Continued innovation beyond COVID-19 crisis: toward mitigating the challenges in the tourism and hospitality industry

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Abstract

Purpose – *This paper aims to provide insights into service innovation (SI) during the COVID-19 crisis and its potential impact on tourism development in the medium-to-long term. The pandemic had a devastating effect on the industry, requiring immediate mitigation. It is yet to fully establish the impact of SI in the face of the COVID-19 volatility, uncertainty, complexity and ambiguity (VUCA). This study discusses the potential link between SI and COVID-19 crisis mitigation and offers recommendations for tourism recovery.*

Design/methodology/approach – *This paper synthesizes empirical evidence on post-crisis tourism SI using a theory-based general literature review approach.*

Findings – *COVID-19 crisis spun various forms of SI, which emerged as a conventional solution to crisis prevention, encompassing the management of crisis-time competitiveness, revenue deficits and risk perception. However, resistance to innovative services is linked to situational conditions.*

Research limitations/implications – *COVID-19 is an unprecedented crisis. Therefore, this study serves as a primer for further inquiry into SI. For instance, areas such as governance in tourism innovation and consumers' inclination toward innovation-driven services are underexplored.*

Practical implications – *SI acts as a situational facilitator, but its characteristics can impede or facilitate adoption. Moreover, the irrelevance of innovations in some environments is evidenced. Thus, practitioners must adopt a responsive learning approach in SI adoption. To mitigate the COVID-19 impacts, reconfiguration in SI, recovery marketing strategy, knowledge gap and governance will be critical interventions.*

Originality/value – *This paper is one of the first comprehensive discussions on the potential role of SI in mitigating the impact of COVID-19 on the THI.*

Keywords *Service innovation, Perceived risk, Travel behavior, Tourism recovery, Tourism future, COVID-19 pandemic*

Paper type *Research paper*

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1. Introduction

The COVID-19 virus, discovered in December 2019, had a significant global impact (Ljubotina and Raspor, 2022; WHO, 2020), leading to VUCA (volatility, uncertainty, complexity, and ambiguity) and disrupting the social and economic systems worldwide. This disruption caused the closure of the tourism and hospitality sectors, which are known for providing highly contact-intensive services. The pandemic had devastating effects on the tourism and hospitality industry (THI). Firstly, it led to a significant loss of livelihoods and travel, with a 9.3% decrease in tourism employment in the EU, resulting in 3.6 million job losses (WTTC, 2021). The Asia-Pacific region also suffered, with the International Labour Organization (ILO) reporting that 19 million tourism-related jobs across 14 countries were in limbo (Elder and Phu, 2021).

Secondly, there was widespread economic disruption, as travel and tourism play a crucial role in driving the local GDP of destination countries (Wondirad *et al*., 2021). The pandemic had varying economic impacts on tourism GDP across Europe (Skare and Riberio Soriano, 2022). In the Asia-Pacific region, the economic costs of the pandemic had significant ripple effects, especially in tourism-dependent economies; the impact and recovery pace of the pandemic varied widely, leaving the THI under strain (Elder and Phu, 2021). For instance, China, the world's largest outbound tourism market, contributed significantly to Thailand's pre-pandemic tourism income, accounting for over 27% of 2019 tourism receipts (Saxon *et al*., 2021). However, the pandemic led to the disappearance of China's population, which spent $288bn in 2018 and $127.5bn in 2019 on international travel from the tourism market, resulting in a significant decline in Thailand's travel receipts (Peñafuerte, 2022). As a result, Thailand's travel receipts recovery is expected to accelerate beyond 2023 (EIU, 2021).

