likely to embrace different types of technology for strategic purposes. Spencer et al. (2012) explored the factors influencing the decision to engage in technology adoption in small owner-managed travel firms. El-Gohary (2012) indicated that environmental pressures significantly affect the perceived benefits and barriers of e-commerce adoption, in addition to having an indirect effect on adoption behaviour in tourism SME’s in developing countries. Siguaw et al. (2000) concluded that luxury and upscale hotels adopted more IT than economy and budget hotels. Eugenia Ruiz-Molina et al. (2013) explored the use of ICTs in established and emerging tourist areas. They found that the reasons for making use of ICT may differ: while hotels located in established tourist destinations may use technology in order to differentiate themselves from the competition in the local market, hotels in emerging destinations may try to attract Western tourists who are looking for something different. Finally, Hsu et al. (2016) explored how established inbound tour operators (ITOs) are increasingly forced to embrace technology-enabled innovations to keep up with their increasingly digital savvy tourists.

Studies also found that the use of IT does not occur in a uniform manner, instead, there are different stages of adoption within organisations. For example, Yuan et al. (2006) found that advancements in IT in American convention and visitor bureaus did not spread uniformly across four information activity dimensions and appear to occur in five recursive and sequential stages, namely: substitution, enlargement, gestation, reconfiguration, and setback. Fareed Ismail et al. (2013) investigated how three organizational factors – affiliation, sufficient capital and company age – related to 323 Malaysian foodservice companies' diffusion of six information technology (IT) applications. Their study highlights multiple diffusion stages for multiple technological innovations in organisations.

5. Users

Information Systems are used by users at all levels of an organisation and can provide various types of support. There was a large amount of research focussed on users and sub-categories such as individual characteristics, user attitudes, user support, and end-user attitudes and behaviour.

5.1 Individual Characteristics

Studies find that individuals’ backgrounds, demographic profiles and intentions largely determine the various patterns of technology use. Comparing the differences between travellers from Australia, China and the US in terms of technology readiness (TR) and customer satisfaction with travel technologies, Yi-Shun Wang et al. (2016) found out the relationships between perceived quality and satisfaction of technology-enabled services, overall satisfaction, and further behaviour were stronger
among travellers with high TR and varied across countries. San Martín and Herrero (2012) found that the higher level of innovativeness of users, the more likely they purchase rural tourism products. Darley et al. (2017) investigated senior caravan travellers’ characteristics and behaviours for SNS use in Australia.

Segmentations are proposed to develop a more strategic targeting plan in various contexts. Four user categories of mobile travel services were identified by Eriksson (2014) to provide insights for travel service providers. Lallicic and Weismayer (2016) categorised three types of tourists in terms of their emotional engagement with their mobile phones. Yuan et al. (2003) classified American convention and visitor bureaus into five adopter groups, and two paths of technology use. Morosan and DeFranco (2014) used actual mobile devices data to offer a systematic operationalization to distinguish private club members’ behavioural and demographic characteristics in different types of clubs as well as different regions in the USA. Using cluster analysis, Lo et al. (2011) classified 5 cohorts of users in terms of different travel motivations, demographic profiles and the choice of online platforms to share travel photos. This finding provides implications for destination promotions.

5.2 User expectations

User expectations of technologies have been widely explored in various contexts. In the context of e-learning in the tourism and hospitality course, students’ expectations from Egypt are influenced by interpersonal, external and instructor these three social factors (Abbas, 2016). Some studies provide implications for organisations to meet users’ expectations. By gaining emotional insights of passenger’s airport experiences, Straker and Wrigley (2016) suggested airports can generate suitable digital channel engagement content to meet passengers’ expectations. On a conceptual level, Coussement and Teague (2013) addressed the paradigm shift from management-facing technology to the new customer-facing technology in the hospitality industry. This helps the industry better manage customers’ expectations by developing suitable mobile technologies.

