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Corresponding Author	Family Name	<b>Moisa</b>
	Particle	
	Given Name	<b>Delia Gabriela</b>
	Suffix	
	Organization	University of Derby
	Address	Buxton, UK
Author	Family Name	<b>Michopoulou</b>
	Particle	
	Given Name	<b>Eleni (Elina)</b>
	Suffix	
	Organization	University of Derby
	Address	Buxton, UK
	Email	E.Michopoulou@derby.ac.uk
Abstract	<p>Accelerating levels of stress and chronic disease have urged travellers to seek products and experiences that promote a holistic healthy living. However, in the context of increasingly integrated online and offline experiences, where technology does not always work in concert with human nature, tourists are facing the challenge of finding about how to best live a connected life. With travel being one of the most stress-inducing experiences we voluntarily subject ourselves to, tourism players are taking advantage of the latest technology to respond to the travellers' changing needs and values, by designing innovative experiences that promote overall well-being. This chapter provides a review of the existing research on well-being related to the travel and tourism sector, while focusing on the link with technology advancements, especially the dual perspective of unplugging and intense technology use. As in all great technological revolutions, the digital traveller's life may potentially unveil a dark side. However, the general consensus is that the positives of using technology within the travel and tourism sector will continue to outweigh the negatives. The chapter focuses on highlighting the different types of technology used to support the traveller's state of well-being, as well as the role and impact of technology in relation to well-being while travelling.</p>	
Keywords (separated by "-")	Well-being - Travel - Tourism - Digital - Technology - Wellness	

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## 2 IT and Well-Being in Travel and Tourism

3 Delia Gabriela Moisa and Eleni (Elina) Michopoulou

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### 17 Abstract

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19 products and experiences that promote a holistic healthy living. However, in the  
20 context of increasingly integrated online and offline experiences, where technol-  
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D. G. Moisa (✉) · E. (Elina) Michopoulou  
University of Derby, Buxton, UK  
e-mail: [deliagmoisa@gmail.com](mailto:deliagmoisa@gmail.com); [moisa.delia@yahoo.com](mailto:moisa.delia@yahoo.com); [E.Michopoulou@derby.ac.uk](mailto:E.Michopoulou@derby.ac.uk)

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29 unplugging and intense technology use. As in all great technological revolutions,  
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32 tourism sector will continue to outweigh the negatives. The chapter focuses on  
33 highlighting the different types of technology used to support the traveller's state  
34 of well-being, as well as the role and impact of technology in relation to well-  
35 being while travelling.

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### 36 Keywords

37 Well-being · Travel · Tourism · Digital · Technology · Wellness

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### 38 Introduction

39 Developments in mobile networks, mobile devices and apps, broadband, cloud  
40 computing, and online communities have altered the travel and tourism landscape  
41 (Xiang et al. 2015; Hannam et al. 2014; Paris 2011). Being “constantly connected”  
42 impacts not only our mental health, family, and work but many other aspects of  
43 our daily life as well as the way people travel and experience travel services and  
44 destinations.

45 As consumers in developed countries rate “time to relax” within the top three  
46 priorities in life (Pyke et al. 2016, 94), the market for holidays focused on well-  
47 being is growing exponentially (Voigt and Pforr 2014) while promoting the concept  
48 of hedonic well-being, where happiness and pleasure are prioritized (Ryan and  
49 Deci 2001). Although the notion of well-being first emerged as an economic  
50 term focusing primarily on wages and income inequity (Sen 1993), it later gained  
51 popularity among psychological studies, extending its meaning from objective to  
52 subjective measures in human life (Piuchan and Sontikul 2016). Simultaneously,  
53 the productivist approach to tourism and leisure, which viewed vacations as a source  
54 of employment and necessary support for work, underwent a process of refocusing  
55 on the “self,” manifested through a growth in medical-, spiritual-, wellness-, and  
56 health-related areas of tourism experiences and products (McCabe et al. 2011).

57 The relationship between the concepts of travel and well-being has been high-  
58 lighted throughout the years, as previous studies emphasize the complex ways  
59 in which tourism can influence cognitive, emotional, psychological, and spiritual  
60 dimensions of well-being, impacting both tourists and destination communities  
61 (Diekmann and McCabe 2017; Paris et al. 2015; Berger and Paris 2014). Chen  
62 and Petrick's (2013) comprehensive review of the literature on health and wellness  
63 revealed positive effects of travel experiences, involving both cognitive and affective  
64 components. As such, domains of health, interpersonal relationships, and overall life  
65 satisfaction are positively affected by travels (Nawijn et al. 2012).

66 The travel and tourism industry adopts various technologies to improve oper-  
67 ational efficiencies and meet customers' expectations, including augmented and

68 virtual reality (AR and VR), artificial intelligence (AI), Internet of Things (IoT),  
69 voice technology, Wi-Fi connectivity, and wearable devices (Global Data Plc 2018).  
70 However, the increasing digitalization of society has been identified as a risk factor  
71 reducing social inclusion, weakening social ties, and increasing stress levels. For  
72 this reason, tourists are choosing to be “unplugged” while travelling, enjoying  
73 tech-free experiences in search of a therapeutic rehabilitation, an escape from  
74 “connectedness” (Egger et al. 2020; Cai et al. 2019; Paris et al. 2015; Pearce and Gretzel  
75 2012).

76 However, digital technologies may offer one mechanism to enhance social  
77 inclusion (Hill et al. 2015) and facilitate and enhance travel- and tourism- related  
78 experiences, depending on the purpose we decide to use it for. To illustrate this, in  
79 spas, for example, people are generally requested to unplug and leave their mobile  
80 phones and other electronics in the locker room. Nonetheless, completely banning  
81 technology is not necessarily a way to increase well-being. These technologies  
82 can support not only the staff by allowing a more efficient and personalized guest  
83 service but also the guest as well by direct booking systems, scheduling service  
84 delivery, and mobile check-in, allowing for the creation of a seamless and relaxing  
85 guest experience (SMS 2017). Hotels also expanded on their version of a healthy  
86 room, with hoteliers including Four Seasons and Swissôtel starting to incorporate  
87 health-boosting technologies such as aromatherapy, special lightning to counter jet  
88 lag, special air purification systems, and dawn simulator alarm clocks to improve  
89 wellness and enhance well-being (Powell 2017).

