International Journal of Hospitality Management 129 (2025) 104181

Contents lists available at ScienceDirect

International Journal of Hospitality Management

journal homepage: www.elsevier.com/locate/ijhm

How T-cruiscape shapes the flow experience of passenger's well-being

Marcya Stefany Gonzáles-Santiago [1], Sandra Maria Correia Loureiro [*,2], Daniela Langaro [3]

Instituto Universitário de Lisboa (ISCTE-IUL) and Business Research Unit (BRU-IUL), Lisbon 1649-026, Portugal

ARTICLE INFO

Keywords:
Cruise servicescape
Flow experience
Subjective well-being
Cruise service technology
Stimulus-organism-response framework (S-O-R)

ABSTRACT

Understanding the new T-cruiscape (a servicescape integrated with technological services in the cruise industry) onboard cruise ships is key for managers. Therefore, this research integrated the T-cruiscape, flow experience, and subjective well-being within the Stimuli–Organism–Response framework to examine how the T-cruiscape shapes the passenger flow experience and enhances their well-being and how discomfort acts as a moderator in this relationship. A mixed-method approach was adopted, including 35 interviews with crew members who were experienced in working with these technologies and passengers, followed by a survey of 358 passengers who had used these technologies. Qualitative data analysis was conducted using MaxQda2020, while quantitative data was analyzed using SmartPLS4. The findings from interviews corroborated the seven facets of T-cruiscape, which were then considered in the main study. T-cruiscape acting as stimuli can generate flow experience and, subsequently, passengers' subjective well-being through desirable feelings. The discomfort passengers feel when using technology can strengthen the relationship between the T-cruiscape and the flow experience. The theoretical and practical implications of the research provide valuable insights into potential marketing practices and suggest avenues for future research.

1. Introduction

Cruise ships were originally designated as a floating hotel (Kester, 2003) that provides passengers with a wide range of services, such as restaurants, spas, swimming pools, and other facilities commonly found in hotels. Recently, several authors have started to refer to these ships as floating cities (Buhalis et al., 2022; Gonzáles-Santiago et al., 2024) due to all kinds of additional facilities offered (e.g., shopping, theatres, casinos, theme parks), often catering to more than 6000 passengers. Royal Caribbean's *Icon of the Seas* ship is an excellent example (Royal Caribbean, 2024a), as it is 364 m long and can carry up to 7600 passengers at maximum capacity along with 2350 crew members. Its 20 decks feature a central park, a rock-climbing wall, seven swimming pools, and six water slides as its main attractions; it also has over 40 dining venues, bars, and lounges in its eight neighborhoods (Sourcetoad, 2022; Royal Caribbean, 2024)

This new trend toward larger cruise ships has revolutionized how services are delivered and how passengers experience them, leading cruise companies to rely more on technology to provide services and thus meet passengers' demands. Cutting-edge technologies such as artificial intelligence (AI) enhanced with the Internet of Things (IoT) and near-field communication (NFC) (Buhalis et al., 2022; Gonzáles-Santiago et al., 2024; Tussyadiah, 2020) became prevalent in various onboard services offered by cruise ships. These technologies are distributed throughout the ship and are mainly used for contactless services, virtual assistance, self-service kiosks, and robots designed to provide passengers with a personalized experience available 24 h a day.

These growing technological trends changed the servicescape in fundamental ways. Previous studies have mostly focused on exploring how different ambient, visual design, and social factors (e.g., Durna et al., 2015; Lin, 2004; Sthapit et al., 2024; Björk et al., 2023; Kwortnik, 2008; Risitano et al., 2017), affect servicescape perceptions. Fewer explore servicescapes associated with technology. Among those, the focus lies on single solutions (e.g., the use of apps as in Even and Lee, 2018) and are limited to the context of hotels, which differ from the complexity and diversity of technologies connected to the new highly

* Corresponding author.
E-mail addresses: marcya_stefany_santiago@iscte-iul.pt (M.S. Gonzáles-Santiago), sandramloureiro@netcabo.pt (S.M.C. Loureiro), daniela.langaro@iscte-iul.pt (D. Langaro).
[1] http://orcid.org/0000–0001-6596–8264
[2] http://orcid.org/0000–0001-8362–4430
[3] http://orcid.org/0000–0002-1246–0720

https://doi.org/10.1016/j.ijhm.2025.104181
Received 6 October 2024; Received in revised form 2 February 2025; Accepted 13 March 2025

technological cruise ships. Therefore, the current study intends to address this first gap by considering the technological aspects embedded in highly technological cruise ship servicescapes, designated as T-cruiscape (a servicescape that integrates technological services in the cruise industry).

Academics have been very prolific in searching for servicescape factors that predict behavioral intentions through emotions or satisfaction (e.g., Calza et al., 2020; Dedeoğlu et al., 2015; Durna et al., 2015; Risitano et al., 2022), or even engagement. Focus on passengers' subjective well-being is scarce (Sthapit et al., 2024). Yet, offering a cruise service that improves passengers' subjective well-being is relevant in driving positive feedback, recommendations, and repurchase (need references), as it includes the experience of positive emotions (e.g., excitement and happiness) that lead to achieving the sense of life satisfaction along the cruise trip (Kim and Hall, 2019).

Thus, the current study spots a second gap in the literature, supported by the relevance of analyzing how servicescape affects subjective well-being. While addressing these gaps, we aim to explore the impact of T-cruiscape in shaping passengers' subjective well-being by means of the following research question: RQ1: How does the T-cruisecape impact passengers' subjective well-being in highly technological cruise ships?

While exploring this this RQ1, we evolve on the S-O-R framework, which suggests that once individuals are exposed to external stimuli (S), (T-cruiscape), their organism (O) experience cognitive and emotional states, which, in turn, influence responses (R) (subjective well-being). Flow state theory is proposed as the mechanism influencing the organism. Online experiences can lead to a state called flow, which happens when people navigate websites (Novak et al., 2000). This state is marked by smooth interactions with digital tools, a natural sense of enjoyment, reduced self-awareness, and a self-sustaining nature. When customers enter this flow state, they become so focused on what they are doing that they pay less attention to what is happening around them in the physical world and are better equipped to enjoy subjective well-being. Once the main relations are established, the effects of discomfort with the technology and desirable feelings are accessed for their moderating and mediating effects. The following research questions capture the mentioned effects RQ2: What is the role of flow state in establishing the causality of effects between T-cruiscape and subjective well-being? RQ3: How does discomfort with the technology moderate the effects of T-cruiscape on flow state, and how do desirable feelings mediate these effects? To address the research questions, this research uses a mixed-method approach, including interviews with crew members and passengers who have experience working with these technologies in this new cruise environment, followed by a survey of passengers who have used these technologies. The preliminary study is conducted through interviews to capture the facets representing the T-cruiscape due to the lack of consensus in the literature about what dimensions should be employed to measure the servicescape environment in a high technological cruise. By gathering data from crew members and passengers, the present research seeks to provide a comprehensive understanding of how T-cruiscape influences the cruise experience and enhances subjective well-being.

In sum, this research is expected to contribute to the existing literature by shedding light on the potential benefits of T-cruiscape for the cruise industry. Based on the findings, it offers practical recommendations for cruise operators to improve their servicescape and, thus, passenger and crew members' experience. Additionally, this research helps to deepen our understanding of the relationship between T-cruiscape, flow experience, and subjective well-being in the proposed conceptual framework. Finally, the conclusions and possible directions for future research are discussed after presenting the research findings.

2. Literature review

2.1. Technology servicescape in cruises

The concept of servicescape is heavily studied in the retail context (Roschk et al., 2017). Bitner (1992) originally considered servicescape as the physical environment in which customers and employees interact while receiving a service, and three key dimensions were identified: ambient conditions, spatial layout/functionality, and signs/symbols/artifacts. However, the emergence of the Internet created a new platform for service delivery, changing how consumers access and receive services (Koernig, 2003). Consequently, Harris and Goode (2010, p. 232) presented the *e-servicescape*, defined "as the online environment factors that exist during service delivery". The e-servicescape comprises three main dimensions, namely online aesthetic appeal, online layout and functionality, and online financial security, which were adapted from Bitner (1992). Recent technological advancements have further expanded the scope of servicescape studies. The embedding of AI and IoT created an increasingly interlinked physical and online environment. Intelligent objects and environments are now continuously communicating with users while data are being collected in real-time using advanced network technology (Loureiro et al., 2019a). This has led to the advent of a new smart services environment, referred to as smart servicescape, conceptualized as different interactions that occur between consumers, smart devices, service firms, and other elements within the service environment (Roy et al., 2019). This new concept embraces several dimensions, including aesthetics, social presence, superior functionality, perceived interactivity, and perceived personalization.

Accordingly, the concept of servicescape has evolved alongside changes in service delivery and technological advancements. It has been extensively analyzed in different service industries, such as hospitality, healthcare, transportation, gaming, and retail, among others (Kaminakis et al., 2019; Roschk et al., 2017; Zimmermann et al., 2023). The cruise industry has also been a subject of academic research, with several studies examining the servicescape of cruise ships. This servicescape, referred to as the shipscape, was coined by Kwortnik (2008) to describe the diverse stimuli that passengers encounter, including cabin linens, music, and odor, among others, that can influence their emotional and behavioral reactions.

The existing literature on servicescape in the cruise context (see Table 1) primarily highlights the impact of environmental stimuli on passengers' perceptions and behavioral intentions (e.g., Calza et al., 2020; Kwortnik, 2008; Lyu et al., 2017).These studies (see Table 1) provide valuable insights into cruise ships' servicescapes and the factors that affect passengers' experiences. They identify different servicescape dimensions and how they influence passengers' emotions, perceived value, satisfaction, and behavioral intentions. Yet, they do not discuss the role of technology in enhancing the servicescape or improving passenger experiences.

The lack of a servicescape conceptualization that incorporates technological components in the literature on cruise sectors led us to consider the e-servicescape structure of Harris and Goode (2010) combined with the hotel service setting structure of Brunner-Sperdin et al. (2012) as a foundation for assessing servicescape in the cruise context, where technology is a key factor. This structure emphasizes the importance of a website's aesthetic appeal in enhancing consumer engagement in the online environment. Layout and financial security are crucial factors in the cruise servicescapes being recognized to stimulate customer feelings and perceptions toward an online environment, ultimately influencing their actions/behaviors (Wu et al., 2017).

Cruise lines are embracing service technologies like those used in hotels, airlines, and amusement parks to provide a better onboard experience, incorporated from the moment of boarding at port terminals (Buhalis et al., 2022) so that passengers can expedite the boarding process via the self-service kiosks or facial recognition (Tussyadiah

Table 1
Overview of prior studies on Servicescape.

Sector	Servicescape dimensions	Theory	Dependent variable	Key findings	Source
Cruise	Facilities and décor, Natural scenery, Onshore excursions, Onboard entertainment, Social interactions, Dining services	Churchill paradigm	-	Identification of six servicescape dimensions based on Chinese tourists.	Lyu et al. (2017)
	Ambient, Design-related,Social factors	-	Behavioral intentions	The onboard environment predicts behavioral intentions, mediated by satisfaction and perceived value.	Calza et al. (2020)
	Perceived crowdedness,Dining atmosphere,Interaction with other guests	S-O-R	Approach behavior	Female travelers' perception of the cruise ship dining environment leads to emotional responses and approach behavior. Perceived health risk from COVID−19 strengthens the relationships between dining atmosphere or interaction with other guests and emotions.	Radic et al. (2021)
	Ambient factors,Design factors,Social factors	S-O-R	Experience memorability	Servicescape influences experience, delight, and memorability, with a place of residence, past travel experience, and income exerting moderating effects on the aforementioned relationships.	Sorrentino et al. (2022)
	Ambient factors, Design factors, Social factors	-	Behavioral intentions	Cruise passengers' clusters based on their perceived onboard servicescape and experience: emotional cruisers, social cruisers, dynamic cruisers, and active cruisers.	Risitano et al. (2022)
	Atmospherics,Other guests,Staff	-	Future behavior	The restaurant's atmosphere and other guests influence passengers' emotions and perceived service quality. Positive emotions impact perceived quality, behavior, and overall dinescape satisfaction, which in turn influences future behavioral intentions.	Björk et al. (2023)
Hotel	Color, Lighting, Space and function, Music, Non-musical sound (noise), Scent	Gestalt psychology	Behavioral responses	Literature review related to the impact of the servicescape on customer behavior.	Lin (2004)
	Service environment (software, hardware), Social surroundings (human-ware), Leisure experience (Flow), Situational variables (age, stay, gender, repeat customer)	S-O-R	Satisfaction	Service setting enhances customers' emotional psychological states and satisfaction.	Brunner-Sperdin et al. (2012)
	Ambiance, Design of casino, Cleanliness, Internal decoration, Comfort	S-O-R	Word-of-mouth, Revisit intentions	Servicescape word-of-mouth and re-visiting. Overall image acts as a mediator.	Durna et al. (2015)
	Ambient conditions, Layout, Decor, Signs and symbols,Image	-	Behavioral intentions	Servicescape influences behavioral intentions through perceived value, image, and pleasure.	Dedeoğlu et al. (2015)
	Substantive staging of servicescape, Communicative staging of servicescape	S-O-R	Behavioral intentions	Servicescape influences customer emotions and these influences behavioral intentions. Service climate and employee engagement act as moderators.	Chang (2016)
	m-servicescape (Aesthetics, Functionality, Symbolism)	S-O-R+self-determination theory	Brand loyalty	m-servicescape affects customers' autonomy and relatedness needs fulfillment, which positively influences their engagement behaviors and brand loyalty.	Lee (2018)
	Social servicescape (customer servicescape, social density, employee servicescape)	Social impact theory	Behavioral intentions	Social servicescape affects leisure travelers' perceptions of the hotel consumption experience (satisfaction and behavioral intentions).	Line and Hanks (2019)
	Aesthetic quality, Functionality, Atmosphere, Spaciousness, Physiological conditions	S-O-R	Favorable behaviors, Propensity to spend	Hotel servicescape dimensions affect customers' emotional states and their behavioral responses.	Lockwood and Pyun (2019)
	Aesthetic quality, Functionality,	Churchill paradigm	Loyalty	Identification of five servicescape dimensions for upscale hotels.	Lockwood and Pyun (2020)

(*continued on next page*)

Table 1 (*continued*)

Sector	Servicescape dimensions	Theory	Dependent variable	Key findings	Source
	Atmosphere, Spaciousness, Physiological conditions				
	Physical servicescape, Social servicescape	S-O-R	Intention to recommend	Physical and social servicescape influence place attachment and this, in turn, affects the intention to recommend.	Xu and Gursoy (2020
	Physical servicescape, Social servicescape	S-O-R	Customer citizenship behaviors (feedback to the organization, making recommendations, helping other customers)	Physical and social servicescape influence customer citizenship behaviors, customer engagement and gender act as moderators.	Li and Wei (2021)
	Substantive servicescape, Communicative servicescape	S-O-R	Engagement (cognitive, affective, behavioral)	Servicescape influences engagement through values (functional, wellness).	Li (2021)
	Branded social servicescape (Employee-customer, Employee-employee, Customer-customer)	Cue-consistency theory	Brand-related outcomes: Brand personality perceptions, Overall brand evaluations	Branded social servicescape influences Brand-related outcomes via conceptual fluency.	Garmaroudi et al. (2021)
	Ambience, Layout, Signage and Decor	Memory-dominant logic (MDL)	Hedonic well-being	Servicescape impacts experiential satisfaction and memorable unmanned smart hotel experience and these last influence hedonic well-being	Sthapit et al. (2024)
T-Cruiscape	T-cruiscape (Aesthetic Appealing, Functionality, Technology Security, Social Presence)	S-O-R + Flow theory	Subjective well-being	T-cruiscape impacts subjective well-being through flow experience and desirable feelings. Discomfort strengthens the relationship between T-cruiscape and flow experience.	This research

Source: Authors' elaboration

et al., 2020; Yang et al., 2021).