Thirdly, the disruption (or less appealing) of tourism and leisure activities resulting from high perceived infection risk and disruption of human activities has led to self-protective behaviors and rules such as social distancing being admitted as new norms. The crisis has affected normal lives, work, and tourism. For example, the COVID-19 crisis has impacted tourists' well-being and behavior (Aman *et al*., 2019), leading to reduced trip frequencies and leisure activities (Parady *et al*., 2020) and travel plan cancellations (Mamirkulova *et al*., 2020). As a result, the THI continues to struggle until people feel very safe to travel en masse again (Behsudi, 2020) to most destinations. A survey by OliverWyman in late October 2022 found that over 50% of 4,000 Chinese tourists planned to postpone international travel even if travel advisories were lifted, citing infection fears as a top concern (Wouters and Chow, 2022). Thus, the COVID-19 crisis has impacted consumer behavior, though differs across generation cohorts (Eger *et al*., 2021), and elicited travel fear that may impede recovery after the pandemic (Zheng *et al*., 2021).

Globally, the WHO confirmed that COVID-19 is now an established and ongoing health issue, but it is no longer a public health emergency of international concern (PHEIC) (WHO, 2023). This allowed destinations to operate under the notion of the "New Normal". International travel recovery reached 66% in 2022 and 80% of pre-pandemic levels in the first quarter of 2023 (UNWTO, 2023). However, the pandemic residual risk is still airing and may cause changes in tourism recovery. Recently, the WHO reported an increase in COVID-19 infection (186,000 new cases) in 95 countries and 2,800 new deaths in 35 countries from 24 June to 21 July 2024 (WHO, 2024). The highest percentage of infection from 24 June to 21 July 2024 was reported in Europe, followed by other regions (WHO, 2024). Specifically in the USA, as of September 17, 2024, the infection is growing in 3 states, declining in 23 states, and is stable or uncertain in 22 states (CDC, 2024). Thus, the struggle to return to pre-pandemic levels continues in most EU countries (Eurostat, 2023) and regional tourism, such as Southeast Asia (New Straits Times, 2022). For example, tourism is expected to recover to pre-pandemic levels in Singapore and Thailand by 2024 (Lin, 2023; The Straits Times, 2024; Saxon *et al*., 2021) and in Malaysia by 2025 (New Straits Times, 2022). Therefore, with the indoctrination that *"if something fails, it must always 'fail to safe' or 'fail to secure',"* rebuilding the THI is still a challenge but provides an opportunity to reset with a new paradigm that values innovation that provides value for all stakeholders.

Surprisingly, pandemics-related crises have historically led to "unscientific" and "asymmetrical" global responses, most of which have negatively affected the tourism industry (Novelli *et al*., 2018). The World Bank noted that 90% of pandemic-related economic losses result from "uncoordinated and irrational public efforts to avoid infection" (Global Rescue & WTTC, 2019). Despite this observation, the recovery of the global travel and tourism sector from COVID-19 has been slower than expected, partly due to inconsistent and uncoordinated measures (WTTC, 2021) in most destinations (Lin, 2023). Interestingly, innovations could form part of a coordinated effort for dynamic tourism organizations' competitive advantage (Booyens, 2015, Booyens and Rogerson, 2016) and ensure the survival and growth of tourism organizations and destinations (Gomezelj, 2016; Williams, 2014) during times of crisis and recovery. Therefore, many researchers' interests lie in understanding how SI efforts can help mitigate COVID-19's disruptive impact on THI, including reducing visitor risk perceptions, improving tourism behavior and processes, and influencing

post-crisis recovery. While SI efforts are presumed to mitigate the crisis, given the unique global impact of COVID-19, the understanding of how SI efforts can mitigate its disruptive impact on global tourism is still limited. SI efforts in epidemic-related crises are understudied before COVID-19. Thus, little empirical evidence is available on how SI efforts mitigate the disruptive impact of COVID-19. To address these gaps, this study aims to explore the following questions: (1) Is SI indeed a coping strategy for tourism and hospitality (T&H)? (2) What is the most common SI in T&H during COVID-19? (3) Does SI truly mitigate COVID-19-related prejudices in T&H? This work aims to lay the groundwork for future empirical research by critically evaluating the potential of SI efforts in mitigating COVID-19's disruptive impact on the THI.