90 This chapter discusses issues in the crossroads of well-being, travel and tourism,  
91 and technology. In order to do so, the first section describes the concept of well-  
92 being and how it is understood within the travel and tourism sector. The following  
93 section introduces the technological developments starting from virtual realities,  
94 Web 2.0, to mobile and social technologies which lead to a modification of the  
95 traditional contours of tourism. These technologies generated new types of tourists,  
96 who want access to unique experiences, where personalization of services is key.  
97 In view of the above considerations, the travel and tourism industry started using  
98 technology to its advantage, and through the use of VR, AR, AI, and IoT, the  
99 industry works towards improving the traveller’s experience. However, the impacts  
100 of these technologies may affect the traveller’s well-being both from a positive  
101 and also from a negative perspective, as discussed within the fifth section of the  
102 chapter. Finally, concluding remarks are forwarded, as well as suggestions for  
103 further research.

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## 104 Defining Well-Being

105 The Industrial Revolution that took place two centuries ago marked the concept  
106 of well-being as an established criterion in studies of economic performance of  
107 countries based on the measures of their gross domestic product (GDP) (Kendall  
108 2014; Van Zanden et al. 2014). However, the traditional quantitative assessments  
109 of well-being deriving from measures such as education, wages, life expectancy,

110 income inequity, personal security, and environmental quality have been criticized  
111 by Amartya Sen, a professor of economics, who raised awareness upon the human  
112 values of well-being (Sen 1993). Consequently, the traditional view of well-being as  
113 related to wealth was replaced with a more subjective approach defined as subjective  
114 well-being (SWB), a perspective of “happiness studies,” which incorporates both  
115 positive and negative measures of mental health and satisfaction (McCabe and  
116 Johnson 2013; Diener 1984).

117 Although a philosophical and sociological concern since the beginning of time,  
118 well-being expanded its meaning over time, and it has been encompassed into  
119 disciplines such as economics, psychology, and health sciences. While there is  
120 no general agreement around a single definition of well-being, there is consensus  
121 around the minimum implications the term brings, as these include positive  
122 emotions such as happiness, contentment, satisfaction with life, fulfillment, positive  
123 functioning, and the absence of negative emotions such as anxiety or depression  
124 (Ryff and Keyes 1995; Andrews and Withey 1976; Diener 2000; Frey and Stutzer  
125 2002). Researchers encompassing various disciplines agree upon the various aspects  
126 of well-being, as they include not only economic, social, physical, and psychological  
127 elements, but it also relates to life satisfaction, development and activity, domain-  
128 specific satisfaction, engaging activities, and work (Eid 2008; Kahneman et al. 2004;  
129 Keyes CLM 2002; Diener 2000; Diener et al. 1999; Csikszentmihalyi 1991).

130 Individual well-being is dependent upon good health, positive social relation-  
131 ships, and availability and access to basic resources including shelter and income  
132 (CDC 2018). Konu et al. (2010) confirm that well-being often refers to the basics  
133 of life that are measurable, such as education, availability of food and service, and  
134 standard of living, but it can also entail more abstract aspects, such as freedom. The  
135 concept is often viewed as nonmaterial well-being, which can be pursued through  
136 nature, relaxation, peace, and getting away from everyday routines (Veenhoven  
137 2008). Thus, in addition to social, mental, and physical aspects, well-being is  
138 greatly influenced by the interaction with cultural, social, and natural environments  
139 (Grénman and Räikkönen 2015). In other words, the optimum tourist well-being  
140 combines hedonic, altruistic, and meaningful experiences (Smith and Diekmann  
141 2017), while its subjective nature highlights its dependability to a specific context,  
142 culture, time, or place (Smith and Puczko 2009).

143 Diener (2000) acknowledges the association with sociodemographic studies and  
144 personality but also religion and spirituality (Bimonte and Faralla 2015) relating  
145 to the state of well-being. Moreover, it must be noted that the level of well-being  
146 differs across various countries. Within the most economically developed societies  
147 where there are low levels of corruption and citizens’ basic needs for food and health  
148 are met, there is a higher life satisfaction and well-being (Frey and Stutzer 2002;  
149 Diener et al. 2009). Cultural factors including social norms, individualism versus  
150 collectivism, etc. also impact national estimates of well-being (Helliwell and Huang  
151 2008).

152 In tourism, studies of well-being focus much less on biomedical health, but  
153 they are closely related to leisure-related phenomena, with an emphasis on lifestyle  
154 and mentality (Chang and Beise-Zee 2013; Hjalager and Flagestad 2012; Corvo

155 2011; Smith and Puczko 2009). As Konu and Laukkanen (2010) confirm, well-  
156 being is fundamentally linked to tourism's role of recreation and relaxation, and  
157 the phenomenon started gaining attention in the early 2000s. Since then, studies  
158 demonstrated that tourism contributes to an increased level of happiness and life  
159 satisfaction of tourists, with travel providing benefits for one's spirit and well-  
160 being (Alizadeh and Filep 2019; Bimonte and Faralla 2015; Tuo et al. 2014; Filep  
161 and Pearce 2013; Nawijn et al. 2012; Corvo 2011; Nawijn 2011a, b). Researchers  
162 in tourism regard well-being as a synonymous concept to subjective well-being,  
163 quality of life, and life satisfaction (Bimonte and Faralla 2015).

164 A major challenge concerning both academia and the tourism industry is  
165 represented by the conceptual confusion related to the key terms "wellness" and  
166 "well-being." Without a commonly accepted definition in the literature, the term  
167 "wellness" is used interchangeably with "well-being" (Huijbens 2011; Konu et al.  
168 2010; Mintel 2004). While both concepts involve a balance of mental, physical,  
169 and social well-being, the concept of "wellness" holds different shades of meaning  
170 compared to the concept of "well-being." Well-being is viewed as a wider concept  
171 often associated with economic factors, involving standards of living, education,  
172 and subsistence but also subjective factors regarding life satisfaction, quality of  
173 life, and happiness. Wellness, however, involves the individual's self-responsibility  
174 and lifestyle. In tourism research, well-being is associated with physical activity,  
175 active enjoyment, and professional training, whereas wellness refers to a lifestyle  
176 of self-discovery, pursued through proactivity and conscious decision-making,  
177 passive enjoyment, and pampering through beauty treatments and spas, for example  
178 Grénman and Rääkkönen (2015).

179 The concept of well-being in tourism has been studied from various perspectives  
180 including the relationship between tourism and well-being as tourists' happiness  
181 in vacation (Nawijn 2011a, b), the attitudes of locals and residents to tourism  
182 development-related issues (Park and Yoon 2009), and using the notion of well-  
183 being to promote destinations (Chang and Beise-Zee 2013). Chang and Beise-Zee's  
184 (2013) study demonstrates the congruence between consumer belief and location  
185 attributes. Therefore, a health-promoting destination eases the visitors' psychologi-  
186 cal stress by offering emotional value which supports well-being. Similarly, Nawijn  
187 (2011a, b) confirms that people who take vacations tend to be happier than those  
188 who do not, as the memories of vacations produce positive effects in their lives.  
189 Ultimately, the notion of well-being continues to gain popularity in the travel and  
190 tourism field, as tourism studies have become more focused on the subject.