These cutting-edge technologies include Robots, Artificial intelligence (AI), Service Automation (SA), IoT (Internet of Things), Virtual Reality (VR), and augmented reality (AR).

Robots are used for diverse tasks, from room service to information and entertainment. AI enhances these interactions by enabling robots to understand and respond to passenger needs more effectively. At the same time, service automation streamlines process services such as check-in and customer service, reducing wait times and improving overall efficiency (Buhalis et al., 2022). IoT plays a crucial role in connecting various devices and systems on board. IoT enables real-time monitoring and control of ship operations, from energy management to passenger safety. For instance, smart sensors can detect maintenance needs before they become critical, ensuring smoother operations. VR and AR are revolutionizing entertainment and training on cruise ships. VR offers immersive experiences, such as virtual tours of destinations or interactive gaming, providing passengers with unique and engaging activities (Tussyadiah et al., 2020; Yang et al., 2021) AR enhances these experiences by overlaying digital information in the real world. It can be used for interactive maps, guided tours, or even augmented dining experiences.

2.2. Flow experience

The "holistic sensation that people feel when they act with total involvement" is how Csikszentmihalyi (1975, p. 36) defines the state of flow. In the online environment, flow is perceived as the state occurring during network navigation (Novak et al., 2000), characterized by seamless interactions with technology, intrinsic enjoyment, loss of self-consciousness, and self-reinforcement. Thus, when customers are in a flow state, their concentration on the subject of interest becomes so intense that other events in their surrounding physical environment lose significance.

Likewise, in the last few years, the theory of flow has been adopted to understand consumers' digital experience, with technologies such as AI, virtual reality (VR), augmented reality (AR), and apps (Kautish and Khare, 2022). For instance, Brannon Barhorst et al. (2021) demonstrate that Augmented Reality (AR) technologies enable the immersive state of flow through the vividness of the sensorial experience of real and computer-generated objects. Other studies added that when consumers are deeply focused while using an app, they are more likely to enter a state of flow (Chen et al., 2018). This is also because mobile apps with AI-powered assistants offer a high level of personalization that can display to consumers what they need while browsing or also answering their queries. This significantly enhances their focus and enjoyment during such interactions (Lee, 2018).

In hospitality and leisure studies, technology services (e.g., travel apps, virtual assistants, robots, or chatbots) influence the consumer flow experience (Huang et al., 2013; Wu et al., 2021). The state of flow in the digital hospitality context is characterized by captivation, immersion, deep involvement, and a strong emphasis on the use of technologies (Loureiro et al., 2020). Empirical research on flow studies has identified the most adopted dimensions, including control, concentration, interest, curiosity, enjoyment, telepresence, and time distortion (e.g., Chen and Lin, 2022; Chen et al., 2018).

In the current study, flow experience refers to the emotional reaction that cruise passengers experience when using technological services onboard cruise ships with complete focus and enjoyment (Huang et al., 2017). Three dimensions are included: telepresence, focused attention, and time distortion (Huang et al., 2017).

Telepresence refers to the feeling of immersion and a sense of being there in the unique virtual environment (Loureiro et al., 2020), such as when a cruise passenger uses digital signage to search port information before arrival. This state of immersion allows passengers to explore and control the technology, making them feel physically present at the destination (Pelet et al., 2017). Focused attention, however, is the

degree to which an individual is hypnotized when their attention is limited to a particular activity (An et al., 2021). For example, when using the cruise app, passengers are fully engaged, experiencing a flow state that filters out irrelevant distractions as they pay more attention to personalized information (Gonzáles-Santiago et al., 2024), such is the case of cruise app that offers customized service. Finally, time distortion means the sense that time passes in a way that is different from the usual (Lu et al., 2022), making cruise passengers feel that they have lost track of time (Pelet et al., 2017) while enjoying the technologies onboard cruise, like robot bartender or the culinary experience in AR.

2.3. Subjective well-being

Subjective well-being is conceptualized as the experience of happiness, life satisfaction, and positive emotions experienced by an individual (Kim and Hall, 2019). Specifically, it refers to people's cognitive (life satisfaction) and affective (emotions) evaluations of their own lives (Diener, 2009).

Subjective well-being is a topic of research across multiple disciplines, mainly used by psychologists, philosophers, economists, and social scientists (Diener, 2009; Lucas et al., 1996). In the field of hospitality and tourism, researchers have widely explored this concept (Karagöz and Ramkissoon, 2024; Kim et al., 2015; Uysal et al., 2016), recognizing it as a significant factor that contributes to determining the negative and positive effects of travel satisfaction (Sirgy et al., 2011). Thus, tourists' overall evaluation of their experience influences their subjective well-being, which can be affected by a range of factors, such as the quality of accommodations (including cleanliness), the level of customer service, the quality of the service, the price, and the impact of the overall atmosphere of the destination (Saayman et al., 2018). Therefore, tourists who have enjoyable vacation and experience positive emotions (e.g., feeling pleasure, relaxation, or excitement) are more likely to produce higher levels of subjective well-being and satisfaction with their leisure life/travel experiences (Kang, 2020; Yu et al., 2021).

Research on smart tourism shows that technology can significantly influence the subjective well-being of tourists. For instance, Kim and Hall (2019) claimed that consumers who use immersive technologies, such as VR, experience subjective well-being in the form of satisfaction or happiness. Similarly, Lee et al. (2018) found that when travelers experience pleasure from using IoT technologies, they tend to have a greater sense of subjective well-being during short-term trips. Thus, the travel experience can be enhanced by using smart technologies.

In the same vein, cruise ships–which offer a whole experience to their passengers–have been adopting the latest technologies to improve the travel experience and generate positive subjective well-being among cruise passengers. The adoption of technologies enhances the experience and satisfaction of cruise passengers (Calza et al., 2020; Gonzáles-Santiago et al., 2024). Yet, despite the various studies related to subjective well-being and cruise ships, no studies have investigated whether the technological environment adopted on board cruise ships enhances passengers' well-being. Most of the previous studies focused on the cruise travel experience (e.g., services, food, excursions, accommodations) (Kang, 2020; Lyu et al., 2018) and some have explored the well-being of cruise ship employees related to their work experience (Radic et al., 2020).

2.4. The effects of desirable feelings

The desirability of a product is often characterized by its usefulness, excellence, and potential to provide hedonic value (Warren et al., 2019). However, recent studies also found that a product's coolness is a desirable characteristic that allows consumers to express their self-identity and communicate with others (Tran et al., 2024). As such, a product that is perceived as *cool* is often associated with benefits and seen as both a product feature and a personality trait (Rodrigues et al., 2024). Such products are extraordinary and energetic, thus making them desirable in terms of branding (Warren et al., 2019).

Cool brands or products can generate emotional responses (e.g., pleasure or arousal) (Penz and Hogg, 2011; Pozharliev et al., 2015) because they have the potential to stimulate positive emotions among consumers (Loureiro and Blanco, 2021; Lv et al., 2024). Consumers use cool brands or products to be perceived by others as being cool, which subsequently leads them to consume socially desirable products (Tiwari et al., 2021).

Likewise, in the hospitality and tourism context, delivering extraordinary products/services can generate positive emotional responses among tourists, who are constantly seeking memorable experiences (Khoi and Le, 2022). The emotional experience of using a good/service can enhance its desirability, particularly if it evokes excitement, fascination, or joy. The Henn-na Hotel in Japan provides a unique and innovative example of a product that has become socially desirable due to the automation of most of its services (Pizam et al., 2022). This differentiation from traditional hotel services has elevated the status of its consumers, thus making it a cool technological service/product (Tiwari et al., 2021). Similarly, the latest technological cruise ships provide a unique technological experience along with luxury services (Celebrity Cruises, 2022; Loureiro, Japutra, et al., 2019) are considered desirable products, especially for the younger generation.

2.5. The role of discomfort

The level of customers' technology readiness to adopt new technology is assessed based on positive (e.g., the potential to enhance the work environment) and negative (e.g., distrust of the new technology) factors encountered by customers (Sunny et al., 2019). This assessment offers insights into "people's propensity to embrace and use new technologies" (Parasuraman, 2000, p. 308). Previous studies in the hospitality and tourism context have primarily focused on analyzing tourist behavior toward automated self-service technologies (Kaushik and Rahman, 2017; Lee et al., 2012; Liljander et al., 2006; Wang et al., 2017), and latest research has delved into the use of emerging technologies (e.g., AI, AR, and VR) by tourists (Ahmad et al., 2023; Han et al., 2024; Shin and Jeong, 2022), highlighting the significance of technology readiness in tourism.

Although it has been demonstrated that this construct is commonly used to understand customers' mental readiness for embracing cutting-edge technological innovations (Blut and Wang, 2020), most of the prior studies discussed the four original dimensions of technology readiness — optimism, innovativeness, discomfort, and insecurity — introduced by Parasuraman (2000). This study will center only on one dimension, discomfort, which represents a prominent facet of customers' mental readiness (Lu et al., 2012; Parasuraman and Colby, 2015). Defined as "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Parasuraman, 2000, p. 311), the discomfort was selected due to the limited attention given to the challenges that travelers faced when using the new technology adopted by the tourism and hospitality sectors. While most of the studies focused on the optimism and innovativeness that technology brings to these sectors (Ahmad et al., 2023; Shin and Jeong, 2022), less consideration has been given to the potential distrust of technology resulting from travelers' lack of control and understanding of the newest technologies (Lu et al., 2012), which they are now indirectly forced to use as part of the service.

Hence, discomfort calls for further consideration (Sunny et al., 2019), especially within the cruise industry sector. In this sector, travelers of different ages encounter a wide range of technologies (Buhalis et al., 2022; Papathanassis, 2017), which may be perceived as challenging or difficult to use due to their complex functionalities, particularly in an environment where human services are traditionally provided and travelers are accustomed to them (Gonzáles-Santiago et al., 2024).

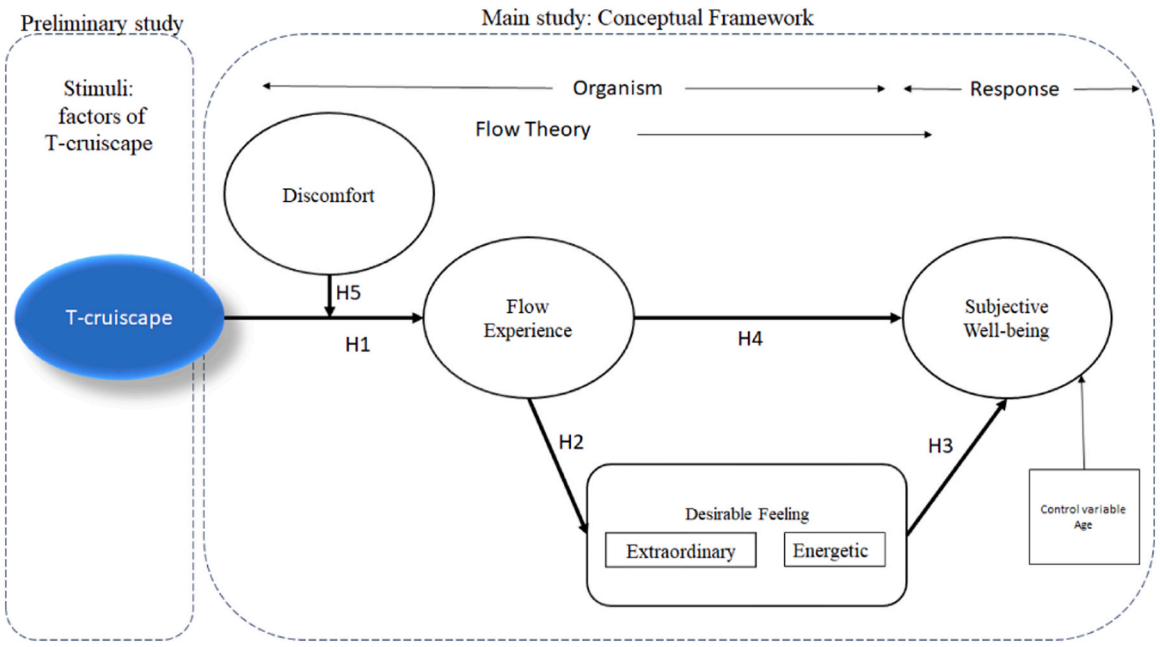

Fig. 1. Conceptual framework. Source: Authors' elaboration.

2.6. Conceptual framework and hypotheses development

The proposed conceptual framework is grounded on the Stimulus-Organism-Response (S-O-R) framework and the Flow Theory (Fig. 1) and states that the environmental stimulus (S) leads to an emotional reaction from customers' organisms (O), which, in turn, influences responses (R).