Providers are required to integrate desirable features when developing new technologies to meet users’ expectations. In the tourism and hospitality context, user requirements focus on conditions and criteria to develop new applications. Content requirement, functional requirement, comfort, experience and resistance are significant user requirement for developing the wearable AR museum application (tom Dieck et al., 2016). Given the heavy reliance of location-based recommendation in tour guide application, Meehan et al. (2016)’s study found that environmental, temporal and social these three contextual conditions at a significantly higher level of influence in mobile recommender systems.
5.3 User Support

In terms of research into ICT from a perspective of user support, studies investigated the supportive role of interactive mobile technologies in hotel guests’ facilitation of transactions. The adoption of these technologies can mediate the experiences of guests in hotel service settings, with importance placed on cognitive absorption, playfulness, and security (Wendy Zhu and Morosan, 2014). Virtual worlds, such as Second Life, can provide visual 3D representations of destinations, and have also been used in the travel and tourism industry for marketing tourism destinations, and business management. The experience and behavioural intentions of tourists’ to use virtual worlds is related to positive emotions, enjoyment, emotional involvement, and flow experience. Social media sites also allow for visual representations of destinations through user-generated content such as the sharing of images. User-generated content has become a new and credible form of word of mouth, as tourists share their images and travel experiences with their social networks. The types of images uploaded by destination marketing organisations, when compared with those uploaded by users, can provide a useful means for tourists’ destination image (Stepchenkova and Zhan, 2013). Ribeiro et al. (2018) explored the potential of mobile technologies can provide supports for disabled tourists to engage in tourist activities.

5.4 End User Attitudes and Behaviours

When looking at consumers, most studies focus on direct users and end users given the increasing user confidence and the improvement from providers. Influential factors of consumers’ intentions and satisfaction were largely explored in the context of online reservation systems (Woo Gon Kim et al., 2006, San Martin and Herrero, 2012, Gregorash, 2016), firm-hosted online travel communities (Casaló et al., 2010), implementation of eVisa (Çakar et al., 2018), and registered traveller biometric system in air travel (Morosan, 2013). Other research has explored the factors affecting intentions for online purchasing generally (Amaro and Duarte, 2015), and more specifically the intentions of purchasing flights from low-cost carrier websites (Escobar-Rodriguez and Carvajal-Trujillo, 2014). Oppositely, Huertas (2018) and Dinhopl and Gretzel (2016) look at how the use of new technology (videos) influence and construct tourists’ travel behaviour and experiences. Related to consumer behaviour, the idea of trust has been emphasised (Agag and El-Masry, 2017, Jungsun Kim et al., 2017) when perceiving new technologies. Content providers, such as tourism boards, are considered the able information providers, however, user-generated content appears to be the most trustworthy, although not necessarily the most informative (Dickinger, 2011).

Technology Acceptance Model (TAM) has been widely adopted to discuss users’ attitudes and behavioural intention. It has been utilised as a theoretical construct to understand factors that influencing users’ attitudes and intentions of technology use, such as the interrelationship of travellers’ attitudes towards travel mobile applications with utilitarian and hedonic motivations, and
self-identity (Young Im and Hancer, 2014), gender differences in terms of technology acceptance in the high-power conditions (Lu Zhang et al., 2014), factors that influence tourists’ acceptance of mobile electronic tourist guides (METG). TAM also used as a useful model to explain why many customers not using mobile applications from the hospitality firms (Kwon et al., 2013).

Some studies extend and modify TAM with other variables and/or theories to investigate users’ attitudes and behavioural intentions in their contexts. Balouchi et al. (2017) examined influences of TAM and variables of perceived enjoyment, perceived source credibility and perceived risk in the behavioural intention in accepting consumer generated contents (CGC) in the context of Iran. Park et al. (2014) looked at how franchise support, which is not included in the original TAM, affects attitudes towards franchise intranet usage in quick service restaurants (QSR). Straker and Wrigley (2016) developed the TAM by proposing to include emotional drivers as influences in the use of digital channels in their study of passengers’ airport experience. Therefore, TAM has been widely extended with contextual factors to understand tourists’ acceptance of social media for the choice of destination (Di Pietro et al., 2012), biometric systems (Morosan, 2012), consumer-generated media (CGM) usage for travel planning (Ayeh et al., 2013), and airline BC2 e-Commerce websites (Hong-bumm Kim et al., 2009).