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## 191 Technology and Well-Being

192 The travel and tourism industry has always been at the forefront of technology  
193 (Sheldon 1997). Considering its status, as being one of the fastest growing industries  
194 in the world, the travel and tourism industry took advantage of the technological  
195 opportunities, ascribing technology a key role not only in the operation but also  
196 within the structure and the strategy of tourism organizations (Buhalis 2003; Buhalis

197 and Law 2008), innovation of products and processes (Hjalager 2010), and in  
198 facilitating opportunities and attracting and retaining tourists (Hjalager 2010). As  
199 early as 1998, Pine and Gilmore noted that emerging technologies generate new  
200 types of tourists. The proliferation of the Internet fostered the new presuming tourist,  
201 one who is empowered and more knowledgeable in the search for experiences and  
202 extraordinary value (Buhalis and Law 2008).

203 The successive emergence of the Web 2.0 and social media involved more  
204 fundamental changes for the tourism industry by converting it into a space of  
205 social networking and collaboration (Sigala 2009). This economic, social, and  
206 technological trend created the basis of the next generation of the Internet, where  
207 users are more mature, distinct, and characterized by openness, more connectivity,  
208 and greater activity within the online environment (O'Reilly 2006). The emerging of  
209 new mobile and social technologies including mobile applications, tablets, laptops,  
210 smartphones, and social media expanded and completely modified the traditional  
211 contours of tourism (Germann Molz and Paris 2013; Michopoulou and Moisa 2016;  
212 Paris 2012; Wang et al. 2012; White and White 2007).

213 Considering its impact, the challenges that arise with the technological develop-  
214 ments are undisputable (Gretzel et al. 2006; Benckendorff et al. 2005). The advent  
215 of technology has not only caused fundamental changes, but it revolutionized the  
216 entire nature of the travel and tourism industry, starting from the way travel is  
217 planned (Buhalis and Law 2008) to the way the tourism product is created and  
218 consumed (Pralhalad and Ramaswamy 2003; Stamboulis and Skayannis 2003).  
219 In these processes, tourists are supported by information and communication  
220 technologies (ICTs) throughout their various activities, such as preliminary infor-  
221 mation search, decision-making, communication, retrieval of information, and  
222 post-sharing of experiences by using a wide range of tools, including websites,  
223 virtual communities, and mobile technologies that enhance and facilitate these  
224 actions (Buhalis 2003; Michopoulou and Moisa 2016; Gretzel et al. 2006). One of  
225 the most significant changes to tourists experiencing travel involves the development  
226 of mobile technologies, which allows them to be constantly connected, with access  
227 to information anytime and anywhere (Buhalis and Sinarta 2019; Wang et al. 2016;  
228 Green 2002). According to Germann Molz and Paris (2013), tourism can be viewed  
229 as a complete "assemblage" of portable technologies, virtual spaces, infrastructure,  
230 networked spaces, and bodies flowing through various mobilities. Multiple studies  
231 confirmed the major impact of ICTs on tourism experiences (Crouch and Desforges  
232 2003; Stamboulis and Skayannis 2003; Tussyadiah and Fesenmaier 2007, 2009),  
233 and most of them recognized technology's importance through exemplifying single  
234 scenarios of use in the context of the tourism experience (e.g., Prahalad and  
235 Ramaswamy 2004, Binkhorst and Den Dekker 2009, and Ramaswamy 2009). As  
236 travellers incorporate mobile technologies into their daily practices and further  
237 expand them into digital spaces, they often reconfigure their performativities and  
238 sociabilities. For example, the virtualization of the backpacker culture, a segment  
239 of tourists that use technology extensively, allows backpackers to maintain a  
240 sustained state of copresence with the backpacker culture online by being fully  
241 integrated into multiple networks (Paris 2010). Virtual backpacker spaces have been



242 found to provide opportunities for negotiating restricted physical mobility and the  
243 development of a sense of community and shared tourism experiences, important  
244 elements contributing to the traveller's well-being (Ong and du Cross 2012).

245 With the dynamics of ICTs, new types and activities transforming the types of  
246 tourism experiences have emerged, as tourists are no longer passive recipients, but  
247 connected prosumers, interactive and frequent travellers seeking experiences, also  
248 known as online tourists (Romina et al. 2013), co-creating their experiences in a  
249 technology-enabled destination environment (Sigala 2021; Gretzel and Jamal 2009;  
250 Prahalad and Ramaswamy 2004; Andersson 2007). The tourists' behavior took a  
251 dramatic change, from what Pihlström (2008) calls "sit and search" approach to  
252 "roam and receive." Cyberspace has reconfigured the concept of space itself, where  
253 virtual spaces are configured based on human interest rather than physical proximity  
254 (Hannam et al. 2014).

255 New technologies reconfigured both time and space (Green 2002); they are inte-  
256 grated into travel practices, with forms of imaginative, virtual, mediated travel; what  
257 used to be regarded as "new" a decade ago became ordinary to the majority (Urry  
258 2000). More importantly, studies have shown major benefits of these technologies  
259 for older adults with limited mobility, as they can use digital technology to maintain  
260 their social networks and ultimately facilitate their well-being (Choi and DiNitto  
261 2013; Winstead et al. 2013). Moreover, giving and receiving support through digital  
262 means enhances a sense of connectiveness and well-being (Thomas 2010).

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## 263 Digital Detox

264 For many travellers, creating and maintaining copresence has become an important  
265 part of the travel experience (White and White 2007) and a necessity of social life  
266 (Urry 2003). The expansion of Wi-Fi and advancements in mobile bandwidth permit  
267 effortless and almost constant connectivity, and with mobile phones and social  
268 media, tourists maintain personalized networks across various geographical dis-  
269 tances (Larsen et al. 2006). Wellman (2001) acknowledged the phenomenon of this  
270 ubiquitous connectivity as "network individualism," where tourists are travelling  
271 both on the Internet and with the Internet (Germann Molz, 2006). Mascheroni (2007)  
272 expands on the idea and claims that for some members of the so-called mobile elite  
273 (Bauman 1998), "flashpackers" as defined by Butler and Hannam (2013), or lifestyle  
274 travellers' (Cohen 2011), without a permanent physical abode, an individual's email,  
275 blog, Twitter, and/or Facebook are often their only permanent address.