2. Methodology and tool

The present study used a systematic literature review (SLR) and content-centric analysis to rigorously and objectively summarize the impact of service innovation (SI) and COVID-19 in THI. The decision to use SLR was based on its advantage in identifying, selecting, and critically assessing extant studies to answer established questions (Baker *et al*., 2020; Rajput and Singh, 2020). To ensure the robustness and reliability of the SLR procedure, we strictly followed systematic review guidelines in the literature (for example, Templier and Paré, 2015) and PRISMA guidelines and checklists (Moher *et al*., 2009). Additionally, this study supplemented the SLR with content analysis of eligible articles to provide insights into the review questions. Content-centric analysis is a qualitative technique for informational content assessment of textual data to identify words, concepts, themes, and patterns (Bhatti *et al.*, 2020).

2.1 Literature

The systematic literature search for the current SLR was conducted in May 2023 using the Scopus and Web of Science (WoS) databases, which are important databases for accessing literature, according to Carrera-Rivera *et al*. (2022) and Gusenbauer and Haddaway (2020). The review aimed to critically evaluate SI in response to the COVID-19 outbreak in tourism and hospitality, considering both the impact and the opportunities. To achieve these objectives, the search string "Service" AND "Innovat*" AND "COVID" OR "Coronavirus" OR "Sars-2" OR "Sars 2" OR "SARS-CoV-2" AND "Tourism" OR "Hospitality" OR "Leisure" was used.

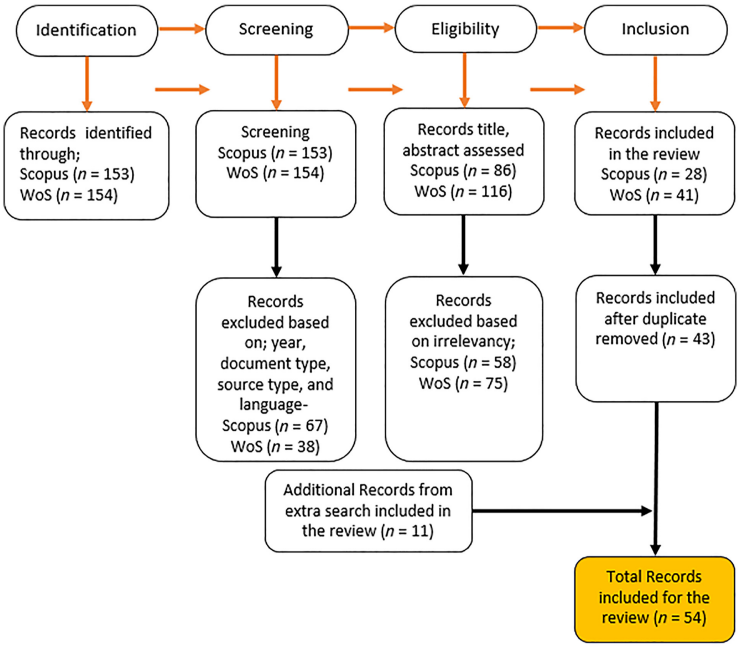
2.2 Resource identification principles

To conduct an SLR that is PRISMA-compliant, we start by setting eligibility criteria. The current SLR inclusion and exclusion criteria can be seen in Figure 1. Only articles published in academic journals with peer review are eligible. Specifically, journals indexed in Clarivate Analytics (Science Citation Index® or Social Sciences Citation Index®) were included in the criteria.

2.2.1 Research articles selection and eligibility criteria. The search results were assessed, and only articles written in English were considered. The studies with these characteristics were included: (1) original research articles published between 2020–2022; (2) related to SI and COVID-19 in tourism and hospitality. However, articles were excluded if they were (1) letters, commentary, editorials, perspectives, reviews or conference abstracts; (2) written in languages other than English. In addition, the titles and abstracts of the remaining articles were briefly reviewed to determine eligibility before extracting the data from the databases (Scopus and WoS).