In some studies, TAM is combined with other theory (ies) to develop the theoretical framework. Jen-Min Huang et al. (2015) used TAM and readiness model as the research structure to investigate the user’s intention golfers towards golf GPS. By examining the applicability of the TAM and Hedonic Theory, (Yu-Chih Huang et al., 2013) developed a research framework to identify the factors that affect tourists’ experience and behavioural intentions within a 3D tourism destination. From a generational perspective, (Sox et al., 2016) synthesised a theoretical model of technology use within meetings by investigating how attendees’ experiences and the basis of the Generational Cohort Theory (GCT) influence the TAM. Integrated TAM with the theory of reasoned action, the theory of planned behaviour, and the innovation diffusion theory, Amaro and Duarte (2015) proposed and test a model of consumers’ intentions to purchase travel online. Casaló et al. (2010) provided a framework that integrates TAM with the Theory of Planned Behaviour and Social Identity Theory to explain the intention to participate in firm-hosted online travel communities.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is another widely used theory in tourism technology research. UTAUT was developed by Venkatesh et al. (2003) to predict user adoption of an information technology. Venkatesh et al. (2003) found that performance expectancy, effort expectancy, social influence and facilitating conditions are the main factors determining user adoption. Escobar-Rodriguez and Carvajal-Trujillo (2014) applied an extended UTAUT model to examine key determinants of purchasing flights from low-cost carrier websites. San Martín and
Herrero (2012) established a theoretical model that includes psychological factors that influence tourists’ online purchase intention in rural tourism. Based on the UTAUT-2 framework, Gupta et al. (2018) found that performance expectancy, social influence, price saving, perceived risk, perceived trust and prior usage habits are significant predictors that affect tourists’ intention of using travel apps.

Some studies synthesize new framework or theory to understand tourist behaviours of technology use. Dan Wang et al. (2014) proposed a new framework to understand the holistic understanding of smartphone use for travel that integrates the mechanism shaping the adoption, use and impact of smartphones. Tingting Zhang et al. (2015) proposed a conceptual model that suggest brand equity, sense of community and monetary incentive are three main motivations for customer engagement in online co-innovation communities (OCCs). In Dinhopl and Gretzel (2016)’s conceptual study, the theory of tourist videography was proposed to establish a foundation of various social practices in relation to tourists’ video taking on holiday. Synthesising previous research, Bendegul Okumus and Bilgihan (2014) developed a conceptual model to test users’ intention of using mobile applications as a tool to promote healthy eating in the restaurant.

6. Discussion and Conclusion

6.1 Concluding thoughts

In this paper, we adopt Barki et al. (1993)’s keyword classification scheme to provide a rigorous and comprehensive understanding of the progress on technology use in tourism. Around the theme of use, we found that research has been widely conducted in both organisational and individual levels with focuses in certain areas. In tourism and hospitality organisations, innovative technologies are used by managers as a strategic tool to maintain a competitive advantage, develop marketing strategies, or support their decision makings. In addition, the recent development of technology such as the interactive feature of the information technology, virtual world, and wearable AR applications also enable tourism and hospitality providers to design a wide range of experiences. One key goal of adopting new technologies is to achieve high levels of user satisfaction. A large amount of research focuses on the consumers, ranging from their expectation, attitudes and behaviours towards various forms of technologies in different tourism and hospitality settings. Among these, eWoM and mobile technologies have been largely explored (Munar and Jacobsen, 2014, Young Im and Hancer, 2014), given the increasing confidence of consumers as well as the development of ICT and e-platforms. Our findings are illustrated in figure 1. The figure is organised by major keyword themes. Bolded keywords above the line were found in our analysis, while un-bolded items below the line were missing from the literature. Based on the focus of the papers, we reclassified [User Support] and [Corporate or Management] research into different categories. Additionally, we found no research from the ‘Type of Access’ category.
6.2 Theoretical Implications