276 The traditional travel and tourism experience shifted dramatically, as these  
277 technological advances allow personalization and a greater flexibility of tourists'  
278 paths through space, hence facilitating collective planning and micro-coordination  
279 (Sorensen 2003). For many tourists, being physically apart from social networks  
280 does not equal to being absent, and White and White (2007) analyzed tourists'  
281 concurrent sense of being away but present through communication technologies.  
282 Instant direct socialization and new virtual moorings in the "blogosphere" and "sta-  
283 tusphere" (Paris 2011) facilitate copresence and open opportunities of interactive



284 travel and collaboration (Germann Molz 2012). This created a virtual “phantasmatic  
285 tourist space,” as described by Enoch and Grossman (2010, 521) supported by the  
286 common behavior of sharing photos, videos, travel diaries, or other media, allowing  
287 other users to actively create and recreate images relating to tourist experiences. In  
288 other words, these spaces support the so-called socially transmitted representational  
289 (Salazar 2012:864) to share, interact with, and consume through virtual networks.

290 Furthermore, Germann Molz (2006) claims that mobile devices and social media  
291 are not only technological items used by tourists but are in themselves social objects  
292 belonging to the tourists’ sociality. They provide the user with a “surveilling gaze”  
293 through which they can follow, monitor, and track other tourists’ updates virtually  
294 from a distance through continuous and detailed updates, creating virtual travel  
295 companions as they respond to subsequent likes and comments received on social  
296 media (White and White 2007). Crawford (2009) shares the idea and confirms that  
297 even when not directly engaged with various networks, tourists travel with and  
298 they are monitored by the constant background presence of their social networks.  
299 However, this monitoring can provide a sense of shared virtual intimacy which can  
300 generate feelings of claustrophobia and discomfort (Crawford 2009) and can be  
301 emotionally disruptive (White and White 2007).

302 Larsen et al. (2007) confirm that tourism is becoming de-exoticized, as users  
303 follow and “co-travel at a distance” with their family and friends though their  
304 travel-related posts. More importantly, tourists developed a sense of obligation to  
305 maintain a regular presence and attention with their followers through a constant  
306 connectivity (Larsen et al. 2007), and being “unplugged” is regarded as unaccept-  
307 able. Considering the physical infrastructure of software and hardware required  
308 to maintain a connectivity, tourists encounter “technological dead zones” which  
309 involve an unexpected disconnection from virtual networks (Pearce and Gretzel  
310 2012). The consequences of such interruptions result in anxiety and distress for  
311 both the tourists and their virtual networks.

312 Moreover, keeping balance became a difficult task for today’s traveller, as they  
313 must negotiate between maintaining intimacy, distance, and togetherness (Hannam  
314 et al. 2014). In the context within the notion of private space becomes synonymous  
315 with “media space,” tourists developed strategies to control their privacy and levels  
316 of access to their various social networks (O’Connor 2021). A pertinent example is  
317 illustrated by individuals who restrict their posts and communications to their local  
318 sphere, by posting to their blogs in their native language, hence restricting access  
319 to their families, friends, or other individuals from their home country (Enoch and  
320 Grossman 2010). In other cases, travellers adopt a defensive strategy which involves  
321 keeping their phone off when wanting to maintain distance (Germann Molz and  
322 Paris 2013; Mascheroni 2007).

323 Technology leaders are also paying attention to this macro trend, responding with  
324 new products and features that promise better experiences and reduce interruption.  
325 For example, three of the newest Apple iOS features are designed to manage  
326 or mitigate engagement with technology, including app limits, Do Not Disturb  
327 improvements, and screen time controls in order to provide better control over the  
328 time users spend using their devices (WTTC 2019).

329 However, the increasing demand for connectivity should not interfere with  
330 the growing need for offline time (WTTC 2019), and Cohen and Cohen (2012)  
331 identified the relationship between the increased intimacy sustained by new tech-  
332 nologies and the confusion between the mundaneness of everyday life and the  
333 extraordinariness of tourists' experiences.

334 Ultimately, technology provides the major benefit of allowing travellers to be  
335 physically mobile and simultaneously emotionally and mentally at home (White  
336 and White 2007). But on the other hand, the constant connectivity is distracting  
337 the individual's attention from their physical experiences, restraining corporeal  
338 proximity to produce "thick embodied socialities" (White and White 2007). Tourists  
339 also use their mobile phones, "technologies of separation," as described by Bull  
340 (2007) to remove themselves from the physicality of social interactions and escape  
341 from immediate situations while travelling (Paris 2012; Wilken 2010). Using their  
342 mobile phones to virtually connect with friends or family during stressful travelling  
343 times, reading, watching movies, and playing games during long periods of time  
344 spent on the road, as well as delegating memories to the camera while missing out  
345 on real life details, all represent ways through which tourists get absorbed into the  
346 virtual environment they are able to create for themselves, enabling their absence  
347 from the physical environment.

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## 348 Technology Trends Enhancing Well-Being in Travel and Tourism

349 The one-size-fits-all approach is not applicable to the travel and tourism sector.  
350 Consumers want access to unique experiences that bring them closer while differen-  
351 tiating them from the mass tourists. Travellers prefer personalized travel experiences  
352 instead of joining tourist groups, and the vast quantity of information they have  
353 access to through the web-based technologies supports their desires (StartUs  
354 Insights 2019). The young generation of travellers is mainly composed of millenni-  
355 als, who are digital natives, educated consumers, discerning, hyper-connected, and  
356 willing to put in the time and having the know-how to conduct extensive research  
357 before making a purchase. They are comfortable with interacting with artificial  
358 intelligence (AI), using digital assistants for research and booking travel, in the  
359 moment, on their primary screen. The Hong Kong-based company offering travel  
360 activities across Asia, Klook, confirms that half of their users book a tour, attraction,  
361 or activity upon arrival, while 70% of them do so via mobile (McCabe et al. 2018).

362 As an integral part of the lifestyle, technology affects tourists' travel experiences  
363 in various aspects, particularly for the tech-savvy tourists (Jamal et al. 2017). Virtual  
364 reality, augmented reality, Internet of Things, virtual assistants, blockchain, and  
365 facial recognition are the technological advances currently leaving a mark on the  
366 travel and tourism industry, bringing significant changes to the sector, allowing  
367 the travel experiences to be more personalized, flexible, and spontaneous. Egger  
368 (2021) reinforces the importance of such advancements in the chapter "► [Virtual,  
369 Augmented and Mixed Reality](#) " of this handbook, and their benefits provided for  
370 tourists are undeniable.

371 However, there is concern about the impact digital life will have on mental health.  
372 As digital life expands, there may be increases in stress, anxiety, and depression.  
373 Meanwhile, there will be less face-to-face interaction as robots can check in hotel  
374 guests, poor in-person communication as chatbots take over customer service,  
375 increased inactivity, and an overall distrust among people. On a larger scale, we  
376 are threatened by the risks for personal information to be stolen and job losses.  
377 For instance, as artificial intelligence and machine learning grows, this may have a  
378 negative impact on the availability for jobs, causing a rise in unemployment. In a  
379 research conducted by the Pew Research Center (2018) asking American Internet  
380 users for their bottom-line judgment about the role of digital technology in their  
381 own lives, the majority concluded that it is favorable. Out of 1150 experts, 47%  
382 predict that individuals' well-being will be more helped than harmed by digital life  
383 in the next decade, while 32% say people's well-being will be more harmed than  
384 helped, with the remaining 21% predicting not much change in the next decade  
385 (Pew Research Center 2018).