2.2.2 Data extraction and collection. After collating all studies from Scopus and WoS databases, and Mendeley software (Elsevier, London, UK) to organize the search results, we removed any duplicate studies using Mendeley and manual checks. We also created a database using MS Excel to manage the records. We then applied an in-depth screening of the article titles and abstracts to determine their eligibility. Any irrelevant studies were removed, and a comprehensive contextual text examination of the full texts of the remaining articles was performed. Any disagreements in the

Figure 1 The study systematic review – PRISMA method



Source(s): Figure by Ugokwe C.K

selection of articles were resolved through collaborative re-examination. The included studies were compared, and any differences were resolved through discussion among the authors. This review followed the PRISMA guidelines and checklist (Moher *et al.*, 2009; Templier and Paré, 2015). Figure 1 depicts the flowchart of how the results were sorted.

2.3 Results

2.3.1 Selection of articles. During the literature search, we found a total of 307 articles (153 from Scopus and 154 from WoS). Additionally, 11 articles from an extra search were included. Following the PRISMA guidelines, 264 articles were eliminated for not meeting the selection criteria (refer to Figure 1). Ultimately, this review comprises 54 articles that fully meet all the mentioned criteria.

2.3.2 Study characteristics. The studies we selected for review were published between 2020 and 2022, during the COVID-19 pandemic. As COVID-19 started at the end of 2019, there were no publications on service innovation (SI) and COVID-19 in tourism and hospitality. Because research on COVID-19 has a discrete starting point and has led to volatility, uncertainty, complexity, and ambiguity (VUCA) in the global THI, this review of studies differs from bibliometric analyses and other systematic literature reviews, which typically track the expansion of a study area over time.

3. Service innovation

Generally, service innovation (SI) refers to the introduction of a new or improved product (good or service), process, new organizational method, new marketing strategy, external relations, or workplace structure (OECD, 2005). With the advent of COVID-19, we define SI as an essential capability for tourism and hospitality organizations and the destination itself in an uncertain environment. Remarkably, SI remains a complex phenomenon, as various approaches have been used to explain it, resulting in different forms of SI. In tourism and hospitality, innovation takes on various forms and is typically non-technological, similar to other service industries

(Booyens and Rogerson, 2016; Gomezelj, 2016). Alternatively, it is now more than a series of technological innovations (Hall and Williams, 2019). The pandemic may have accelerated different forms of SI to enable the tourism and hospitality industry (THI) to maintain relevance. Thus, innovations could be part of a deliberate strategy for the survival of tourism organizations and the growth of tourism destinations (Gomezelj, 2016; Williams, 2014) in the post-pandemic recovery.

4. Service innovation and tourism and hospitality operators in the COVID-19 (post-) crisis

Tourism and hospitality industry (THI) implemented various service innovation (SI) strategies to address the challenges posed by the COVID-19 crisis and to restore the consumer process. The identified Oslo Manual categories of innovation -product, process, organizational, and marketing innovations, still apply to the numerous initiatives undertaken by the THI in response to the pandemic (Sharma *et al*., 2021). However, it is difficult to distinguish between product and process innovations in practice despite the clear theoretical distinction between the two. As a result, Sharma *et al*. (2021) have grouped these two types of innovations into a single category "product-process innovation". The review findings are further discussed in the next sections.