Servicescape is often regarded as stimuli that can affect emotions and behaviors (e.g., Lockwood and Pyun, 2019; Radic et al., 2021; Xu and Gursoy, 2020). In the current study, stimuli are represented by the different factors – which depend on the characteristics of the service and the level of technology employed – that integrated the T-cruiscape. The stimuli of the T-cruiscape are expected to generate cognitive and emotional states (Kwortnik, 2008), affecting the organism. These states can be developed during the interactions with the aesthetic visual of the cruise ship environment. When the interaction is such that the technology is felt as effortless and rather enjoyable in reference to the physical, technological, and social environment — with passengers losing self-consciousness, and self-reinforcement (Novak et al., 2000) — flow experience is expected to occur. Therefore, we hypothesize:

H1: T-cruiscape positively influences cruise passengers' flow experience.

Desirable feelings represent emotional exacerbations (Khoi and Le, 2022; Reinikainen et al., 2021; Warren et al., 2019). This emotional intensification can result from a flow experience, such as when passengers engage with onboard technology. They are not only focused on the technology they are using, but they are also genuinely enjoying it (Lee, 2018). This immersive and pleasurable experience causes passengers to lose track of time, demonstrating the significant impact of such interactions. Flow, therefore, represents an optimal and immensely enjoyable experience characterized by complete concentration, joy, and deep interest in the activity (Rodriguez-Sanchez et al., 2008). It also involves positive feelings associated with the activity, as evidenced by Lee and Wu (2017), who found that consumers experience a sense of enjoyment, pleasure, and fun from being in a flow state while interacting in an online store.

Therefore, passengers living a flow experience will be so focused on such an experience that they forget anything that is not connected to such an experience. This process can develop a very intense, extraordinary, and energetic emotional state, leading us to propose:

H2: Cruise passengers' flow experience positively affects desirable feelings.

The characteristics of products can influence consumer emotions (Penz and Hogg, 2011; Tran et al., 2024). Cruise ships are products composed of tangible and intangible facets (service offered) that have the power to generate emotional responses, such as pleasure or arousal (Kang, 2020; Loureiro and Blanco, 2021).Therefore, the positive experience of using such products/services can increase passengers' subjective well-being.

This study, focusing on technological services provided on cruise ships and following Warren et al. (2019), considers desirability as a technological service offering superior functional value, such as the cruise app that enables faster service (Gonzáles-Santiago et al., 2024). Additionally, energetic technological services can convey strong enthusiasm, energy, and vigor to passengers, as seen with the AR dining experience or robot bartenders that customize drinks (Buhalis et al., 2022). These desirable feelings – extraordinary and energetic – arise from the technological services/products (Kim and Hall, 2019) regarding that cool onboard cruise ships can increase the subjective well-being of the passengers if they experience positive emotions from the interactions (Lee et al., 2018). Thus, the impact of technological services/products on cruise passengers' emotions can generate satisfaction, which, in turn, affects their subjective well-being. As a result, we proposed:

H3: Desirable feelings positively influence cruise passengers' subjective well-being.

The state of flow proposed by Csikszentmihalyi (1975) continues to be a subject of interest and discussion among researchers. Individuals are recognized to become fully engaged in an activity, experiencing enjoyment to the extent that nothing else seems to matter (Hsu and Lu, 2004).

This state of full engagement and immersion in activity can promote positive emotions and happiness (Filep, 2014), thereby enhancing the subjective well-being of the individual. Kim and Hall (2019) found the relationship between flow experience and subjective well-being to be positive and has been demonstrated to be stronger, especially regarding leisure activities (Kang, 2020; Yu et al., 2021). Flow occurs in technological tourism activities (Kim et al., 2017; Lee et al., 2018) – such as those available on the newest cruise ships – where passengers can experience services leveraged by digital technologies (e.g., contactless

payments, virtual assistance, virtual excursions) or being served by service robots (Buhalis et al., 2022; Papathanassis, 2017). These services are so captivating and distinct from other aspects of life that they can trigger happiness.

Further, based on the S-O-R framework, previous studies have confirmed that flow experience plays a mediating role (Kim and Hall, 2019; Liu et al., 2016). Several studies demonstrate that the emotional reaction of consumers, such as feeling happiness (organism), can mediate the relationship between stimuli (servicescape) and consumer response (subjective well-being) (Kim et al., 2017; Lee and Jeong, 2012). Thus, flow experience can enhance the subjective well-being of cruise passengers. Accordingly, we propose:

H4: Cruise passengers' flow experience significantly affects subjective well-being

Wang et al. (2017) argued that travelers' use and satisfaction with technologies depend on their technological readiness, influenced by the traveler's age and profession, among others. The study also confirms that "technology readiness is an important determinant or moderator of consumer attitudes toward and adoption of technologies" (Wang et al., 2017, p. 563).

Technology readiness is described as a two-dimensional construct that triggers both positive and negative feelings toward technology (Parasuraman, 2000). Optimism refers to a positive belief that technology can enhance the travel experience, driving people toward new technologies. In contrast, discomfort represents distrust and fears of technology, which may hold individuals back (Parasuraman, 2000; Sunny et al., 2019).

Considering the faster disruption of technologies, this study specifically examines the dimension of discomfort, recognizing the necessity for further exploration (Sunny et al., 2019). This is particularly relevant since travelers are consistently required to adapt and familiarize themselves with new technologies, especially on cruise ships that are continually integrating new technological advancements (Son and Han, 2011).

Given the rapid pace of technological disruption, this study specifically examines the dimension of discomfort, acknowledging the necessity for further investigation (Sunny et al., 2019). This is particularly relevant as travelers should continually adapt and familiarize themselves with new technologies, especially on cruise ships that are consistently integrating technological advancements (Son and Han, 2011). Consequently, cruise passengers who experience discomfort with technology-based services often perceive these services as more complex and challenging to use. According to Flavián et al. (2022), this discomfort arises from a lack of familiarity and confidence in using new technologies, which can make the learning curve steeper and the overall experience more intimidating. This perception of complexity can lead to increased focus and engagement, as passengers are compelled to pay closer attention to navigate these unfamiliar systems effectively (Peifer, 2012; Peifer and Tan, 2021).

Building on this premise, we argue that when cruise travelers feel discomfort while using new technologies, their flow experience may be enhanced due to the additional cognitive effort required. Passengers who are uncomfortable with technology might find themselves more engaged and focused, as they need to pay closer attention to understand and use the technology. This heightened focus can facilitate a deeper state of flow, as the challenge of mastering the technology becomes an engaging and immersive experience. Therefore, discomfort may act as a moderating variable that can strengthen the relationship between T-cruiscape and the flow experience, and the following hypothesis is proposed:

H5: Cruise passengers' discomfort can strengthen the relationship between the T-cruise and the flow experience.

3. Preliminary study: facets of T-cruiscape

3.1. Methodology

The preliminary study aims to uncover the facets to be regarded to measure T-cruiscape. In the literature, there is no consensus regarding the number and categorization of factors to consider in servicescape (e.g., Lockwood and Pyun, 2020; Radic et al., 2021)This categorization depends on the characteristics of the service offered, which evolve over time and according to the level of technology incorporated. The service offered inside cruise ships is not an exception. To better capture its characteristics and measure T-cruiscape, we conducted semi-structured in-depth interviews with crew members and passengers during 2022.

Crew members had to meet the following specific criteria to qualify for the interviews: (1) work on the newest cruise ships, as those ships have introduced technologies into their services; (2) have experience working with the new service technology (service robots, virtual assistance, digital dining) (Li et al., 2019). Passengers interviewed were those who had recent experience using technology on a cruise ship. We conducted a total of 35 interviews, reaching saturation after 26 (Creswell, 2014)

After accepting the interview, crew members and passengers were invited to recommend this study to others with similar characteristics, with anonymity guaranteed to all participants (Salmons, 2014). The interview began with the overall introduction of the research, followed by open-ended questions (Mason, 2002), allowing interviewers to expand on what they consider important.

The interviews (lasting 40–60 min each) were audio-taped with participants' permission. Subsequently, these recordings were transcribed verbatim for analysis. An open–axial–selective coding was employed for data analysis (Strauss and Corbin, 1998), following the steps of the Gioia Methodology (Gioia et al., 2013). A computer-based qualitative analysis (MaxQda2020) supported the coding process. The analysis involved extracting relevant quotation concepts from each interview transcript, comparing similarities and differences between codes, and categorizing them at a more abstract level. The results were further elaborated into higher levels of abstraction and integrated into aggregate dimensions.

3.2. Findings

Participants' ages ranged between 26 and 73 years old. Sixteen are female, one decided not to say, and the rest are male. Among the crew members, there were diverse positions, including cruise staff, Maitre d'hotel, IT Manager, Senior Manager Kids & Families Entertainment, Hotel Director Manager, Guest relations manager, Future Cruise Manager, Casino, Multimedia Technician/Digital content specialists, Marketing Communication Manager. Crew participants were experienced in cruise ships, most of them had between 6 and 20 years in the cruise sector.

The data analysis uncovered seven facets for delimitating the T-cruiscape, including visual appeal, originality of design, usability, customization, interactivity, perceived security, and social presence (see Table 2). The new service technologies onboard cruises are regarded as visually attractive to passengers due to their design, originality, and creative features (visual appeal, originality of design).

Technologies enhance the passengers' ability to utilize new services and activities, which made this aspect a topic of discussion in the interviews. For cruise ship members, the younger generation, who are the main users during cruises, demonstrates a keen interest in these technologies. Crew members highlight that onboard technologies assist passengers in locating places and venues, a feature especially useful for first-time cruisers or frequent cruisers on a new ship. By interacting with these technologies in various ways (e.g., through apps, digital screens, or service robots) passengers receive services tailored to their needs, thereby replicating the traditional human-assisted services typically

Table 2
Overview of the findings of the preliminary study.

Facet	Excerpt from the interview	Literature	
		Conceptualization	Source
Visual appeal	*Guests onboard are inquisitive about the robot bartender […] for the digital screens, people stop to find out specific information. (R8)* *In my opinion, the aesthetic of the technology attracts the guests, particularly the younger people. (R20)*	Aesthetic: elements intrinsic to a consumption setting (including technologies) that are manifest in the visual appeal	Mathwick et al. (2002)
Original design	*Apps are generally well-designed. (R11)* *Technology is innovative, modern and that impacts the experience. (R21)*	The originality and creativity of the setting and technologies	Harris and Goode (2010) and Grewal et al. (2004)
Usability	*Most technologies are built to be intuitive and easy usage. (R5)* *On digital screens, passengers are looking for the main directions or location of venues. (R8)* *For embarking in some ports like the Everglades, facial recognition makes it faster. (R29)* *As a young family that travel with kids, this ship suits us. The technologies help us, and the small itineraries are good. (R30)*	Ease of using the technology; user-friendly	Harris and Goode (2010)
Customization	*The main selling point for these services is definitely …the fact the preferences are remembered and used to suggest other activities onboard. (R5)* *Suggestions based on historical behavior there is great mileage, and guests respond well to having been served tailored activities. (R15)* *I used the app to book the main dining room every night of the cruise; even it asked me if I wanted to dine at the same time every night. (R29)*	The extent to which the setting (cruise) can recognize a customer and then tailor the service and technology for that customer	Srinivasan et al. (2002)
Interactivity	*Fast check-in, booking of experiences, instant feedback, daily programs, preference saved and transferred between restaurants, etc. (R15)* *Being able to find guests' way on the touchscreen maps or being able to add only the ship activities that guests prefer to their agenda, easy bookings, and important notifications (R18)* *Technologies work good, with no issues. …* *The digital queues for bookings worked well for us, and so far, we haven't experienced any problems with the technology. (R30)*	Dynamic nature of the involvement between a setting (cruise) and its customers	Srinivasan et al. (2002)
Perceived security	*For instance, we implemented kiosks where guests can set up their onboard account with a credit card or cash and pay the bill; this is open 24/7 and the information they provide is secure (not used for anything else). (R9)* *Passengers can pre-reserve and book dining and shore before they board. They can add their credit card and check their account. Soon, they will be able to choose their debark group. (R16)*	The extent to which individuals perceive the technological processes and general policies for data storage of the setting (cruise) as secure or safe	Swaminathan et al. (1999) and Harris and Goode (2010)
Social presence	*When new technologies like robots or a virtual/digital concierge were implemented onboard, the guests that usually cruise with us were a little reluctant because they are used to interact with crew members, but, in the end, they end up using them because the service is provided faster and feels that there is more privacy. (R3)* *The robot bar is a welcome experience… friendliness. (R7)* *We implemented a voice-activated device like Google's Alexa called Zoe in our cabins on our latest vessel. In the beginning, people need to learn how to use or interact […] then people start to feel a sense of belonging. (R8)* *The virtual assistance in cabins mostly answering questions and providing information but, in my opinion, can communicate some human warmth. (R18)*	The extent to which technologies in the setting (onboard cruise) are capable of conveying a sense of human touch (friendliness, belonging, warmth, and sensitivity)	Dassanayake and Senevirathne (2018)

(*continued on next page*)

Table 2 (*continued*)

Facet	Excerpt from the interview	Literature	
		Conceptualization	**Source**
Age	*If a guest is old, they are more likely to reject the technological service and ask for human assistance. (R26)* *Senior guests refuse to use the new technology. (R04)* *For younger guests, new technologies are like interacting with their phones or being online. (R03)* *I tried the app, the big screen next to the elevator, and kiosks to get faster services since most of the old people doesn't like to use them; I don't even see them with phones. (R31)* *I never found the menus of the main dining room on the app. I prefer to go to the entrance of the restaurant and read them there every day. (R32)* *My grandson made all the bookings for me. It is just too complicated. (R33)* *Technologies are used to attract the younger demographics, and they are more and more selling short trips with less than 7 days—something that we are not used to. (R35)*	Age can be a factor that differentiates the ability to use technology and change behavior	Zhang et al. (2017) and Islam et al. (2018)

Note: R-refers to the participant
Source: Authors' elaboration

available on cruise ships (usability, customization, interactivity; see Table 2).

The crew members and passengers interviewed recognize that passengers may have concerns about data security when providing their information via technology. Yet, they also claimed that cruise companies have considered that, and they reveal that, in their opinion, passengers are comfortable sharing their personal information, including credit card details and facial recognition data. By divulging this information, passengers can fully utilize all onboard technologies, which, in turn, remember their preferences and elevate their overall service experience (perceived security; see Table 2).