386 In light of the above considerations, the table below introduces the most recent  
387 types of technology used within the travel and tourism industry with the purpose of  
388 improving traveller's well-being, highlighting their positive and negative impacts,  
389 which are going to be discussed in the following section (Table 1).

AU3

### 390 Virtual Reality (VR)

391 The concept of virtual reality (VR) refers to computer technology which utilizes  
392 images, sounds, and physical sensations to make users feel as though they are  
393 physically present in a virtual world (Revfine.com 2019a). Although the idea of  
394 this technology emerged since the 1930s, VR immersed within the hospitality  
395 industry during recent times and completely changed the average customer  
396 experience. In the travel industry, customers are generally looking to purchase  
397 experiences, rather than products, and VR technology provides the means for  
398 marketers to offer travellers a taste of what they can experience while stimulating  
399 multiple senses in the process.

AU4

400 Initially, researchers were concerned about the advancements of virtual reality  
401 as it was perceived as a potential threat to physical travel and tourism (Williams  
402 and Hobson 1995; Cheong 1995), and even later, Guttentag (2010) also recognized  
403 that VR has the potential to substitute physical travel. Nonetheless, Larsen et al.  
404 (2007) observed that, despite continued technological innovations, the number of  
405 global tourists was on the rise and confirmed that "places are going to be physically  
406 travelled to for a long while yet" (Larsen et al. 2007, p. 259).

407 Although physical travel is mostly preferred by travellers, scholars suggested  
408 that "digital destinations" explored by users through MMOGs (Massive Multiplayer  
409 Online Games) and other 3D virtual worlds represent alternative options for  
410 corporeal travel experiences (Hannam et al. 2014). Considering the overlap between  
411 the virtual world and the physical form of tourism, Gale (2009) proposes a new  
approach, where virtual worlds are viewed as a type of "themed tourist" space.

**Table 1** Impacts of different types of technology within travel and tourism

Type of technology	Positive impact	Negative impact
Virtual Reality (VR)	Provides a sense of a destination Provides access to people who cannot afford to travel for economic or health reasons Reduces conventional stress arising from living in a different environment, different cultures, different cuisines	Virtual substitute for the real experience Lacks the opportunity to discover the physical world Lacks the opportunity to be engaged with the present place Feeling of worthlessness Technology is still experimental
Augmented Reality (AR)	Improves the travel experience Allows personalization Enhances the real-world environment Can support the authenticity of a destination	Distorts reality Potentially unsafe Technology is still experimental
Internet of Things (IoT)	Enables superior customer service Mobile engagement Hyper-personalization Reduces waiting times Supports hospitality companies to save money, energy Predictive maintenance	Cyberattacks Security breaches Privacy concerns Uncertain regulatory environment
Artificial Intelligence (AI)	Eliminates human error Enhances superior customer service Increases service personalization Facilitates the travel planning journey Reduces congestion Delivers extremely swift response times	Eliminates human interaction All solutions are anticipated and specifically programmed Relatively new technology that still needs to be explored
Facial recognition	Increases guest satisfaction Reduces waiting time Enhances traveller safety Enhances levels of customer service Convenient	Threat to an individual's privacy New technology requires improvement Ethical issues (e.g., racial discrimination)

412 Several researchers have explored the implications of 3D virtual worlds for tourism  
413 marketing (Huang et al. 2012).

414 Although there might be disadvantages of travel in virtual worlds because people  
415 are fully immersed into a simulated environment without having the ability to  
416 develop relationships within the real world (Kounavis et al. 2012), people can also  
417 become attached to virtual places, and this can impact the traditional way of travel,  
418 mostly, as technology advances and the carbon footprint of physical travel become

419 an increasing concern (Plunkett 2011). VR could become extremely important to  
420 the travel industry as a method through which tourists experience somewhere new  
421 without the pollution, carbon footprint, and overcrowding.

422 Considering the amount of information required for a guest before planning a  
423 trip or before booking a hotel, the traveller is facing a daunting challenge. The VR  
424 technology however allows customers to benefit from the type of “try before you  
425 buy” marketing, a common strategy within the food industry, as guests can now  
426 experience virtual recreations of a room within a hotel and they can see nearby  
427 attractions or experience certain destinations with the help of a VR set (Tom Dieck  
428 et al. 2019; Revfine.com 2019a).

429 Virtual travel experiences – using 360 degree video technology which allows  
430 travellers to experience virtual recreation of various aspects of travel, from the flight  
431 to arrival, to some attractions and key sights, virtual hotel tours that allow customers  
432 to enter their hotel room before they even book, and even virtual booking processes  
433 where companies such as Amadeus allow customers to look for flights and compare  
434 hotel prices through a virtual reality headset – are just some of the practical uses  
435 of virtual reality technology. Nonetheless, the use of VR does not stop when the  
436 customer completed a booking, but the technology is further utilized to add on to the  
437 hotel experience itself, to deliver information, and to exceed customer expectations.

438 For example, Marriott Hotels & Resorts’ VRoom Service, the world’s first in-  
439 room virtual reality travel experience, and its virtual travel content platform – “VR  
440 Postcards” – allow customers to experience destinations from around the globe by  
441 combining storytelling with technology (Marriott International, Inc 2015). Using  
442 a Samsung Gear VR headset and headphones, Marriott guests enjoy authentic  
443 experiences in exciting destinations including Chile, Beijing, and Rwanda while  
444 hearing the story told by a real traveller who embarked on a journey to a unique  
445 destination. These action-motivating virtual travel logs are designed to inspire guests  
446 to challenge their existing expectations of travel, embark upon new adventures, and  
447 learn why travel is important to them and how this has played a role in their personal  
448 development (VR Studio 2016). While this example demonstrates how VR can be  
449 used effectively, it is argued that the introduction of VR tourism experiences at  
450 specific attractions, especially at places of historical significance, can detract from  
451 an authentic experience.