4.1 Service innovation efforts and adoption in the COVID-19 (post-) crisis

4.1.1 Product-process innovation. Demographic factors are crucial determinants in the adoption of innovation. From a business perspective, demographics can be employees or organizational demographics. In the tourism enterprise context, innovation is largely influenced by entrepreneurial characteristics (Pikkemaat *et al*., 2018). For instance, previous research has highlighted demographic trends and changes as main drivers of product-process innovation, such as service automation, in the tourism sector (Webster and Ivanov, 2020). In a crisis, despite the devastating impact of the pandemic, socio-demographic factors continue to impact the technological product-process innovations adoption. A study of Italian travel agencies (TAs) by Dini *et al*. (2022) revealed that women in ownership or managerial positions demonstrate higher adoption of in-store technology compared to their male counterparts. This suggests that women in leadership roles have greater adaptability and agility in responding to crises by promptly embracing technology, making them more inclined to explore tech-based crisis management. Interestingly, the study found that travel agency (TA) managers with a high school diploma or less adopted more technological innovation tools than university graduates (Dini *et al*., 2022), challenging the notion that higher educational attainment always correlates with greater technological literacy or innovation adoption (Kabakus *et al*., 2023; Mann *et al*., 2017). This suggests that lower-educated TA managers are more adaptable during crises and may possess strong self-taught digital skills or be more open to exploring and promptly embracing new technologies.

In times of uncertainty and upheaval, organizations develop capabilities to adapt, recover, and respond to disruptive occurrences. Two important theories that contribute to this capability are the dynamic capability theory (DCT) and the technology-organization-environment (TOE) paradigm. DCT states that dynamic capabilities enable organizations and their top management to adjust resources based on volatile and ever-changing environments by creating, recombining, integrating, and releasing resources (Eisenhardt and Martin, 2000; Teece, 2019). On the other hand, the TOE paradigm outlines the organizational, technological, and environmental as factors influencing the adoption and implementation of technological innovations (Tornatzky *et al*., 1990). The disruptive impact of COVID-19 challenged the innovative capabilities of tourism and hospitality operators (THOs). To reduce physical contact, improve efficiency, market their services, engage customers, provide virtual experiences, and manage customer relationships, most THOs adopted technological product-process innovations, such as self-service technology (SST) check-in kiosks, queuing solutions, robots, social networks, virtual content design, and technology-based customer relationship management (CRM). (Chi, 2021; Dillette and Ponting, 2021; Liu and Yang, 2021; Mbatha, 2022; Barker and Rodway-Dyer, 2023; Ma *et al*., 2023). However, the hotel industry also showed a lack of capability in adopting technology innovations.

The success of innovation in tourism and hospitality relies on organizational capabilities and resources. For instance, capabilities to uncover new directions depend on prior knowledge and practices (Gulati *et al*., 2012). However, in severe crises, previous organizational capabilities and learning routines may not provide sufficient guidance. The fact that Italian hospitality operators were unable to innovate their service offerings in response to COVID-19 using previous problem-solving routines (Visentin *et al*., 2021) demonstrates that COVID-19 posed unique and unprecedented challenges different from familiar disruptions like natural disasters or economic downturns in the tourism and hospitality industry (THI). Thus, the crisis presented new issues that challenged existing problem-solving routines. Consequently, hospitality small and medium-sized enterprises (SMEs) must evolve in their dynamic capabilities (DC) to address disruptive situations. For instance, Chinese hospitality operators with strong DC (such as sensing, learning, integrating, and coordinating capabilities) were able to improve their innovation strategies and sense-making of technology developments adoption for COVID-19 (Liu and Yang, 2021). The firms' capabilities were evident in their swift adaptation and creativity during the pandemic. In the implementation and management of strategic innovation options, several Chinese hoteliers ceased using the service technology innovations they had adopted before the COVID-19 pandemic. However, the hoteliers who continued their operations displayed strong capabilities, particularly those partially staffed with self-service technologies (SSTs) to drive sales through virtual technology; those staffed with minimal SST added and updated technology to mitigate the impact of COVID-19; and those mainly staffed by SST provided increased staff training in SST usage and allocated resources to expedite technology product development and implementation (Liu and Yang, 2021). Thus, strong dynamic capabilities promote high performance in creating new products (and processes), identifying technology opportunities, and assessing the business environment (Teece, 2019) during crises.