Virtual agents on cruise ships are integrated seamlessly into the cruise apps as digital concierges (Lee and Jeong, 2012; Gonzáles-Santiago et al., 2024). These agents — for instance, voice-enabled assistant ZOE at MSC Cruises (MSC Cruises, 2022) — can provide information about onboard services and answer a multitude of questions about the cruise in various languages. The social presence experience is further enhanced by ROB – the humanoid-robot bartender at MSC Cruises – who can engage in conversation with passengers while preparing drinks and expressing emotions (MSC Cruises, 2021) (social presence, see Table 2). Taken together, both the literature review (see Table 1) and the findings from interviews, the main study incorporates the seven facets to measure T-cruiscape.

4. Main study: conceptual framework

4.1. Methodology

4.1.1. Sample and data collection

Data were collected by intercepting passengers over 18 years old when they left the cruise at the Lisbon Cruise Port terminal in the morning and upon returning to the ship (Creswell, 2014). This cruise port was chosen because it can accommodate a wide range of ships of different sizes, including the latest technological ships selected for this study (Porto de Lisboa, 2024). It is also the largest cruise terminal in Portugal and was recognized by the World Cruise Awards (2024) as the Best Cruise Terminal in Europe in 2022. Three ships — belonging to the world's leading cruise companies (i.e., Carnival Corporation, Royal Caribbean Cruises, and MSC Cruises) — were approached with authorization during the high season of 2023 on various days. These ships were considered representative of the cruise context, as they are among the latest smart-tech cruise ships built and currently in operation (CLIA, 2023). Only cruise passengers who embarked on a cruise journey for the first time (to avoid past experiences in memory) and who used technological devices onboard were considered (Malhotra, 2015). In total, 358 valid responses were retrieved from 400 distributed.

4.1.2. Profile of participants

Participants were balanced in terms of gender (52.4 % males and 47.6 % female), and no one signaled another gender. The majority of them fall within the 26 and 45 age group (25.6 %), followed by older passengers, aged between 66 and 75 years old (20.9 %). This result is

Table 3
Sociodemographic profile of the cruise passengers.

Variable	Category	Percentage
Gender	Female	47.6
	Male	52.4
Age	18 – 25	8.1
	26 – 35	12.8
	36 – 45	12.8
	46 – 55	16.2
	56 – 65	16.4
	66 – 75	20.9
	> 76	12. 8
Education	Less than a high school diploma	8.9
	High school degree or equivalent	36.5
	Bachelor's degree	42.9
	Master's degree	11.4
	Doctoral degree	0.3
Occupation	Working (paid employee)	46.5
	Working (self-employed)	8.4
	Not working (unemployed)	8.0
	Student	5.3
	Retired	38.7
	Prefer not to answer	1.0
Country	UK and Ireland	69.6
	North America	12.8
	Latin America	4.4
	Europe	3.7
	Rest of the world	9.5

Source: Authors' elaboration

Table 4
Measurement model.

Construct	Factor Loading	Adapted from
Visual appeal *(α: 0.917, CR: 0.948, CRm: 0.918, AVE: 0.859)*		Mathwick et al. (2002)
I find these technologies onboard cruise ships visually attractive.	0.929	
I consider these technologies onboard cruise ships to be aesthetically appealing.	0.943	
I like the way these technologies onboard cruise ships look.	0.908	
Originality design *(α: 0.751, CR: 0.889, CRm: 0.889, AVE: 0.801)*		Harris and Goode (2010) and Grewal et al. (2004)
I find these technologies onboard cruise ships to be original.	0.897	
I find these technologies onboard cruise ships to be innovative and creative.	0.893	
Usability *(α: 0.864, CR: 0.917, CRm: 0.917, AVE: 0.786)*		Harris and Goode (2010)
I believe that a first-time cruiser can use these technologies onboard cruise ships without much help.	0.892	
I use these technologies onboard cruise ships because is easy to find what I am looking for.	0.912	
I find these technologies onboard cruise ships to be very user-friendly.	0.854	
Customization *(α: 0.734, CR: 0.849, CRm: 0.948, AVE: 0.653)*		Srinivasan et al. (2002)
I feel that these technologies onboard cruise ships are tailored explicitly toward me.	0.838	
If I wanted to, I could easily customize these technologies onboard cruise ships to what I like (e.g., changing colors, layout, fonts, view, etc.).	0.767	
I find that these technologies onboard cruise ships make recommendations that specifically address my needs.	0.818	
Interactivity *(α: 0.751, CR: 0.889, CRm: 0.902, AVE: 0.800)*		Srinivasan et al. (2002)
I can interact with the content of these technologies onboard cruise ships in different ways.	0.907	
I appreciate the search tool in these technologies onboard cruise ships that assists me in finding what I want.	0.882	
Perceived security *(α: 0.866, CR: 0.918, CRm: 0.945, AVE: 0.790)*		
I feel that technologies onboard cruise ships are very secure.	0.917	Swaminathan et al. (1999) and Harris and Goode (2010)
I have no concerns about providing my details to these technologies onboard cruise ships.	0.927	
I find the security systems of these technologies onboard cruise ships rigorous.	0.819	
Social presence *(α: 0.903, CR: 0.928, CRm: 0.928, AVE: 0.720)*		Dassanayake and Senevirathne (2018)
I feel a sense of human touch whenever I interact with these technologies onboard cruise ships.	0.820	
I feel a sense of friendliness whenever I interact with these technologies onboard cruise ships.	0.880	
I get a feeling of belonging whenever I interact with these technologies onboard cruise ships.	0.845	
I notice a sense of human warmth in these technologies onboard cruise ships.	0.847	
I perceive a sense of human sensitivity in these technologies onboard cruise ships.	0.851	
Flow experience *(α: 0.837, CR: 0.902, CRm: 0.849, AVE: 0.755)*		(Huang et al., 2017)
When I use these technologies onboard cruise ships, I do not think about anything else.	0.852	
When I use these technologies onboard cruise ships, I am totally absorbed in what I am doing.	0.912	
When I use these technologies onboard cruise ships, I lose track of time.	0.841	
I perceive a sense of human sensitivity in these technologies onboard cruise ships.	0.851	
Extraordinary *(α: 0.923, CR: 0.945, CRm: 0.929, AVE: 0.812)*		Warren et al. (2019)
I find it (the selected technology) exceptional.	0.928	
I believe it (the selected technology) is superb.	0.913	
I think it (the selected technology) is fantastic.	0.896	
I consider it (the selected technology) extraordinary.	0.866	
Energetic *(α: 0.898, CR: 0.929, CRm: 0.856, AVE: 0.766)*		Warren et al. (2019)
I find it (the selected technology) energetic.	0.819	
I see it (the selected technology) as outgoing.	0.887	
I find it (the selected technology) lively.	0.903	
I perceive it (the selected technology) as vigorous.	0.890	
Subjective well-being *(α: 0.917, CR: 0.941, CRm: 0.941, AVE: 0.801)*		Kim and Hall (2019)
I feel that using these technologies onboard cruise ships fits perfectly with my ideal life.	0.916	
I am experiencing excellent conditions in my life while using these technologies onboard cruise ships.	0.927	
I am satisfied with my life when using these technologies onboard cruise ships.	0.886	
So far, I have gotten the important things I want by using these technologies onboard cruise ships.	0.848	
Discomfort *(α: 0.700, CR: 0.855, CRm: 0.856, AVE: 0.747)*		Parasuraman (2000)
I often find these technologies onboard cruise ships to be overly complicated to be useful.	0.920	
I sometimes feel overwhelmed by the amount of knowledge required to use these technologies onboard cruise ships effectively.	0.807	

Note: α: Cronbach's alpha; CR: Composite reliability; CRm: Composite reliability with a marker; AVE: Average Variance Extracted.
Source: authors' elaboration

aligned with the recent report by CLIA (2024), indicating the increasing enthusiasm of millennials toward cruise travel.

Most participants hold a bachelor's degree (42.9 %) and are working employees (46.5 %) or have already retired (38.7 %). Additionally, since the selected ships were sailing in European itineraries, the majority of the respondents were from the U.K. and Ireland (69.6 %), with North American passengers accounting for 12.8 % and a smaller percentage for Latin American passengers (4.4 %) and European passengers (3.7 %) (see Table 3).

4.1.3. Measurements

Considering the measurement scales, we used prior validated scales to ensure validity and reliability (see Table 4). Thus, T-cruiscape is

composed of seven factors — visual appeal, design, usability, customization, interactivity, security, and social presence — adapted from diverse scales. Visual appeal was measured with three items adapted from Mathwick et al. (2002). Originality design and usability were based on Grewal et al. (2004) and Harris and Goode (2010). Customization and interactivity were adapted from Srinivasan et al. (2002). Security was measured using a scale adapted from Swaminathan et al. (1999) and Harris and Goode (2010). Lastly, social presence used five items based on Dassanayake and Senevirathne (2018).

Regarding the other constructs, two items were used to measure discomfort from the study of Parasuraman (2000). The eight items for desirability, comprising extraordinary and energetic, were measured using the study of Warren et al. (2019). Subjective well-being, with four items, was based on Kim and Hall (2019). The three items used to measure flow experience were from the work of Huang et al. (2017).

All the items were measured with a 7-point Likert-type scale, ranging from "strongly disagree" to "strongly agree". The questionnaire was developed in English (the official language used on cruise ships) and included social demographic questions such as gender, age, educational level, and profession. A pilot test for its content analysis was conducted with ten individuals, comprising passengers and crew members to ensure the questionnaire's accuracy and readability. Based on the feedback from the pilot, necessary changes were made, including revising the wording of some scale items.

This study assessed the common method bias (CMB) using the marker variable approach (Chin et al., 2013). The marker variable was the attitude toward the color blue measured with four items (e.g., "I like the blue color") (Williams et al., 2010). Finally, we considered age as a control variable. Age is often regarded as a control or moderator variable in studies to understand consumer or tourist behavior (e.g., Islam et al., 2018; Zhang et al., 2017). Crew staff – during the interviews in the preliminary study – also mentioned that younger passengers tend to be more enthusiastic about technology and consider it more easily friendly than the older ones. Therefore, age may influence the passengers' well-being.

4.2. Results

4.2.1. Measurement model

In this study, we used the Partial Least Square (PLS) method and SmartPLS4 software for data analysis. The conceptual framework is an exploratory and predictive model and the PLS approach is suitable for such a purpose (Hair et al., 2021; Ali et al., 2018).

The reliability of the individual measures, the convergent validity, and the discriminant validity of the constructs were analyzed to assess the measurement model (see Table 4). The results show that all item loadings are above the recommended value of 0.7. The Cronbach's alpha and the composite reliability for each construct are higher than 0.7, and the Average Variance Extracted (AVE) values are higher than 0.5, confirming the reliability of the scales and their convergent validity (Hair et al., 2021).

To test discriminant validity (see Table 5), first, we used the Fornell-Larcker criterion and verified that the square root of the AVE for each construct was greater than the inter-construct correlation values (Fornell and Larcker, 1981). Subsequently, the Heterotrait-Monotrait Ratio (HTMT), which measures the average of the HTMT correlations, found that all values were below the 0.9 threshold (Hair et al., 2021), thus meeting the discriminant validity criterion. Finally, as T-cruiscape was measured as a second-order formative construct with seven dimensions, the variance inflation factor (VIF) was used to detect multicollinearity, where the value should be equal to or lower than 5 (Hair et al., 2021). In this study, all VIF values were in such condition, with the maximum VIF recorded at 3.398, indicating the absence of multicollinearity issues (Lee and Xia, 2010) (see Table 6).

4.3. Structural results

The bootstrapping procedure (with 5000 sub-samples) at a 95 % confidence interval was used to calculate the significance of the path coefficients and test the hypothesis of the structural model (Hair et al., 2021). While structuring the model, two second-order constructs were estimated; both had their dimensions based on previous studies. The first was named T-cruiscape, including seven first-order formative constructs, all previously checked for validity and reliability. All T-cruiscape indicators were significant at 0.001 level. Among them, visual appeal (weight = 0.212, $t = 25.047$, $p < 0.001$) and social presence (weight = 0.270, $t = 19.827$, $p < 0.001$) appear as most relevant. The other second-order construct was named desirable feelings, including two first-order reflective constructs or indicators, both previously evaluated for validity and reliability.

The direct effects demonstrate that T-cruiscape has a positive effect on the flow experience, ($\beta = 0.517$, $t = 8.575$, $p < 0.001$), supporting H1. Similarly, the effect of flow experience on desirable feelings ($\beta = 0.595$, $t = 15.956$, $p < 0.001$) is positive and significant, supporting H2. Further, H3, which explores the positive effect of desirable feelings on subjective well-being, was also supported ($\beta = 0.366$, $t = 9.599$, $p < 0.001$). Flow experience has a positive effect on subjective well-being ($\beta = 0.507$, $t = 15.132$, $p < 0.001$), thus supporting H4. Although passengers' discomfort does not influence directly the flow experience, significantly ($\beta = 0.022$, $t = 0.358$, $p > 0.05$), the results of the moderator analysis revealed that passengers' discomfort with technologies moderates the relationship between T-cruiscape and the flow experience, such that variations in discomfort tend to strengthen this relationship, hence supporting H5 ($\beta = 0.153$, $t = 4.106$, $p < 0.001$) (see Table 7 and Fig. 2).

Regarding the mediation effect of desirable feelings, the specific indirect effect flow experience → desirable feelings → subjective well-being ($\beta = 0.218$, $t = 8.062$, $p < 0.001$) is significant at 0.001 level,

Table 5
Discriminant validity.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Design	0.895	**0.649**	**0.697**	**0.719**	**0.505**	**0.647**	**0.860**	**0.711**	**0.751**	**0.679**	**0.493**	**0.782**
2. Discomfort	−0.489	0.864	**0.531**	**0.675**	**0.421**	**0.674**	**0.622**	**0.657**	**0.638**	**0.629**	**0.444**	**0.705**
3. Energetic	0.571	−0.429	0.875	**0.794**	**0.647**	**0.605**	**0.632**	**0.782**	**0.650**	**0.681**	**0.450**	**0.617**
4. Extraordinary	0.598	−0.543	0.814	0.901	**0.651**	**0.689**	**0.617**	**0.821**	**0.686**	**0.707**	**0.551**	**0.687**
5. Flow experience	0.401	−0.330	0.560	0.572	0.869	**0.511**	**0.501**	**0.710**	**0.531**	**0.825**	**0.546**	**0.504**
6. Security	0.521	−0.532	0.533	0.616	0.430	0.889	**0.626**	**0.757**	**0.674**	**0.575**	**0.461**	**0.667**
7. Visual	0.797	−0.519	0.573	0.568	0.440	0.557	0.927	**0.684**	**0.740**	**0.671**	**0.457**	**0.767**
8. Customization	0.528	−0.494	0.637	0.679	0.550	0.608	0.563	0.808	**0.818**	**0.769**	**0.623**	**0.808**
9. Interactivity	0.565	−0.477	0.535	0.573	0.423	0.543	0.614	0.761	0.895	**0.664**	**0.513**	**0.778**
10. S. well-being	0.563	−0.530	0.618	0.652	0.724	0.512	0.617	0.629	0.551	0.895	**0.652**	**0.698**
11. Social presence	0.409	−0.372	0.410	0.506	0.479	0.412	0.422	0.511	0.431	0.598	0.849	**0.518**
12. Usability	0.630	−0.566	0.545	0.614	0.429	0.576	0.684	0.649	0.629	0.624	0.464	0.887

Note: Bottow-left Fornell Lacker criterion; top-right in bold Heterotrait–Monotrait Ratio (HTMT) criterion
Source: authors' elaboration

Table 6
Inner model VIF.