In terms of theories, information system theories such as UTAUT, TAM, Hedonic Theory, and Innovation Diffusions Theory are widely adopted or extended in various tourism and hospitality context to understand technology use. In addition to IS theories, these articles also widely adopt concepts from other fields and disciplines such as Cognitive Absorption, postcolonial theory and theory of tourist motivation, the theory of affordances and the theory of planned behaviour. Furthermore, there are several conceptual papers developing new frameworks and/or theories to understand technology use.

Future research can broaden the choice of IS theories. Two particular theories that could be borrowed from the information systems field is that of adaptive structuration theory (DeSanctis and Poole, 1994) and task-technology fit theory (Goodhue and Thompson, 1995). The basic reasoning of adaptive structuration theory is that of how information systems work. System designers embed their own intentions (spirit) into the functioning of the systems, but that users “adapt” these to their own needs (appropriations) and thus use the system in unintended ways (Straub, 2012). These kinds of workarounds result in new ways to use systems which designers respond to in subsequent redesigns. From a tourism information technology design point of view, this could be an interesting theory to apply in terms of how technology evolves over time according to use. On the other hand, the task-technology fit theory asserts that users, depending on the relevant tasks at hand, make conscious choices of best-fitting technologies before they use systems (Straub, 2012). Again this could be applied to the tourism field in terms of how and why users choose information systems for their specific purposes.

Studies of technology use can be further explored by exploring various critical turns of theories, such as mobilities turns, performance turn, late modernity and queer theory in order to contribute to critical tourism and hospitality studies. Issues such as the critics of ubiquitous connectivity during the holiday, ICT roles in the social inclusion in the holiday space, and ethical concerns the robotic use in the hospitality sector are worthy of further investigation.

6.3 Practical Implications

Our paper has delineated the research in this area into three main categories: type of processing, organisational use, and users. This is a useful way of categorising the main uses of technology in tourism. That is, managers for example, can and should deal with future IT-related issues by integrating the innovative uses of IT into their strategic business plans. One way to do this is to simultaneously be aware of changing IT technology that could benefit the bottom line of tourist organisations, and being aware of changing tourist perceptions, expectations and increasing digital
savviness. The way data is collected, stored and analysed is also important to consider due to changes in data protection laws in Europe for example, and future research could explore more ways to make this interactive, online, and to provide information processing in real-time.

6.4 Limitations and Future Research

This literature review article focuses on four high impact tourism journals and two specialised tourism and technology journals. Although the selection criteria ensures the quality and impact of reviewed papers, some relevant research published in other journals or proceedings could be potentially excluded. Future research can review a wider scope of journals and books in order to achieve a comprehensive understanding. This article applied Barki et al. (1993)’s keyword classification scheme of IS use. In figure 1, we illustrate that tourism and technology studies only focus on certain use themes, and there are a wide range of themes in IS use which are under-researched. Tourism and IS academics can look for potential topics to research in these areas.

References


Ayeh, J. K. et al. (2013), "Predicting the intention to use consumer-generated media for travel planning", Tourism Management, 35 132-143.


Casalò, L. V. et al. (2010), "Determinants of the intention to participate in firm-hosted online travel communities and effects on consumer behavioral intentions", Tourism Management, 31 (6), pp. 898-911.


Hsu, A. Y.-c. et al. (2016), "In-destination tour products and the disrupted tourism industry: progress and prospects", *Information Technology & Tourism*, 16 (4), pp. 413-433.


Straub, D. (2012), "Editor’s comments: does MIS have native theories?", MIS quarterly, 36 (2), pp. iii-xii.


http://mc.manuscriptcentral.com/jhtt
Appendix

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Figure 1: Findings