Additionally, collaboration efforts as an organization's capabilities can enhance innovation during challenging times. In Hjalager's (2010) findings, the innovation cluster approach (ICP) promotes innovation in individual tourism businesses where new knowledge about their collaborative efforts is crucial to overcoming behavioral and structural impediments to innovation. Similarly, an organization's relationship networks can function as an ICP, which encourages collaboration and facilitation of innovation. However, this may require a firm's dynamic capabilities (DC). Dynamic capabilities theory (DCT), as proposed by Teece (2010, 2019), is embedded in a firm's culture, values, individual managers and collective ability to swiftly implement changes. Interestingly, lack of cooperation among stakeholders in most destinations usually hinders destination development, highlighting the need for innovation driven by a network of actors rather than a single entity (Pikkemaat *et al*., 2018). In this way, relationship networks like social capital can enhance adaptive resilience and crisis recovery of tourism and hospitality. For instance, studies have shown that social capital structure at the intraorganizational level in Jordanian hotels (Alkhatib and Valeri, 2024) and interorganizational level in Italian hotels (Visentin *et al*., 2021) positively influenced service innovativeness to cope with the pandemic. Interestingly, interorganizational relational capital among Italian hoteliers did not contribute to service innovation (SI) (Visentin *et al*., 2021), unlike the intraorganizational relational capital in Jordanian hotels (Alkhatib and Valeri, 2024). This could be attributed to the cultural, structural, and dynamic differences in the hospitality industry between Italy and Jordan. Eastern cultures value collectivism, while Westerners value individualism (Hofstede, 2001; Markus and Kitayama, 1991). Thus, the adaptability and resilience of tourism SMEs in Eastern may depend on cooperation more than Western ones. This is because collaboration among tourism actors is essential in consistently providing high-quality experiences for guests (Pikkemaat *et al*., 2018). While leveraging external networks to enhance innovation for global tourism recovery is crucial, it's equally important for firms to build a robust internal network and foster a collaborative culture. Firms can explore other internal approaches. For instance, a lack of knowledge on idea management and implementation can hinder tourism SMEs and destinations' innovations (Pikkemaat *et al*., 2018). However, knowledge management is crucial in promoting crisis adaptive resilience and recovery by enhancing Vietnamese hoteliers' innovation capability (Chi, 2021).

Furthermore, hospitality SME technology adoption has shown unique characteristics, requiring distinct approaches in examining adoption behavior (Wang and Qualls, 2007) in crisis. According to the TOE paradigm, various organizational, technological, and environmental factors influence a firm's ability to implement technological innovations (Tornatzky *et al*., 1990). Organizational resources (financial, technical), culture, and management support play significant roles in technology adoption, as indicated in other recent fields of study (e.g. Nguyen *et al*., 2022). *Management support*, as a source of motivation and encouragement, has a significant impact on the digital adoption behavior of retailers (Nguyen *et al*., 2022) and hospitality employees (Tarhini *et al*., 2017). However, the myopic views of top management can sometimes conflict with the market orientation's long-term focus (Pan and Jaju, 2015). In this regard, hospitality SMEs' perception of technology being considered greatly influences its adoption (Wang and Qualls, 2007). During a crisis, the top management perspectives can hinder an organization's ability to innovate. Only 25% of Russian tourism SMEs believed that digital technology adoption could help them overcome the COVID-19 pandemic (Sheresheva *et al*., 2021). Additionally, management support played a crucial role in driving AI performance (product-process) adoption in China's hotel industry during the COVID-19 pandemic (Chen *et al*., 2023).