	Design	Desirable feeling	Discomfort	Energetic	Extraordinary	Security	Visual	Customization	Flow experience	Interactivity	S. well-being	Social presence	T-cruiscape	Usability	Discomfort x T-cruiscape
Design													2.901		
Desirable feeling				1.000	1.000						1.548				
Discomfort									1.651						
Energetic															
Extraordinary															
Security													1.847		
Visual													3.398		
Customization													3.036		
Flow experience		1.000									1.548				
Interactivity													2.749		
S. well-being															
Social presence													1.440		
T-cruiscape									1.999						
Usability													2.485		
Discomfort x T-cruiscape									1.277						

Source: Authors' elaboration

suggesting a mediator effect. The direct effect flow experience → subjective well-being is also significant ($\beta = 0.507$, $t = 15.132$, $p < 0.001$), indicating the existence of a partial mediation.

The Stone–Geisser Q^2 statistic used to evaluate the predictive relevance of the model, shows results above zero (Hair et al., 2021), which means that the relationship in the model has a strong predictive relevance (see Table 7). The results of R^2, which represents the variance of the amount of the construct explained by the model, are greater than 0.1 (flow experience =0.362, desirable feelings = 0.354, and subjective well-being = 0.611), exceeding the recommended value (Falk and Miller, 1992). In addition, we assessed the effect size (f^2) to measure the effect of one variable on another one. Based on Cohen's (2013) criteria, f^2 values range from 0.02 (small) to 0.15 (medium) and 0.35 (large), thus showing the impact of the independent variable on the dependent variable. The results of this study show a substantial effect size, ranging from 0.036 to 0.548 (small to large) (see Table 7). Lastly, the normed fit index (NFI) was 0.90, as recommended, and the standardized root mean square residual (SRMR) of the model was 0.07, which is lower than 0.08, both indicating a good model fit (Hair et al., 2021).

This study assessed the common method bias (CMB) using the marker variable approach (Chin et al., 2013). The marker variable was the attitude toward the color blue measured with four items (e.g., "I like the blue color") (Williams et al., 2010). This marker was distributed among the constructs, that is, linked to each variable in the conceptual framework to measure the path values in the presence of the marker. The comparison analysis between the baseline model without the marker variable and the CMB test model with the marker variable was conducted using SmartPLS4. The results (see Table 7) indicated that there were no significant differences between the models, suggesting the absence of CMB in the study. Although the path value is negative ($\beta = -0.056$, $t = 1.432$, $p > 0.05$), the results for the control variables did not show any significant effect.

5. Discussion

The current research highlights seven distinct aspects that warrant further discussion. First, a second-order construct, termed T-cruiscape, was introduced. This construct comprises a seven-factor structure from prior research on e-servicescape (Harris and Goode, 2010) and hotel service environments (Brunner-Sperdin et al., 2012). The structure was sequentially refined based on qualitative interview insights. T-cruiscape forms an index, with social presence (weight = 0.270, $p < 0.001$) and visual elements (weight = 0.212, $p < 0.001$) having the highest weights.

The relevance of social presence can be attributed to technology's ability to foster a sense of presence via avatars or other forms of online assistance, leading passengers to feel as though they are interacting with a human crew member (Roy et al., 2019). Interviewees supported this finding, highlighting that social interaction onboard cruise ships is no longer limited to human interactions. These results are also in line with Flavián et al. (2024), which suggests that automated social presence allows consumers to feel understood by technology, similar to their interactions with human employees. This study extends prior research by demonstrating the influence of social presence in the new technological environment of cruise ships. Although this concept has been investigated in the smart retail context (Roy et al., 2019), it is being studied here in the cruise ship context for the first time.

Regarding visual appeal, the current research demonstrates that the aesthetic aspects of these technologies can persuade passengers to use them, even without prior experience (Harris and Goode, 2010). This effect is enhanced when the technologies are user-friendly, enabling even first-time cruisers to use them. Thus, passengers' positive perceptions of these technologies and the cruise company are further enhanced.

Secondly, the T-cruiscape positively influences cruise passengers' flow experience, thereby supporting H1. This claim means that as passengers embrace the cruise ship's service attributes—particularly social

Table 7
Structural results.

Relationships	B	SD	t	*p*-value	Bias Corrected Confidence Interval		f^2	Hypothesis
					Lower Bound	Upper Bound		
Direct effect								
T-cruiscape → Flow experience (with moderation)	0.517	0.060	8.575	0.000	0.397	0.635	0.210	H1:Supported
Flow experience → Desirable feelings	0.595	0.037	15.956	0.000	0.520	0.666	0.548	H2:Supported
Desirable feelings → Subjective well-being	0.366	0.038	9.599	0.000	0.289	0.440	0.223	H3:Supported
Flow experience → Subjective well-being	0.507	0.033	15.132	0.000	0.443	0.573	0.427	H4:Supported
Discomfort x T-cruiscape → Flow experience	0.153	0.037	4.106	0.000	0.080	0.228	0.036	H5:Supported
Discomfort → Flow experience	0.022	0.062	0.358	0.720	−0.103	0.141	0.000	
Specific indirect effect								
T-cruiscape → Flow experience → Desirable feelings	0.308	0.046	6.722	0.000	0.220	0.400		
T-cruiscape → Flow experience → Subjective well-being	0.262	0.037	7.143	0.000	0.192	0.338		
Flow experience → Desirable feelings → Subjective well-being	0.218	0.027	8.062	0.000	0.166	0.272		
					Bias Corrected Confidence Interval			
Second order formative	Weight	SD	t	*p-value*	Lower Bound	Upper Bound		
Design → T-cruiscape	0.123	0.006	21.569	0.000	0.112	0.134		
Security → T-cruiscape	0.179	0.008	21.119	0.000	0.162	0.196		
Visual → T-cruiscape	0.212	0.008	25.047	0.000	0.196	0.228		
Customization → T-cruiscape	0.171	0.007	24.408	0.000	0.158	0.186		
Interactivity → T-cruiscape	0.125	0.006	21.793	0.000	0.114	0.136		
Social presence → T-cruiscape	0.270	0.014	19.827	0.000	0.243	0.297		
Usability → T-cruiscape	0.193	0.009	21.696	0.000	0.176	0.210		
Control variable	B	SD	t	*p-value*	Lower Bound	Upper Bound		
Age → Subjective well-being	−0.056	0.039	1.432	0.152	−0.133	0.019		
R^2 Flow experience	0.362	R^2 Flow experience (with marker)		0.362	Q^2 Desirable feelings		0.399	
R^2 Desirable feelings	0.354	R^2 Desirable feelings (with marker)		0.354	Q^2 Flow experience		0.342	
R^2 Subjective well-being	0.611	R^2 Subjective well-being (with marker)		0.611	Q^2 Subjective well-being		0.461	
Model fit								
SRMR	0.07	Chi-square		372.005				
d_ULS	0.29	NFI		0.90				
d_G	0.17							

Note: SD: Standard Deviation (STDEV); t: T statistics (|O/STDEV|); f 2 effect size; * **$p < 0.001$
Source: Authors' elaboration

presence, visual appeal, technology usability, and security—they are more likely to become fully immersed in a state of complete absorption, leading to flow and enjoyment (Baabdullah et al., 2022). As in other hospitality contexts (e.g., Huang et al., 2017; Lee, 2018; Lee and Jeong, 2012), technologies can enhance tourists' flow experience. The features of cruise technologies not only meet passengers' needs but also facilitate seamless interactions, contributing to increased concentration, enjoyment, and intrinsic interest (Lee and Jeong, 2012).Therefore, this study builds on previous research—for instance, the smart retail context (Roy et al., 2019)—to demonstrate, for the first time, the influence of social presence in the new technological environment in cruise ships.

The third aspect refers to the positive effect of cruise passengers' flow on desirable feelings, confirming H2. As a result, passengers focus on the technology they are using and genuinely enjoy the experience (Lee, 2018; Warren et al., 2019).This pleasurable experience generates positive emotions toward these technologies, creating an extraordinary and energetic emotional state in passengers as they use these new and desirable technological services on cruise ships.

Fourth, desirable feelings positively influence passengers' subjective well-being (H3). These findings reflect that passengers who experience strong enthusiasm or ecstasy from using these technologies (Lee et al., 2018) tend to consider that they fit well with their ideal lifestyle and feel satisfied with their onboard life.

Fifth, H4, suggesting a positive effect of flow experience on subjective well-being, was supported and is aligned with prior studies (e.g., Kim et al., 2017; Kim and Hall, 2019).These findings indicate that strong absorption and focus on the onboard technological experience affect passenger satisfaction with onboard life. Yet, the fact the indirect effects of Flow experience → Desirable feelings → Subjective well-being are also significant reveals that desirable feelings act as a partial mediation. Therefore, passengers do not need to feel that the technology and the onboard environment are exceptional, extraordinaire, or lively (desirable feelings) to consider that the cruise setting fits their lifestyle. However, if they feel desirability, it reinforces their well-being.

Sixth, this research confirms the moderating role of discomfort in the relationship between T-cruiscape and the flow experience among cruise passengers (H5). So, for passengers who find these technologies complex or challenging, the discomfort they experience prompts them to focus more on learning how to use them, thereby enhancing the flow effect. Although a lack of control or ability to handle these technologies might eventually result in their complete rejection (Flavián et al., 2022) and a preference for traditional crew services, research shows that initially, passengers may become more attentive and focused on the technological service if they feel the need to learn how to use it. Conversely, passengers who do not have discomfort when using technology tend to be less engaged with the experience, as its simplicity and lack of complexity fail to capture their full attention.

Lastly, the control variable (age) included in the model does not significantly affect the passengers' well-being. The negative path value suggests that younger passengers feel more comfortable using these technologies in the new technological environment (Zhang et al., 2024) compared to older passengers. However, the lack of significance in this effect indicates that the subjective well-being of both younger and older passengers is similar and does not significantly depend on age.

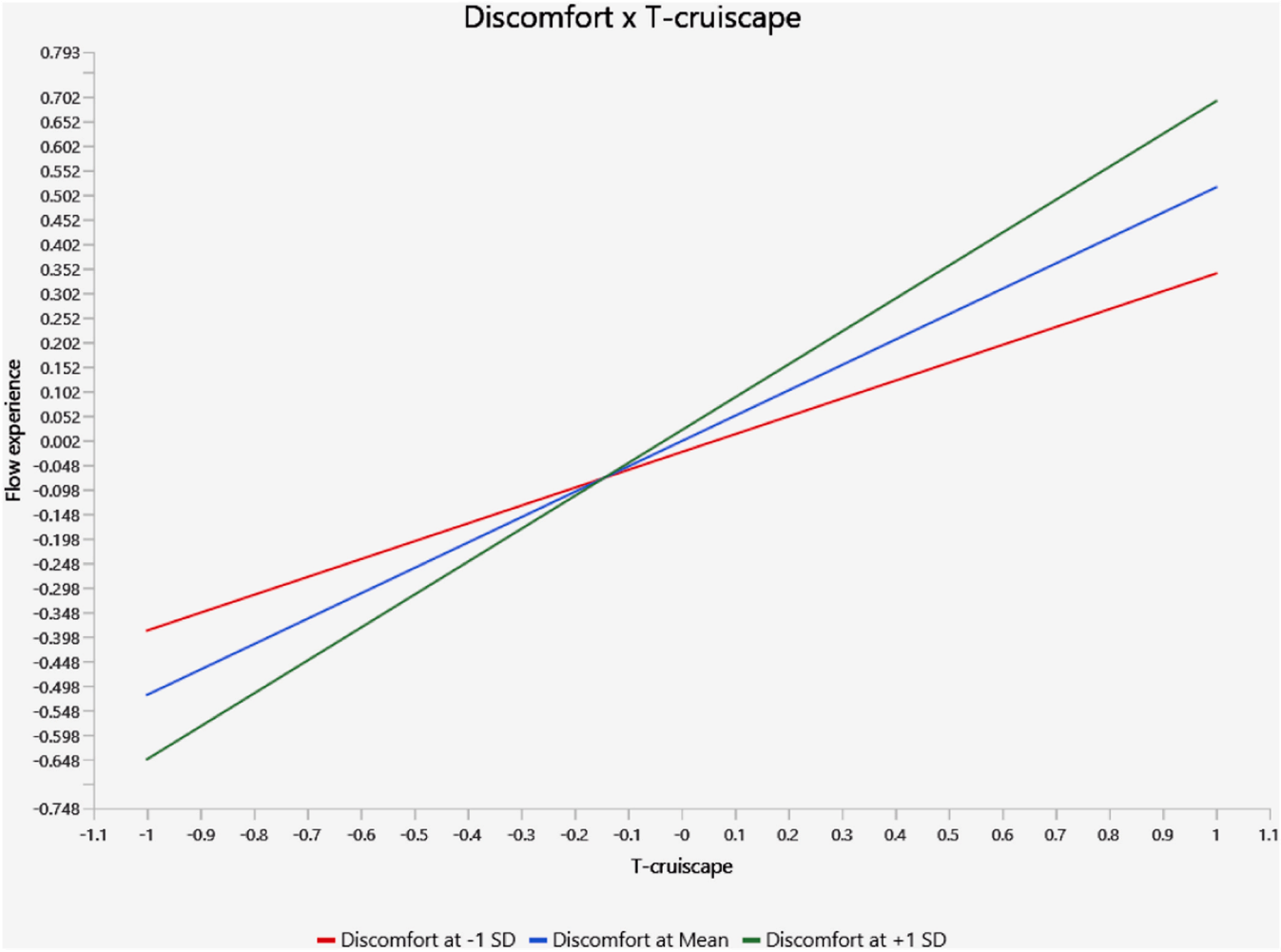

Fig. 2. Graphic plots. Source: Authors' elaboration.