452 There is also significant potential for technology to act as a mediator that  
453 creates or enables a mindful state, providing a more relaxing tourist experience  
454 (Stankov et al. 2020; Stankov and Filimonau 2019). Stankov and Filimonau’s  
455 (2021 chapter “► Technology-Assisted Mindfulness in the Co-creation of Tourist  
456 Experiences” provides a more in-depth understanding of the subject. As such, some  
457 of the most exclusive hotels in the UK, including The Savoy, Sanderson Hotel, or  
458 Dormy House Hotel, offer one of the spa industry’s most innovative treatments,  
459 “The Mindful Touch,” which combines Natura Bissé’s cosmetics with virtual reality  
460 (Natura Bissé 2019). The ritual explores a new dimension of the art of well-being,  
461 as the spa experience begins with an immersive VR video inspired by the concept of  
462 mindfulness. Hence, the protocol first introduces the customers to enter into a state

463 of tranquility, clearing their mind from the everyday stress, before commencing the  
464 treatments.

465 Airports are also making use of this technology to ease the stress of travel  
466 and allow travellers to escape and disconnect from the airport environment. Since  
467 research brought evidence on the recreational effects of natural environments on  
468 humans (White et al. 2013) and considering the purpose of VR which enhances the  
469 elicitation of the sense of presence, it is reasonable to use this technology to expose  
470 individuals to restorative environments, especially when access to nature is limited  
471 (Berto 2014). For example, the French company Be Relax combined virtual reality  
472 technology with relaxing massages. Since 2017, passengers at Dubai International  
473 Airport can enjoy a relaxing foot massage while virtually swimming with dolphins  
474 or taking a hot air balloon ride (BeRelax 2017).

### 475 **Augmented Reality (AR)**

476 The new emerging marketing tool augmented reality is revolutionizing the trav-  
477 eller's experience. This technology allows the overlaying of digital enhancements  
478 over an existing real-life scenario, which for tourism translates into a seamless,  
479 simple, and interactive process starting from booking a hotel room, navigating  
480 around the destination, sightseeing, to accessing information and locating dining  
481 and entertainment options (Augment 2016). Often compared to virtual reality (VR),  
482 which replaces the real-world environment with a virtual one, augmented reality  
483 (AR) is used to enhance the real-world environment in real time (Revfine.com  
484 2019b).

485 Advances in computer graphics, wireless connectivity, computing power, and  
486 sensor technologies of smartphones allied with faster networks and cloud computing  
487 to establish the augmented reality on the accessible market (Linaza et al. 2012;  
488 Yovcheva et al. 2012). Apps such as Layar, Acrossair, Wikitude, Sekai Camera,  
489 and Junaio allow users to search, browse, and overlay virtual "layers" of spatially  
490 relevant information allowing them to browse their surrounding areas through  
491 their screens. For example, Tripadvisor's tool allows tourists to gain insights into  
492 their destination through virtual walks while providing them with reviews and  
493 information overlapping Google Street View (Linaza et al. 2012).

494 Many destinations started to develop and launch their own AR applications,  
495 including Dubai and Hong Kong. The Fondazione Sistema Toscana is the first  
496 to develop an AR application for the region of Tuscany, which operates like a  
497 digital tourist guide, providing tourists with accommodation-, dining-, nightlife-,  
498 and sightseeing-related information in both English and Italian language (Kounavis  
499 et al. 2012). Other destinations including London, Tokyo, New York, and Seoul  
500 utilize apps such as Detour, which enables travellers to explore the city through  
501 location-based immersive content (WTTC 2019). Through audio narration and AR  
502 features, tourists can view the neighborhoods and structures as they were in another  
503 era, providing a more authentic experience. One main disadvantage when using AR



504 in this regard is the dependability on gadgets; the users can become captivated by  
505 their devices and may not be aware of traffic or other hazards as they are walking.

506 Moreover, mobile augmented reality (AR) influence tourists' experiences in  
507 several ways, and Sandvik (2008) highlights three processes that support the conver-  
508 sion from physical to imaginary places, as follows: narrativization, fictionalization,  
509 and finally, the construction of a so-called mixed-reality. The process through  
510 which an authentic place is augmented through mobile technologies is described  
511 as narrativization, as illustrated by the Museum of London's Street Museum  
512 augmented reality app which allows tourists to point their mobiles at the landmark  
513 and a historical photo is superimposed. The fictionalization process augments the  
514 tourist experience using a place as a setting for a work or fiction, being mainly  
515 characterized by "set-jettlers" (Joliveau 2009), and film-induced tourists who visit  
516 locations which become famous due to popular authors (Herbert 2001). Finally, the  
517 hybrid mixed reality involves a physical place augmented with an imaginary space,  
518 and it can include the use of AR in the gamification of the physical space (Hannam  
519 et al. 2014).

520 Furthermore, Revfine.com (2019b) confirms that the most common use of AR  
521 within the tourism industry involves the introduction of interactive elements into  
522 hotels, allowing customers to receive more information on demand and make the  
523 hotel environment more enjoyable to spend time in. For example, the Hub Hotel  
524 from Premier Inn in Great Britain merged AR with the wall maps placed in hotel  
525 rooms. Therefore, when viewed through a tablet or a smartphone, the wall map  
526 serves as a tourist information tool by offering detailed information regarding local  
527 places of interest.

528 Holiday Inn also created an AR experience which allows customers to see  
529 realist depictions of famous celebrities in the hotel, while Best Western offers  
530 children the possibility to see themselves alongside characters from Disney films  
531 (Revfine.com 2019b). Other hotels including Marriott use AR apps as a practice  
532 of relaxation, psychological well-being, and self-awareness by allowing guests to  
533 virtually redecorate, for example (WeRSM 2018). These applications of AR are  
534 used to encourage a feeling and atmosphere of peace and relaxation, redefining the  
535 role of technology through practices of psychological well-being, relaxation, and  
536 self-awareness.

## 537 Internet of Things (IoT)

538 One of the most important emerging trends in the hospitality industry is the Internet  
539 of Things (IoT), which helps to automate processes, by not only improving the  
540 customer experience through more personalized experiences and reduced waiting  
541 times but also supporting hospitality companies to save money and energy and  
542 maintenance costs, helping with early identification of problems or preventing  
543 them from occurring (Revfine.com 2019c). IoT involves the inclusion of Internet  
544 connectivity within everyday devices that typically do not have such capabilities,  
545 examples ranging from thermostats and energy meters through to vehicles and



546 large machines. Fundamentally, it turns regular devices or applications into “smart”  
547 objects, capable to communicate with each other, allowing multiple devices to be  
548 controlled from one centralized object such as a tablet or a phone.

549 Focusing on customer-facing IoT, the services available through this technology  
550 are simple to use, efficient, and primarily focused on hyper-personalization. Hotels,  
551 including Hilton and Marriott, adopted the “connected room” concept, where  
552 guests can control features in their room such as heating, air-conditioning systems,  
553 television, and ventilation from their mobile phones or from a provided tablet.  
554 Through this technology, travellers are able to personalize as per their needs,  
555 offering the convenience similar to their home, increasing their state of well-being  
556 and relaxation.