Further, technology adoption often leads to changes in service delivery methods and necessitates technical, financial, and human resources to improve performance (Diansari *et al*., 2020). Thus, *Organizational resources* continue to predict innovation adoption (Damanpour, 1991) during crises. Human capital investment in Jordanian hotel firms increased new idea production, which enhances service innovation (Alkhatib and Valeri, 2024). Professional growth implementation among US event management operators empowered innovative change during the pandemic (Dillette and Ponting, 2021). These findings clarify that successful managerial support must equip employees to promote the firm's innovation goals. However, resource constraints in hospitality organizations, especially SMEs, can slow the innovation adoption process and affect its outcome, particularly during challenging times. Only 50% of Russian tourism SMEs were able to transition to online services during the COVID-19 crisis, while others were unable to do so due to their businesses' nature and technical resource constraints (Sheresheva *et al*., 2021). Additionally, a budget for technology implementation is crucial in the adoption (Winata and Mia, 2005) during a crisis. For instance, financial support helped Greek hoteliers adopt digital technologies during the pandemic (Nikopoulou *et al*., 2023). However, high investment costs prevented most Chinese hoteliers from adopting self-service technologies to withstand the crisis (Liu and Yang, 2021). Hence, technical competence and financial resources indicate hoteliers' organizational readiness to employ technology innovations (Leung and Law, 2013) during a crisis. Unlike larger organizations that have resources and can afford more risk in technology adoption (Ramdani *et al*., 2013), most destinations' hospitality sector consists of micro, small, and medium enterprises (MSMEs) that lack the technical and financial resources to adopt digital-technology innovation during a crisis.

The cultural dimensions theory suggests that Eastern and Western cultures have different self-conceptions (Hofstede, 2001). Hospitality workers in Eastern cultures tend to view technology more favorably when it is tied to work performance than their Western counterparts (Guo *et al*., 2023; Leung and Law, 2013). However, since a firm's dynamic capabilities are embedded in its organizational culture (Teece, 2019), a firm's position and corporate culture can significantly impact how technology adoption is considered. For instance, during the crisis, cultural digital maturity among Greek hoteliers is the primary predictor of technology adoption (Nikopoulou *et al*., 2023). Contrarily, the firm position and corporate culture of Chinese hoteliers were identified as impediments to technology adoption (Liu and Yang, 2021). This could be attributed to the fact that non-supervisory hospital staff are generally more inclined to embrace technology compared to supervisory staff (Guo *et al*., 2023). In the technology adoption context, the top management's perspective, especially in a high-power distance culture, can significantly impact organizational culture, especially for MSMEs hospitality operators. This is because culture in a technological context is seen as a firm's digitally-driven approach to digital innovations (Gill and VanBoskirk, 2016), and managerial support contributes greatly to shaping technology adoption awareness (Matikiti *et al*., 2018).

Environmental factors are major components of organization's technology adoption behavior. In the literature, these factors include customer and competitive pressure, government regulation and support, etc., (Ezzaouia and Bulchand-Gidumal, 2020). Competitive pressure (CP) in the innovation context refers to the peer pressure to use innovative technology (Gatignon and Robertson, 1989), however, the emergency of COVID-19 implies that CP is both a peer pressure and crisis pressure to innovate to survive. This pressure has been identified as one of the main drivers of AI adoption by hoteliers in China during the COVID-19 crisis (Chen *et al*., 2023), as survival became the top priority due to the deteriorating business environment during COVID-19 (Lau, 2020). SI adoption improved Jordanian hoteliers' crisis-time competitiveness (Alkhatib and Valeri, 2024). Hence, innovation adoption is a crisis-focused firm performance dimension.

Furthermore, the reluctance to adopt innovative products such as technology may undermine a firm's competitiveness (Palmié *et al*., 2022) and survival. However, in challenging times, firms may need a solid orientation to deploy service innovation (SI) adoption. The strategic innovation theory states that market orientation, including networks, internal resources, market saturation, and customer orientation, impacts a firm's innovativeness but the effectiveness is contingent on the managerial interpretation of these aspects (Sundbo, 2001). Notably, the strong customer orientation of most hoteliers in Vietnam contributed to their innovation capabilities in surviving the crisis (Chi, 2021). Additionally, the innovativeness among Chinese hoteliers significantly impacts the performance of AI adoption (Chen *et al*., 2023). These findings reflect the idea that innovativeness and customer orientation enable organizations to create superior customer value (Narver and Slater, 1990) during a crisis.