6. Implications and future research

6.1. Theoretical implications

This research presents five important theoretical contributions to the existing literature. First, through the S-O-R framework, the research extends the current understanding of technology incorporated in the cruise industry by investigating the effect of the T-cruiscape environment in cruise ships (S) on the flow experience (O) and how this flow influences subjective well-being (satisfaction with passengers' life onboard) (R).

Second, this study is one of the first to examine the servicescape on cruises integrated with technological services, referred to as T-cruiscape, while previous research (Sorrentino et al., 2022) has demonstrated the significant influences of the cruise ship environment on the emotional responses of the passengers. This study considers the new technological environment experienced by cruise passengers (e.g., cruise apps, service robots, and digital dining) that also creates a sense of presence (i.e., social presence). As such, this study serves as the foundation for further studies on hospitality research and other domains where similar technologies have been implemented.

A third implication concerns the impact of T-cruiscape on passengers' subjective well-being. Previous research (Kim and Hall, 2019) confirmed that smart technology can predict tourists' well-being. This study extends that finding to the cruise industry, showing that when travelers use new technological services, they create memorable experiences and enhance their positive feelings towards these technologies, thereby improving their overall well-being. This finding addresses recent calls for studies (Hu et al., 2023), requesting research to examine how technologies shape subjective well-being in diversified industries.

Fourth, the current research reveals a significant moderating effect of discomfort on the relationship between T-cruiscape and flow experience. This is the first research undertaking the moderating role of discomfort in the context of cruise hospitality regarding technology, revealing that when passenger faces discomfort while exposed to new technologies, they dedicate more attention, being absorbed in understanding how to use it, which can also create enjoyment. So, despite the level of discomfort with technology that might initially cause distress and frustration, passengers face it by being more immersed in their flow state.

Finally, desirable feelings, comprising energetic and extraordinary (Warren et al., 2019), are relevant for reinforcing the flow state of passengers to have a positive sensation of well-being onboard. Still, it is not mandatory for passengers to feel highly excited about living in such a technological environment to achieve subjective well-being.

6.2. Managerial implications

The current research findings offer nine practical recommendations for cruise managers and marketers. These recommendations can also be useful for managers in other industries where similar technologies have been adopted.

Firstly, this research uncovers that passengers experience positive feelings due to the T-cruiscape, which, in turn, improves their well-

being. However, passengers experience these feelings differently, as their technology readiness levels vary. Therefore, cruise managers should prioritize passengers who struggle with using this new service by providing detailed information on how to use these technologies. This can include instructional VR videos available before the cruise starts and seminars during the first days of the cruise, which can also be accessible on passengers' stateroom televisions.

Concurrently, developing and introducing adaptive technology features, offering dual modes—beginner and advanced—within the same technologies (e.g., in cruise apps or digital signage), will allow passengers to select the best option that aligns with their comfort levels regarding these technologies. Consequently, first-time cruisers or passengers having difficulties can choose the most suitable option.

Secondly, passengers seek to use those technologies that can provide them with security, customizable options that can remember their preferences and make suggestions based on them, and those that are easy to use. Cruise managers recognize the importance of original design and the attractiveness of these technologies to capture passengers' attention. For instance, conducting real-time surveys through the app while passengers are sailing can provide valuable insights into passengers' design preferences; by leveraging these insights, cruise companies can develop attractive designs that gather passengers' attention, hence fostering a greater interaction with the onboard technologies.

Thirdly, a reward system can effectively encourage interactivity and usage of those technologies. Incentives such as complimentary beverages/meals, gifts, excursions, cruise merchandise, or eco-friendly perks (e.g., reusable water bottles or digital coupons for sustainable products onboard) may be offered for specific actions that passengers can take—such as completing surveys, treasure hunts, or sustainability trivia games—through the app, digital screens, or service kiosks. This approach helps passengers learn how to use the new technologies and enhances their level of interactivity.

Fourthly, cruise companies should consider making cruise apps available at least one month before the cruise departure date. The app can be tailored for specific demographics (e.g., older passengers and first-time cruisers), giving passengers time to become familiar with its features rather than just a week or 24 h before the cruise starts. So, interactivity can be significantly enhanced when sailing, as passengers already know how to use them.

Fifthly, cruise companies could implement a recognition program within the app to reinforce sustainable behaviors further. The app could track passengers' contributions to sustainability initiatives during their cruise. Cruise companies can acknowledge and award top contributions by offering some redemption, thus encouraging other passengers to follow their example on their next cruise. Onboard technologies (e.g., the app) can display real-time data on energy savings, water consumption, food waste reduction, and a carbon footprint tracker based on passengers' activities (e.g., excursions, meals, or onboard energy usage in cabins).

Sixthly, cruise companies can introduce AR and VR training for crew members in emergency response, safety training, and new technology usage. This approach provides crew members with virtual environment experiences, improving training effectiveness. Aligned, passengers can also use VR to understand safety standards.

Seventhly, when marketing managers target young passengers who usually tend to demonstrate more comfort with technology, promotions could focus on the more high-technology cruise ships. However, for older or less tech-comfortable passengers, campaigns should emphasize user-friendly technologies and human assistance. Technology zones or lounges onboard cruise ships should be set up on each cruise ship with the technologies available (e.g., onboard kiosks, digital signage, or cruise app) and be available along with user-friendly tutorials where passengers can understand how they work. In this place, tech-savvy crew members or specialists can offer live demonstrations and assist passengers during the first days of the cruise. Thus, if the technology enthuses passengers, even those with more discomfort, they may become more focused on learning how to use it. Thus, this study suggests that cruise managers should pay attention to passengers' responses toward this new technological service, as they can enhance or lower the passenger's subjective well-being.

Eighthly, social media platforms can facilitate targeted marketing campaigns that showcase the modern cruise experience. These campaigns can highlight that cruises are not just for older generations but also feature new digitalized experiences, thereby awakening the travel desire of younger generations.

Finally, integrating crew members in the design of technological solutions is crucial for advancements, as their insights and experience in assisting passengers are invaluable. Current research shows crew members can anticipate recurring issues and contribute significantly to the T-cruise construct. Indeed, creating positive, energetic impressions of the technology requires more than just functional use. It demands unconventional, emotional interactions that blend human elements with onboard technologies.

6.3. Limitations and future research

Similarly to other research, this study has some limitations that serve as a foundation for future studies. First, the data collected from the survey was at the Lisbon Cruise Port; therefore, most of the passengers surveyed were from the U.K., as the selected ships were sailing from there. Thus, to have a different and broader perspective, this research can be replicated in other cruise terminals, e.g., Miami or Hong Kong) to have a different perspective from a more diverse range of nationalities.

Second, since the selected ships provide various technologies from which passengers can choose the one they want, future studies can go further and specify which technology is more helpful for them. Based on the findings, a new survey can be developed and tailored to allow cruise companies to understand if all the technologies implemented have the same influence on passengers.

Third, the study only measured technology readiness using the discomfort dimension. Future studies could broaden their scope by considering the other dimensions of technology readiness—optimism, innovativeness, and insecurity—to compare these technologies' positive and negative effects.

Lastly, the study focused on the subjective well-being of passengers. Future research should also consider the well-being of crew members and additional outcomes, such as recommendations for cruise tourism to others, advocates in favor of this type of tourism, or the willingness to pay more.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Gonzales-Santiago, Marcya Stefany reports that she received financial support for her PhD, a scholarship, provided by Foundation for Science and Technology. A scientific, non-profit, Foundations for Science and Technology in Portugal (FCT PhD research grant 2022.11668.BD). This Foundation is only committed with science and its development and are not associated with any enterprise. The other authors declare that they have no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Ahmad, H., Butt, A., Muzaffar, A., 2023. Travel before you actually travel with augmented reality–role of augmented reality in future destination. Curr. Issues Tour. 26 (17), 2845–2862. https://doi.org/10.1080/13683500.2022.2101436.

Ali, F., Rasoolimanesh, S.M., Sarstedt, M., Ringle, C.M., Ryu, K., 2018. An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research. Int. J. Contemp. Hosp. Manag. 30 (1), 514–538. https://doi.org/10.1108/IJCHM-10-2016-0568.