557 The IoT also changed radically the traditional physical hotel key card and opened  
558 new possibilities in terms of sending electronic key cards directly to the customer’s  
559 mobile phone which can communicate with the door lock on their room (Allianz  
560 Partners Business Insights 2017). This technology goes even further, and hoteliers  
561 including Hilton send the digital key to the guest’s mobile phone on the arrival day,  
562 allowing the guests to enter directly their room, bypassing the check-in desk (Hilton  
563 2017). Hence, the IoT smoothes the travel process, by making the traveller more  
564 comfortable and settled in.

565 Voice-controlled customer service also allows hoteliers to provide superior  
566 customer experience, and hotel companies including Wynn, Marriott, and Best  
567 Western are the early adopters of this technology set to expand substantially over  
568 the next years. Therefore, through voice-controlled room assistants, customers can  
569 book a table at the restaurant, book a spa session, or request room service simply by  
570 speaking to a device located in their room (Revfine.com 2019c).

571 While installation costs, technological and regulatory challenges with the data  
572 sharing, replacement of devices, and overdependence on sensors (Kaur and Kaur  
573 2016) are the challenges for tourism executives, security of data by cyberattacks and  
574 security breaches (Pate and Adegbija 2018) are the main negatives when using this  
575 technology that can directly affect travellers too. “Smart hotel rooms” are not smart  
576 enough to protect their guests’ privacy; all IoT devices can potentially be hacked to  
577 disrupt hotel security and provide access to guests’ personal information. Moreover,  
578 the convenient IoT devices can provide access to guests’ personal computers and  
579 smartphones while revealing their personal data or download spyware, disrupting  
580 the traveller’s well-being beyond the trip.

## 581 **Artificial Intelligence (AI)**

582 Artificial intelligence (AI) refers to intelligent behaviors of machines and computers  
583 able to carry out tasks that would traditionally require cognitive function to carry  
584 out. Although the concept has been around since the 1950s, it is only during recent  
585 times that this technology advanced to the point where it is considered reliable,  
586 providing a wide range of functions, from personalization tasks, customer service,  
587 to advanced problem- solving, direct messaging, and sales processes (Revfine.com

588 2019d). By having the ability to carry out traditional human functions at any time of  
589 the day, AI is playing an increasingly important role within the hospitality industry  
590 (Bulchand-Gidumal 2021) as this technology allows hoteliers to deliver superior  
591 customer service and increased personalization to tailored recommendations and  
592 eliminate human error (Revfine.com 2019d).

593 The development of robots with artificial intelligence and their ability to deal  
594 with basic customer-facing situations support the potential of growth for this  
595 technology. The best example of this is “Connie,” the first Watson-enabled robot  
596 concierge in the hospitality industry, piloted at Hilton (IBM Watson 2016). Connie  
597 not only provides tourist information regarding local tourist attractions, dining  
598 recommendations, and hotel features and amenities to the guests, but it is also able to  
599 learn from human speech and adapt to individuals. The robot supports Hilton’s team  
600 members in assisting with customers’ requests, personalizing the guest experience  
601 and empowering travellers with more information to help them plan their trips,  
602 hence facilitating the travel planning journey, reducing congestion, contributing to  
603 a more positive customer experience, and improving the traveller’s well-being.

604 Travel agencies including Amadeus also experimented with the 1A-TA robot  
605 powered by AI, deployed for pre-qualifying customers. Instead of forcing customers  
606 to wait during busy periods, the robot can work immediately, finding out about the  
607 customer’s needs and preferences and passing the information on when they speak  
608 to a human travel agent.

609 LaGuardia Airport in the USA recently adopted Knightscope robots which  
610 are increasingly used to help keep passengers safe during flights by being able  
611 to autonomously detect concealed weapons (Knightscope, Inc 2019), while the  
612 autonomous suitcase Travelmate eliminates the travellers’ need for carrying, push-  
613 ing, or pulling a suitcase around. Controlling it through a mobile app, the suitcase  
614 follows the traveller on its own, with 360 degree turning capabilities and anti-  
615 collision technology (Travelmate Robotics 2019).

616 Airlines are also taking advantage of this technology with KLM Royal Dutch  
617 Airlines’ chatbot allowing people to receive flight status updates, booking confir-  
618 mation, check-in notification, and boarding passes via Messenger in nine different  
619 languages. KLM responds to 15,000 social conversations in a typical week, and  
620 the chatbot supports the company to provide personalized but fast customer  
621 care, ultimately improving the customer experience (KLM 2019a). Moreover, the  
622 company’s self-driving luggage, Care-E, wants to make air travel less stressful  
623 (KLM 2019b). Care-E is created to carry customers’ luggage, scan their boarding  
624 passes, and guide them to their departing gates or any other points of interest  
625 within the airport (Mashable 2018). This allows a more relaxed journey, positively  
626 impacting the tourist’s well-being.

627 Nonetheless, a more popular form of AI being deployed within the travel  
628 and hospitality sector is the front-facing customer service in the form of online  
629 chat services and direct messaging. To illustrate, hoteliers adopted AI chatbots  
630 on their social media platforms, allowing travellers to ask questions and receive  
631 instantaneous responses, at any time of the day, any day, which would otherwise be

632 impossible to maintain with human interaction, delivering extremely swift response  
633 times.

634 The online travel agency (OTA) Expedia is leading the field in terms of deploying  
635 chatbots to engage customers on their website and social media. By simply chatting  
636 with Expedia on Facebook Messenger and providing some details regarding the  
637 traveller's plans, the five most popular hotel options in the chosen locations with  
638 the direct links to book are provided instantly. This process facilitates customers'  
639 managing their own bookings, eliminates the need to wait in line for a next available  
640 OTA representative, and simplifies the process of decision-making by providing the  
641 customer with the best options based on their preferences (Street 2016).

642 Although an original and innovative concept for travellers, AI is still a relatively  
643 new technology that still needs to be explored, and the debate whether people will  
644 be put off by speaking to a robot rather than a human remains open. The elimination  
645 of human error when it comes to tourism-related services clearly benefits the  
646 travellers' experience. However, due to the fact that the solutions provided by this  
647 technology are anticipated and specially programmed so that they only cater to the  
648 limited services it has been designed for, human interaction may still be preferable  
649 for consumers, due to better flexibility, versatility, and ability to cater to more  
650 diverse requests.

## 651 Facial Recognition Technology

652 Although this technology became mainstream during recent years due to systems  
653 like Facebook DeepFace and Apple Face ID, it soon found multiple applications  
654 within the travel industry, such as seamless airport and hotel check-ins, delivering  
655 more personalized customer service (Revfine.com 2019e).

656 Marriott International set itself as a pioneer in the hospitality industry through  
657 its facial recognition hotel payment and check-in hardware and software solution.  
658 Guests booking a room at one of the two Marriott International properties in China –  
659 Hangzhou Marriott Hotel Qianjiang and Sanya Marriott Hotel Dadonghai Bay – can  
660 simply scan their ID on the kiosk, and after a public security system verification, a  
661 credit authorization is produced, and a room card is released (Marriott International,  
662 Inc 2018). With a traditional hotel check-in process taking at least 3 min or even  
663 more during peak times, the facial scanning check-in process takes 30 s from arrival  
664 to room card issued including payment authorization, providing an effective solution  
665 designed to increase guest satisfaction and reduce waiting time as much as possible  
666 (Hospitality Net 2018).

667 Especially useful in high-traffic environments, facial recognition is being used  
668 for greater convenience, personalization, and security, aiming to improve the overall  
669 travel experience and travel satisfaction, which directly link to the traveller's well-  
670 being. Hence, airports are taking the approach to make the travel experience as  
671 seamless as possible, with American Airlines being the latest carrier to trial bio-  
672 metrics at Los Angeles International Airport (LAX). Before boarding, passengers

673 simply approach the gate and receive confirmation via a computer screen and camera  
674 following a facial scanning. Once verified, the captured images will be wiped from  
675 the system to ensure privacy for all passengers (FTA 2018).

676 Similarly, the Miami International Airport (MIA) has recently launched biomet-  
677 ric exit technology for passengers travelling to Munich Airport with Lufthansa,  
678 enhancing the level of customer service for its passengers. A simple photograph  
679 taken at Lufthansa's boarding gate is used to confirm each passenger's identity and  
680 their authorization to travel. The facial recognition verification process takes less  
681 than 2 s with a 99% matching rate, enhancing both traveller safety and convenience  
682 (FTA 2019).

683 However, facial recognition is surrounded by privacy concerns, and many people  
684 may feel like this type of biometric data collection is overly intrusive. In such cases,  
685 the positives such as personalization and convenience are shadowed by feelings  
686 of anxiety and worries, taking away from the traveller's state of well-being. Also,  
687 facial recognition still has racial bias, and there are studies supporting the idea that  
688 facial recognition algorithms are significantly more accurate when identifying white  
689 faces compared to African American ones (Garvie and Frankle 2016). Ivanov et al.'s  
690 (2021) chapter "► Robotics in Tourism and Hospitality" provides a more detailed  
691 analysis of the incorporation of automation in tourism, providing both a consumer  
692 and a supply-side perspective.

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## 693 Conclusion and Future Directions

694 This chapter highlighted the fundamental role of well-being in relation to tourism's  
695 role in recreation and relaxation and revealed technology's potential to contribute  
696 towards increasing the traveller's state of well-being. As highlighted in the introduc-  
697 tion, tourism has been widely regarded as a mentally and physically healthy pursuit  
698 (Chen and Petrick 2013). Tourism can balance and integrate lives unsettled and  
699 fractured by runaway time, disconnection from everyday world and other people,  
700 and frantic busyness, longing for a sense of place in an impersonal, out-of-control  
701 world (Steiner and Reisinger 2006). As studies demonstrated, travelling provides  
702 benefits for one's spirit and well-being (Alizadeh and Filep 2019; Bimonte and  
703 Faralla 2015). While there is no general agreement around the definition of the term  
704 well-being, this chapter introduced the implications the term brings, defined through  
705 positive emotions such as happiness, fulfilment, and overall satisfaction with life  
706 (Diener 2000; Frey and Stutzer 2002).

707 Well-being is a central goal that ever more individuals actively seek to achieve  
708 through tourism experiences. Travelers want to experience new cultures and envi-  
709 ronments and connect with communities in ways that feel human and authentic  
710 (Park et al. 2019; Michopoulou 2017). And the technological developments starting  
711 from virtual realities, augmented realities, Internet of Things, artificial intelligence,  
712 and facial recognition enhance the delivery of such experiences and support and  
713 complement the traveller's well-being by making tourism experiences as person-

714 alized, enjoyable, convenient, and friction-free as possible. In other words, these  
715 technological developments provide means for augmenting, extending, and shaping  
716 existing well-being-related travel and tourism.

717 Although embraced by travellers, technology creates new worries regarding data  
718 collection, security, and privacy, negatively impacting the tourist's state of well-  
719 being. Nonetheless, the way we rely on technology as well as travel preferences can  
720 only be determined on an individual basis. Travel and tourism executives are facing  
721 the challenge to mitigate these concerns through guests' education, providing an  
722 understanding of the technology implemented and ways in which it needs to be  
723 protected from external threats, suitable firewalls, encryption, and data backing up  
724 or simply offering the guests the ability to opt out. Travel is inherently a service  
725 industry, and it is important to see these new technologies as a way to improve the  
726 complete customer experience and to ensure that the personal interaction remains a  
727 core part of the offering.

728 Today's interconnected and fast-paced environment makes it extremely challeng-  
729 ing to anticipate transformations ahead. However, it becomes clear that technology  
730 trends and the travel and tourism industry are intertwined, providing incredible  
731 opportunities for growth and development. While technology enhances the delivery  
732 of authentic travel experiences, industry players must embrace change, acknowledge  
733 the dynamic nature of the "today's traveller," and adopt a customer-centric approach  
734 based on a response to the customer's needs, values, and desires, notably personal  
735 enhancement and well-being (WTTC 2019). Technology provides connectedness  
736 that enables travel for a larger share of the world population and for demographics  
737 that would have otherwise not been able to travel. Connected and personalized  
738 experiences are no longer reserved for the high-end luxury market (WTTC 2019).

739 The growth of technology within the tourism industry creates new expectations  
740 for travellers, and the service providers are given the opportunity to truly delight  
741 customers in ways that they do not expect. Innovation is key in such a crowded  
742 industry, and it can both solve operational problems and help travellers. As Gen  
743 Z ages and technologies such as VR, AR, AI, and machine learning develop  
744 and spread, the trend will only intensify (WTTC 2019). These technologies offer  
745 tremendous opportunities for the travel and tourism sector to provide connected,  
746 personalized, and integrated customer experiences; but trust and accountability are  
747 also required.

748 In the future, technology will continue to shape the travel and tourism industry  
749 with advances expected to emerge and help travellers lead better lives and travel  
750 smarter as they adopt well-being as a dominant lifestyle value. However, the  
751 relationship between the use of digital tools and the direct and indirect benefits  
752 when focusing on restoration of the mind and body remains controversial, and the  
753 connection between technology and well-being needs to be more deeply explored  
754 in relation to tourism. Therefore, future research should involve longitudinal studies  
755 focusing on the different types of technologies and how they impact the travellers'  
756 well-being or the different tourists' typologies that may emerge from technology  
757 consumers.

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