An, S., Choi, Y., Lee, C.K., 2021. Virtual travel experience and destination marketing: effects of sense and information quality on flow and visit intention. J. Destin. Mark. Manag. 19. https://doi.org/10.1016/j.jdmm.2020.100492.
Baabdullah, A.M., Alalwan, A.A., Algharabat, R.S., Rana, N.P., 2022. Virtual agents and flow experience: An empirical examination of AI-powered chatbots. Technol. Forecast. Soc. Change 181 (2), 121772. https://doi.org/10.1016/j.techfore.2022.121772.
Barhorst, J.B., McLean, G., Shah, E., Mack, R., 2021. Blending the real world and the virtual world: exploring the role of flow in augmented reality experiences. J. Bus. Res. 122, 423–436. https://doi.org/10.1016/j.jbusres.2020.08.041.
Bitner, M.J., 1992. Servicescapes: the impact of physical surroundings on customers and employees. J. Mark. 56 (2), 57–71. https://doi.org/10.1177/002224299205600205.
Björk, P., Kauppinen-Räisänen, H., Sthapit, E., 2023. The impact of cruise ship dinescape on travellers' behaviour. Consum. Behav. Tour. Hosp. 18 (2), 174–190. https://doi.org/10.1108/CBTH-02-2022-0048.
Blut, M., Wang, C., 2020. Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage. J. Acad. Mark. Sci. 48, 649–669. https://doi.org/10.1007/s11747-019-00680-8.
Brunner-Sperdin, A., Peters, M., Strobl, A., 2012. It is all about the emotional state: managing tourists' experiences. Int. J. Hosp. Manag. 31 (1), 23–30. https://doi.org/10.1016/j.ijhm.2011.03.004.
Buhalis, D., Papathanassis, A., Vafeidou, M., 2022. Smart cruising: smart technology applications and their diffusion in cruise tourism. J. Hosp. Tour. Technol. 13 (4), 626–649. https://doi.org/10.1108/JHTT-05-2021-0155.
Calza, F., Pagliuca, M., Risitano, M., Sorrentino, A., 2020. Testing moderating effects on the relationships among on-board cruise environment, satisfaction, perceived value and behavioral intentions. Int. J. Contemp. Hosp. Manag. 32 (2), 934–952. https://doi.org/10.1108/IJCHM-09-2019-0773.
Celebrity Cruises, 2022. CELEBRITY CRUISES APP Luxury at Your Fingertips [WWW Document]. Celebritycruises.com URL ⟨https://www.celebritycruises.com/int/celebrity-app⟩ (accessed 3.28.24).
Chang, K.-C., 2016. Effect of servicescape on customer behavioral intentions: Moderating roles of service climate and employee engagement. Int. J. Hosp. Manag. 53, 116–128. https://doi.org/10.1016/j.ijhm.2015.12.003.
Chen, Y.M., Hsu, T.H., Lu, Y.J., 2018. Impact of flow on mobile shopping intention. J. Retail. Consum. Serv. 41, 281–287. https://doi.org/10.1016/j.jretconser.2017.04.004.
Chen, Y., Lin, C.A., 2022. Consumer behavior in an augmented reality environment: exploring the effects of flow via augmented realism and technology fluidity. Telemat. Inf. 71. https://doi.org/10.1016/j.tele.2022.101833.
Chin, W.W., Thatcher, J.B., Wright, R.T., Steel, D., 2013. Controlling for Common Method Variance in PLS Analysis: The Measured Latent Marker Variable Approach. In: Abdi, H., Chin, W.W., Vinzi, V.E., Russolillo, G., Trinchera, L. (Eds.), New Perspectives in Partial Least Squares and Related Methods, pp. 231–239. https://doi.org/10.1007/978-1-4614-8283-3_16.
CLIA, 2023. 2023 State of the Cruise Industry Outlook [WWW Document]. cruising.org. URL ⟨https://cruising.org/-/media/clia-media/research/2023/2023-clia-state-of-the-cruise-industry-report_low-res.ashx⟩ (accessed 4.18.23).
CLIA, 2024. 2024 State of the Cruise Industry Report [WWW Document]. cruising.org. URL ⟨https://cruising.org/en-gb/news-and-research/research/2024/april/2024-state-of-the-cruise-industry-report⟩ (accessed 6.3.24).
Cohen, J., 2013. Statistical Power Analysis for the Behavioral Sciences, 2nd ed. Routledge, New York.
Creswell, J.W., 2014. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th ed. SAGE Publications, Thousand Oaks.
Csikszentmihalyi, M., 1975. Beyond Boredom and Anxiety. Jossey-Bass, Washington.
Dassanayake, H.C., Senevirathne, A., 2018. Impact of e-servicescapes on student engagement: mediating impact of experience quality. Asian Assoc. Open Univ. J. 13 (2), 203–222. https://doi.org/10.1108/AAOUJ-11-2018-0024.
Dedeoğlu, B.B., Küçükergin, K.G., Balıkçıoğlu, S., 2015. Understanding the relationships of servicescape, value, image, pleasure, and behavioral intentions among hotel customers. J. Travel Tour. Mark. 32 (sup1), S42–S61. https://doi.org/10.1080/10548408.2014.982268.
Diener, E., 2009. The science of well-being: The collected works of Ed Diener, 1st ed. Springer Science + Business Media, New York.
Durna, U., Dedeoglu, B.B., Balikçioglu, S., 2015. The role of servicescape and image perceptions of customers on behavioral intentions in the hotel industry. Int. J. Contemp. Hosp. Manag. 27 (7), 1728–1748. https://doi.org/10.1108/IJCHM-04-2014-0173.
Falk, R.F., Miller, N.B., 1992. A Primer for Soft Modeling, 1st ed. The University of Akron Press, Akron.
Filep, S., 2014. Moving beyond subjective well-being: a tourism critique. J. Hosp. Tour. Res. 38 (2), 266–274. https://doi.org/10.1177/1096348012436609.
Flavián, C., Belk, R.W., Belanche, D., Casaló, L.V., 2024. Automated social presence in AI: avoiding consumer psychological tensions to improve service value. J. Bus. Res. 175. https://doi.org/10.1016/j.jbusres.2024.114545.
Flavián, C., Pérez-Rueda, A., Belanche, D., Casaló, L.V., 2022. Intention to use analytical artificial intelligence (AI) in services – the effect of technology readiness and awareness. J. Serv. Manag. 33 (2), 293–320. https://doi.org/10.1108/JOSM-10-2020-0378.
Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Mark. Res. 18 (1). https://doi.org/10.1177/002224378101800104.
Garmaroudi, S.A., King, C., Lu, L., 2021. Social servicescape's impact on customer perceptions of the hospitality brand – the role of branded social cues. Int. J. Hosp. Manag. 93. https://doi.org/10.1016/j.ijhm.2020.102774.
Gioia, D.A., Corley, K.G., Hamilton, A.L., 2013. Seeking qualitative rigor in inductive research: notes on the gioia methodology. Organ. Res. Methods 16 (1), 15–31. https://doi.org/10.1177/1094428112452151.
Gonzáles-Santiago, M.S., Loureiro, S.M.C., Langaro, D., Ali, F., 2024. Adoption of smart technologies in the cruise tourism services: a systematic review and future research agenda. J. Hosp. Tour. Technol. 15 (2), 285–308. https://doi.org/10.1108/JHTT-06-2022-0159.
Grewal, D., Lindsey-Mullikin, J., Munger, J., 2004. Loyalty in e-tailing: a conceptual framework. J. Relatsh. Mark. 2 (3–4), 31–49. https://doi.org/10.1300/J366v02n03_03.
Hair Jr., J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2021. A primer on partial least squares structural equations modeling (PLS-SEM). J. Tour. Res. Sage Publications.
Han, H., Kim, S. (Sam), Badu-Baiden, F., Al-Ansi, A., Kim, J.J., 2024. Drivers of hotel guests' choice of smart products: applying a complexity theory involving TAM, technology readiness, TPB, and emotion factors. Int. J. Hosp. Manag. 120. https://doi.org/10.1016/j.ijhm.2024.103755.
Harris, L.C., Goode, M.M.H., 2010. Online servicescapes, trust, and purchase intentions. J. Serv. Mark. 24 (3), 230–243. https://doi.org/10.1108/08876041011040631.
Hsu, C.-L., Lu, H.-P., 2004. Why do people play on-line games? An extended TAM with social influences and flow experience. Inf. Manag. 41 (7), 853–868. https://doi.org/10.1016/j.im.2003.08.014.
Hu, M., Pantano, E., Stylos, N., 2023. "Home alone" no more: how does the internet of things (IoT) enhance travellers' subjective well-being. Technol. Forecast. Soc. Change 192. https://doi.org/10.1016/j.techfore.2023.122563.
Huang, Y.C., Backman, S.J., Backman, K.F., Moore, D.W., 2013. Exploring user acceptance of 3D virtual worlds in travel and tourism marketing. Tour. Manag. 36, 490–501. https://doi.org/10.1016/j.tourman.2012.09.009.
Huang, D., Li, Z., Mou, J., Liu, X., 2017. Effects of flow on young Chinese consumers' purchase intention: a study of e-servicescape in hotel booking context. Inf. Technol. Tour. 17, 203–228. https://doi.org/10.1007/s40558-016-0073-0.
Islam, J.U., Rahman, Z., Hollebeek, L.D., 2018. Consumer engagement in online brand communities: a solicitation of congruity theory. Internet Res. 28 (1), 23–45. https://doi.org/10.1108/IntR-09-2016-0279.
Kaminakis, K., Karantinou, K., Koritos, C., Gounaris, S., 2019. Hospitality servicescape effects on customer-employee interactions: a multilevel study. Tour. Manag. 72, 130–144. https://doi.org/10.1016/j.tourman.2018.11.013.
Kang, J., 2020. Identifying antecedents and consequences of well-being: the case of cruise passengers. Tour. Manag. Perspect. 33. https://doi.org/10.1016/j.tmp.2019.100609.
Karagöz, D., Ramkissoon, H., 2024. Loneliness, travel nostalgia, subjective well-being and prevention regulatory focus: a moderated mediation model analysis. Curr. Issues Tour. 27 (2), 217–233. https://doi.org/10.1080/13683500.2023.2175201.
Kaushik, A.K., Rahman, Z., 2017. An empirical investigation of tourist's choice of service delivery options: SSTs vs service employees. Int. J. Contemp. Hosp. Manag. 29 (7), 1892–1913. https://doi.org/10.1108/IJCHM-08-2015-0438.
Kautish, P., Khare, A., 2022. Investigating the moderating role of AI-enabled services on flow and awe experience. Int. J. Inf. Manag. 66. https://doi.org/10.1016/j.ijinfomgt.2022.102519.
Kester, J.G.C., 2003. Cruise tourism. Tour. Econ. 9 (3), 337–350. https://doi.org/10.1177/135481660300900307.
Khoi, N.H., Le, A.N.H., 2022. Is coolness important to luxury hotel brand management? The linking and moderating mechanisms between coolness and customer brand engagement. Int. J. Contemp. Hosp. Manag. 34 (7), 2425–2449. https://doi.org/10.1108/IJCHM-10-2021-1230.
Kim, M.J., Hall, C.M., 2019. A hedonic motivation model in virtual reality tourism: comparing visitors and non-visitors. Int. J. Inf. Manag. 46, 236–249. https://doi.org/10.1016/j.ijinfomgt.2018.11.016.
Kim, M.J., Lee, C.K., Bonn, M., 2017. Obtaining a better understanding about travel-related purchase intentions among senior users of mobile social network sites. Int. J. Inf. Manag. 37 (5), 484–496. https://doi.org/10.1016/j.ijinfomgt.2017.04.006.
Kim, H., Lee, S., Uysal, M., Kim, J., Ahn, K., 2015. Nature-based tourism: motivation and subjective well-being. J. Travel Tour. Mark. 32 (sup1), S76–S96. https://doi.org/10.1080/10548408.2014.997958.
Koernig, S.K., 2003. E-Scapes: the electronic physical environment and service tangibility. Psychol. Mark. 20 (2), 151–167. https://doi.org/10.1002/mar.10065.
Kwortnik, R.J., 2008. Shipscape influence on the leisure cruise experience. Int. J. Cult. Tour. Hosp. Res. 2 (4), 289–311. https://doi.org/10.1108/17506180810908961.
Lee, S.A., 2018. m-servicescape: effects of the hotel mobile app servicescape preferences on customer response. J. Hosp. Tour. Technol. 9 (2), 172–187. https://doi.org/10.1108/JHTT-08-2017-0066.
Lee, W., Castellanos, C., Chris Choi, H.S., 2012. The effect of technology readiness on customers' attitudes toward self-service technology and its adoption; the empirical study of U.S. airline self-service check-in kiosks. J. Travel Tour. Mark. 29 (8), 731–743. https://doi.org/10.1080/10548408.2012.730934.
Lee, S., Jeong, M., 2012. Effects of e-servicescape on consumers' flow experiences. J. Hosp. Tour. Technol. 3 (1), 47–59. https://doi.org/10.1108/17579881211206534.
Lee, H., Lee, J., Chung, N., Koo, C., 2018. Tourists' happiness: are there smart tourism technology effects? Asia Pac. J. Tour. Res. 23 (5), 486–501. https://doi.org/10.1080/10941665.2018.1468344.
Lee, C.H., Wu, J.J., 2017. Consumer online flow experience. The relationship between utilitarian and hedonic value, satisfaction and unplanned purchase. Ind. Manag. Data Syst. 117 (10), 2452–2467. https://doi.org/10.1108/IMDS-11-2016-0500.
Lee, G., Xia, W., 2010. Toward agile: an integrated analysis of quantitative and qualitative field data on software development agility. MIS Quart. 34 (1), 87–114. https://doi.org/10.2307/20721416.

Li, S., 2021. Linking servicescape and customer engagement: an investigation in the hotel context. Int. J. Hosp. Manag. 94. https://doi.org/10.1016/j.ijhm.2021.102880.
Li, J. (Justin), Bonn, M.A., Ye, B.H., 2019. Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: the moderating roles of perceived organizational support and competitive psychological climate. Tour. Manag. 73, 172–181. https://doi.org/10.1016/j.tourman.2019.02.006.
Li, S., Wei, M., 2021. Hotel servicescape and customer citizenship behaviors: mediating role of customer engagement and moderating role of gender. Int. J. Contemp. Hosp. Manag. 33 (2), 587–603. https://doi.org/10.1108/IJCHM-07-2020-0656.
Liljander, V., Gillberg, F., Gummerus, J., van Riel, A., 2006. Technology readiness and the evaluation and adoption of self-service technologies. J. Retail. Consum. Serv. 13 (3), 177–191. https://doi.org/10.1016/j.jretconser.2005.08.004.
Lin, I.Y., 2004. Evaluating a servicescape: the effect of cognition and emotion. Int. J. Hosp. Manag. 23 (2), 163–178. https://doi.org/10.1016/j.ijhm.2003.01.001.
Line, N.D., Hanks, L., 2019. The social servicescape: understanding the effects in the full-service hotel industry. Int. J. Contemp. Hosp. Manag. 31 (7). https://doi.org/10.1108/IJCHM-11-2017-0722.
Liu, H., Chu, H., Huang, Q., Chen, X., 2016. Enhancing the flow experience of consumers in China through interpersonal interaction in social commerce. Comput. Hum. Behav. 58, 306–314. https://doi.org/10.1016/j.chb.2016.01.012.
Lockwood, A., Pyun, K., 2019. How do customers respond to the hotel servicescape? Int. J. Hosp. Manag. 82, 231–241. https://doi.org/10.1016/j.ijhm.2019.04.016.
Lockwood, A., Pyun, K., 2020. Developing a scale measuring customers' servicescape perceptions in upscale hotels. Int. J. Contemp. Hosp. Manag. 32 (1), 40–59. https://doi.org/10.1108/IJCHM-04-2017-0208.
Loureiro, S.M.C., Blanco, T.M., 2021. Museum coolness: creating the desire to revisit. Tour. Recreat. Res. 48 (1), 94–109. https://doi.org/10.1080/02508281.2021.1885799.
Loureiro, S.M.C., Guerreiro, J., Ali, F., 2020. 20 years of research on virtual reality and augmented reality in tourism context: a text-mining approach. Tour. Manag. 77, 104028. https://doi.org/10.1016/j.tourman.2019.104028.
Loureiro, S.M.C., Guerreiro, J., Eloy, S., Langaro, D., Panchapakesan, P., 2019a. Understanding the use of virtual reality in marketing: a text mining-based review. J. Bus. Res. 100, 514–530. https://doi.org/10.1016/j.jbusres.2018.10.055.
Loureiro, S.M.C., Japutra, A., Kwun, D., 2019b. Signalling effects on symbolic status and travellers' well-being in the luxury cruise industry. Int. J. Tour. Res. 21 (5), 639–654. https://doi.org/10.1002/jtr.2287.
Lu, J., Wang, L., Hayes, L.A., 2012. How do technology readiness, platform functionality and trust influence C2C user satisfaction? J. Electron. Commer. Res. 13.
Lu, Y.H., Zhang, J., Zhang, H., Xiao, X., Liu, P., Zhuang, M., Hu, M., 2022. Flow in soundscape: the conceptualization of soundscape flow experience and its relationship with soundscape perception and behaviour intention in tourism destinations. Curr. Issues Tour. 25 (13), 2090–2108. https://doi.org/10.1080/13683500.2021.1922363.
Lucas, R.E., Diener, E., Suh, E.M., 1996. Discriminant validity of well-being measures. J. Pers. Soc. Psychol. 71 (3), 616–628. https://doi.org/10.1037/0022-3514.71.3.616.
Lv, Z., Zhao, W., Liu, Y., Wu, J., Hou, M., 2024. Impact of perceived value, positive emotion, product coolness and Mianzi on new energy vehicle purchase intention. J. Retail. Consum. Serv. 76. https://doi.org/10.1016/j.jretconser.2023.103564.
Lyu, J., Hu, L., Hung, K., Mao, Z., 2017. Assessing servicescape of cruise tourism: the perception of Chinese tourists. Int. J. Contemp. Hosp. Manag. 29 (10), 2556–2572. https://doi.org/10.1108/IJCHM-04-2016-0216.
Lyu, J., Mao, Z., Hu, L., 2018. Cruise experience and its contribution to subjective well-being: a case of Chinese tourists. Int. J. Tour. Res. 20 (2), 225–235. https://doi.org/10.1002/jtr.2175.
Malhotra, N.K., 2015. Essentials Of Marketing Research/ A Hands-on Orientation, 1st ed. Pearson, Upper Saddle River.
Mason, J., 2002. Qualitative Researching, 2nd ed. SAGE Publications Inc., Thousand Oaks.
Mathwick, C., Malhotra, N.K., Rigdon, E., 2002. The effect of dynamic retail experiences on experiential perceptions of value: an internet and catalog comparison. J. Retail. 78 (1), 51–60. https://doi.org/10.1016/S0022-4359(01)00066-5.
MSC Cruises, 2021. MSC Cruises introduces the MSC starship club featuring the world's first humanoid robotic bartender at sea [WWW Document]. msccruises.com URL ⟨https://www.msccruises.com/en-gl/About-MSC/News/MSC-Starship-Club.aspx⟩ (accessed 5.9.21).
MSC Cruises, 2022. MSC for Me with ZOE. Taking the art of hospitality to the next level thanks to innovation. [WWW Document]. mscbook.com URL ⟨https://www.mscbook.com/pages/sdl/img/B2B_TA_25010_05_MSC_FOR_ME_PHASE_2_TRADE_KIT_FAQ_.pdf⟩ (accessed 11.18.22).
Novak, T.P., Hoffman, D.L., Yung, Y.-F., 2000. Measuring the customer experience in online environments: a structural modeling approach. Mark. Sci. 19 (1), 22–44. https://doi.org/10.1287/mksc.19.1.22.15184.
Papathanassis, A., 2017. Cruise tourism management: state of the art. Tour. Rev. 72 (1), 104–119. https://doi.org/10.1108/TR-01-2017-0003.
Parasuraman, A., 2000. Technology readiness index (TRI) a multiple-item scale to measure readiness to embrace new technologies. J. Serv. Res. 2 (4), 307–320. https://doi.org/10.1177/109467050024001.
Parasuraman, A., Colby, C.L., 2015. An updated and streamlined technology readiness index: TRI 2.0. J. Serv. Res. 18 (1), 59–74. https://doi.org/10.1177/1094670514539730.
Peifer, C., 2012. Psychophysiological correlates of flow-experience. In: Engeser, S. (Ed.), Advances in Flow Research. Springer, New York, NY, pp. 139–164. https://doi.org/10.1007/978-1-4614-2359-1_8.
Peifer, C., Tan, J., 2021. The psychophysiology of flow experience. In: Peifer, C., Engeser, S. (Eds.), Advances in Flow Research. Springer, Cham, pp. 145–160. https://doi.org/10.1007/978-3-030-53468-4_8.
Pelet, J.É ., Ettis, S., Cowart, K., 2017. Optimal experience of flow enhanced by telepresence: evidence from social media use. Inf. Manag. 54 (1), 115–128. https://doi.org/10.1016/j.im.2016.05.001.
Penz, E., Hogg, M.K., 2011. The role of mixed emotions in consumer behaviour: investigating ambivalence in consumers' experiences of approach-avoidance conflicts in online and offline settings. Eur. J. Mark. 45 (1/2), 104–132. https://doi.org/10.1108/03090561111095612.
Pizam, A., Ozturk, A.B., Balderas-Cejudo, A., Buhalis, D., Fuchs, G., Hara, T., Meira, J., Revilla, R.G.M., Sethi, D., Shen, Y., State, O., Hacikara, A., Chaulagain, S., 2022. Factors affecting hotel managers' intentions to adopt robotic technologies: a global study. Int. J. Hosp. Manag. 102. https://doi.org/10.1016/j.ijhm.2022.103139.
Porto de Lisboa, 2024. Lisbon Cruise Terminal [WWW Document]. portodelisboa.pt. URL ⟨https://www.portodelisboa.pt/en/terminal-de-cruzeiros-de-lisboa⟩ (accessed 6.2.24).
Pozharliev, R., Verbeke, W.J.M.I., Van Strien, J.W., Bagozzi, R.P., 2015. Merely being with you increases my attention to luxury products: using EEG to understand consumers' emotional experience with luxury branded products. J. Mark. Res. 52 (4), 546–558. https://doi.org/10.1509/jmr.13.0560.
Radic, A., Arjona-Fuentes, J.M., Ariza-Montes, A., Han, H., Law, R., 2020. Job demands–job resources (JD-R) model, work engagement, and well-being of cruise ship employees. Int. J. Hosp. Manag. 88. https://doi.org/10.1016/j.ijhm.2020.102518.
Radic, A., Lück, M., Al-Ansi, A., Chua, B.L., Seeler, S., Han, H., 2021. Cruise ship dining experiencescape: the perspective of female cruise travelers in the midst of the COVID-19 pandemic. Int. J. Hosp. Manag. 95. https://doi.org/10.1016/j.ijhm.2021.102923.
Reinikainen, H., Tan, T.M., Luoma-aho, V., Salo, J., 2021. Making and breaking relationships on social media: the impacts of brand and influencer betrayals. Technol. Forecast. Soc. Change 171. https://doi.org/10.1016/j.techfore.2021.120990.
Risitano, M., Romano, R., Sorrentino, A., 2022. Segmenting cruise passengers from the experiential marketing perspective: an explorative study. Res. Transp. Bus. Manag. 45. https://doi.org/10.1016/j.rtbm.2020.100590.
Risitano, M., Romano, R., Sorrentino, A., Quintano, M., 2017. The impact of consumer-brand engagement on brand experience and behavioural intentions: an Italian empirical study. Br. Food J. 119 (8), 1884–1896. https://doi.org/10.1108/BFJ-11-2016-0579.
Rodrigues, M.B., Loureiro, S.M.C., Romero, M.I.R., 2024. Luxury fashion games are so cool! Predicting awareness, perceived quality, and loyalty. J. Retail. Consum. Serv. 77 (24). https://doi.org/10.1016/j.jretconser.2023.103668.
Rodriguez-Sanchez, A.M., Schaufeli, W.B., Salanova, M., Cifre, E., 2008. Flow experience among information and communication technology users. Psychol. Rep. 102 (1), 29–39. https://doi.org/10.2466/pr0.102.1.29-39.
Roschk, H., Loureiro, S.M.C., Breitsohl, J., 2017. Calibrating 30 years of experimental research: a meta-analysis of the atmospheric effects of music, scent, and color. J. Retail. 93 (2), 228–240. https://doi.org/10.1016/j.jretai.2016.10.001.
Roy, S.K., Singh, G., Hope, M., Nguyen, B., Harrigan, P., 2019. The rise of smart consumers: role of smart servicescape and smart consumer experience co-creation. J. Mark. Manag. 35 (15–16), 1480–1513. https://doi.org/10.1080/0267257X.2019.1680569.
Royal Caribbean, 2024. Icon of the Seas: Ship Fact Sheets [WWW Document]. royalcaribbeanincentives.com. URL ⟨https://www.royalcaribbeanincentives.com/ships/icon-of-the-seas/⟩ (accessed 3.27.24).
Saayman, M., Li, G., Uysal, M., Song, H., 2018. Tourist satisfaction and subjective well-being: an index approach. Int. J. Tour. Res. 20 (3), 388–399. https://doi.org/10.1002/jtr.2190.
Salmons, J., 2014. Qualitative Online Interviews: Strategies, Design, and Skills, 2nd ed. SAGE Publications, Thousand Oaks.
Shin, H.H., Jeong, M., 2022. Redefining luxury service with technology implementation: the impact of technology on guest satisfaction and loyalty in a luxury hotel. Int. J. Contemp. Hosp. Manag. 34 (4), 1491–1514. https://doi.org/10.1108/IJCHM-06-2021-0798.
Sirgy, M.J., Kruger, P.S., Lee, D.J., Yu, G.B., 2011. How does a travel trip affect tourists' life satisfaction? J. Travel Res. 50 (3), 261–275. https://doi.org/10.1177/0047287510362784.
Son, M., Han, K., 2011. Beyond the technology adoption: technology readiness effects on post-adoption behavior. J. Bus. Res. 64 (11), 1178–1182. https://doi.org/10.1016/j.jbusres.2011.06.019.
Sorrentino, A., Ferretti, M., Risitano, M., Del Chiappa, G., Okumus, F., 2022. The influence of the onboard servicescape on cruisers' experiential state, delight and memorability. Consum. Behav. Tour. Hosp. 17 (1), 17–41. https://doi.org/10.1108/cbth-11-2020-0258.
Sourcetoad, 2022. 2022 Cruise Mobile Apps Annual Report [WWW Document]. Sourcetoad.com URL ⟨https://sourcetoad.com/cruise-app-report-archive/⟩ (accessed 11.23.22).
Srinivasan, S.S., Anderson, R., Ponnavolu, K., 2002. Customer loyalty in e-commerce: an exploration of its antecedents and consequences. J. Retail. 78 (1), 41–50. https://doi.org/10.1016/S0022-4359(01)00065-3.
Sthapit, E., Ji, C., Ping, Y., Prentice, C., Garrod, B., Yang, H., 2024. Experience-driven well-being: the case of unmanned smart hotels. Int. J. Contemp. Hosp. Manag. 36 (13), 1–18. https://doi.org/10.1108/IJCHM-07-2023-1063.
Strauss, A., Corbin, J., 1998. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory, 2nd ed. SAGE Publications, Inc., London.

Sunny, S., Patrick, L., Rob, L., 2019. Impact of cultural values on technology acceptance and technology readiness. Int. J. Hosp. Manag. 77, 89–96. https://doi.org/10.1016/j.ijhm.2018.06.017.

Swaminathan, V., Lepkowska-White, E., Rao, B.P., 1999. Browsers or Buyers in Cyberspace? an Investigation of Factors Influencing Electronic Exchange. J. Comput. -Mediat. Commun. 5 (2). https://doi.org/10.1111/j.1083-6101.1999.tb00335.x.

Tiwari, A.A., Chakraborty, A., Maity, M., 2021. Technology product coolness and its implication for brand love. J. Retail. Consum. Serv. 58. https://doi.org/10.1016/j.jretconser.2020.102258.

Tran, K.T., Truong, A.T.T., Truong, V.A.T., Luu, T.T., 2024. Leveraging brand coolness for building strong consumer-brand relationships: different implications for products and services. J. Prod. Brand Manag. 33 (2), 258–272. https://doi.org/10.1108/JPBM-05-2023-4476.

Tussyadiah, I., 2020. A review of research into automation in tourism: Launching the annals of tourism research curated collection on artificial intelligence and robotics in tourism. Ann. Tour. Res. 81. https://doi.org/10.1016/j.annals.2020.102883.

Uysal, M., Sirgy, M.J., Woo, E., Kim, H.L., 2016. Quality of life (QOL) and well-being research in tourism. Tour. Manag. 53, 244–261. https://doi.org/10.1016/j.tourman.2015.07.013.

Wang, Y., So, K.K.F., Sparks, B.A., 2017. Technology readiness and customer satisfaction with travel technologies: a cross-country investigation. J. Travel Res. 56 (5), 563–577. https://doi.org/10.1177/0047287516657891.

Warren, C., Batra, R., Loureiro, S.M.C., Bagozzi, R.P., 2019. Brand Coolness. J. Mark. 83 (5), 36–56. https://doi.org/10.1177/0022242919857698.

Williams, L.J., Hartman, N., Cavazotte, F., 2010. Method variance and marker variables: a review and comprehensive cfa marker technique. Organ. Res. Methods 13 (3), 477–513. https://doi.org/10.1177/1094428110366036.

World Cruise Awards, 2024. Europe's Best Cruise Terminal 2022 [WWW Document]. worldcruiseawards.com. URL ⟨https://worldcruiseawards.com/award/europe-best-cruise-terminal/2022⟩ (accessed 6.2.24).

Wu, W.Y., Quyen, P.T.P., Rivas, A.A.A., 2017. How e-servicescapes affect customer online shopping intention: the moderating effects of gender and online purchasing experience. Inf. Syst. E-Bus. Manag. 15, 689–715. https://doi.org/10.1007/s10257-016-0323-x.

Wu, S., Wong, I.K.A., Lin, (CJ), Z., 2021. Understanding the role of atmospheric cues of travel apps: a synthesis between media richness and stimulus–organism–response theory. J. Hosp. Tour. Manag. 49, 226–234. https://doi.org/10.1016/j.jhtm.2021.09.014.

Xu, X., Gursoy, D., 2020. Exploring the relationship between servicescape, place attachment, and intention to recommend accommodations marketed through sharing economy platforms. J. Travel Tour. Mark. 37 (4), 429–446. https://doi.org/10.1080/10548408.2020.1784365.

Yang, Y., Zhang, C.X., Rickly, J.M., 2021. A review of early COVID-19 research in tourism: launching the Annals of Tourism Research's Curated Collection on coronavirus and tourism. Ann. Tour. Res. 91. https://doi.org/10.1016/j.annals.2021.103313.

Yu, G.B., Sirgy, M.J., Bosnjak, M., 2021. The effects of holiday leisure travel on subjective well-being: the moderating role of experience sharing. J. Travel Res. 60 (8), 1677–1691. https://doi.org/10.1177/0047287520966381.

Zhang, M., Hu, M., Guo, L., Liu, W., 2017. Understanding relationships among customer experience, engagement, and word-of-mouth intention on online brand communities: the perspective of service ecosystem. Internet Res 27 (4), 839–857. https://doi.org/10.1108/IntR-06-2016-0148.

Zhang, T., Lu, L., Chi, O.H., Lu, C., Cobanoglu, C., 2024. Smart service interactional experience for family travelers: scale development and validation. J. Hosp. Tour. Res. https://doi.org/10.1177/10963480231226085.

Marcya Stefany Gonzáles-Santiago is currently a fourth-year Ph.D. candidate in Management, specializing in Marketing, at ISCTE-IUL. She is a Research Assistant and has been awarded an FCT doctoral scholarship (2022.11668.BD). Her research interests primarily lie in customer behavior, smart tourism, and digital technology, including AI, VR, AR, and Robots. Marcya completed her master's in international marketing & management from ISM University of Management and Economics in Vilnius, Lithuania, after earning her Bachelor's and Licentiate Degree in Tourism and Hotel Management from Universidad de San Martín de Porres in Lima, Perú. Prior to her master's studies, Marcya worked in the tourism and hospitality industry for over ten years. Most of her experience was in customer service roles at a luxury cruise company. Marcya has presented her work at international conferences such as IBIMA, EuroMed, AMA (American Marketing Association), and RMER.

Sandra Maria Correia Loureiro is a Full Professor in Instituto Universitário de Lisboa and BRU- Business Research Unit, Portugal. She is also in the ranking of 2 % of the best scientists in the world in both Marketing and Sport, Leisure & Tourism by Stanford University, together with the publishing house Elsevier and SciTech Strategies. Her research interests include relationship marketing, marketing communication issues and the implications with VR, AR and AI. Her papers have been published in a variety of peer reviewed journals that include Journal of Marketing, Tourism Management, International Journal of Hospitality Management, Journal of Business Research, She recently won several awards, such as: the 2012 Best Paper Premier Award presented by the Global Marketing Conference (comprised of EMAC, ANZMAC, KSMS, and the Japanese Association of Marketing), Highly Commended paper Award 2014–7th EuroMed Conference and EuroMed Research Business Institute (EMRBI), Highly Commended paper Award 2016–9th EuroMed Conference and EuroMed Research Business Institute (EMRBI), Best Paper Award 2016- ICCMI 2016. In 2017, 2018, 2024 she also won high commended papers award from editor Emerald. Best paper award at the Fashion Management Conference 2019 and Best reviewer award for Psychology and Marketing.

Daniela Langaro is assistant professor at ISCTE-IUL (Portugal) and visiting professor at Católica Lisbon Business School (Portugal). Following her 15 years of experience in Consumer Packaged Goods and OTC industry, Langaro moved to academia in 2012. Her general research interests involve issues in internet marketing, social media, brand communications and brand management. She has published her research in scientific journals such as Journal of Business Research, Journal of Marketing Communications, Journal of Brand Management, Journal of Event Management, International Journal of Internet Marketing and Advertising, Journal of Promotion Management and Journal of Creative Communications.