Furthermore, government encouragement greatly influences the enterprises' innovation adoption (Nguyen *et al*., 2022) during a crisis. For instance, China's hoteliers' AI performance adoption during the COVID-19 crisis is enhanced by perceived government regulatory support (Chen *et al*., 2023). Also, crisis-related government regulations, such as social distancing and disinfection, etc., motivated hoteliers in China to adopt product-process innovations like SSTs to mitigate the impacts of COVID-19 (Liu and Yang, 2021). This shows that innovation adoption in some cases, is mainly driven by crisis-related regulations rather than the crisis itself.

Technological factors based on the TEO paradigm influence the adoption and implementation of technology. In hospitality, the characteristics of technology directly affect the adoption process, not the organization's perception of technology (Nguyen *et al*., 2022). Specifically, Chen *et al*. (2023) discovered that Chinese hoteliers perceived AI risk negatively impacted the performance of AI adoption. In contrast, AI system quality did not contribute to the performance of AI adoption in China's hospitality industry during the pandemic (Chen *et al*., 2023). Therefore, AI-based contactless devices and robots might have been adopted as a conventional solution for COVID-19 crisis prevention, rather than as a performance enhancer.

4.1.2 Organizational innovation. Management of organizational practices is crucial for crisis management, as an organization's survival may depend on the innovative practices adopted at the organizational level. With the emergence of the COVID-19 pandemic, organizations must embrace new practices to survive. The pandemic significantly impacted the strategic management (cost identification, productive capacity, financial goals, expenditure budget, and formulation of income budget) of most Colombian tourism small and medium-sized enterprises (SMEs) (Tobón Perilla *et al.*, 2022). In adaptive response to survive the pandemic, most tourism and hospitality SMEs first innovated by reducing costs and increasing their efficiency in response to the industry's economic decline, lack of government support (Bianchi, 2022), and government ineffectiveness (Tobón Perilla *et al.*, 2022). Specifically, 79% of Russian tourism SMEs complained that governmental support is insufficient (for covering expenses such as office rents, salaries, and bills) and ineffective (Sheresheva *et al*., 2021). As a result, most tourism SMEs halted operations, with 50% retaining their staff and some did so without implementing wage reductions, while 80% introduced wage reductions, unpaid leave, and shorter work schedules (Sheresheva *et al*., 2021). This confirms that the crisis altered the business situation, particularly the number of workers, for most hospitality

operators (HOs) due to reduced innovation and development practices, such as investment in products, marketing, and process improvement development (Anggadwita *et al.*, 2021; Tobón Perilla *et al.*, 2022).

DCT emphasizes that a firm's DC to organizational change is embedded in its culture, values, and ability (Teece, 2010, 2019). However, the firm's position, corporate culture, and financial capacity hindered most Chinese hoteliers from implementing product-process innovation (e.g. SST) during the pandemic (Liu and Yang, 2021). Therefore, the survival of an organization during crises depends on management's ability to implement organizational changes. For example, the survival of the leading cruise company in Vietnam during the pandemic is attributed to its shift to an organic and flexible organizational structure, to establish a new working structure (Jaaron *et al.*, 2023). Moreover, human resources play a significant role in driving innovation, as ineffective employee engagement can impede innovation in travel destinations (Pikkemaat *et al.*, 2018). This aligns with most hospitality organizations' focus on crisis-related employee development and team consolidation (Sheresheva *et al.*, 2021). Hospitality operators (HOs) also implemented professional growth initiatives to drive innovative change in the US event management industry amidst the pandemic (Dillette and Ponting, 2021), and increased staff training in Chinese hotels to support new service delivery (Liu and Yang, 2021). They also introduced contemporary training programs like COVID-19 awareness and environmental management certificates and reshaped their standard operating procedures (SOPs) to bolster confidence in health and safety among Indian hospitality consumers (Gupta and Sahu, 2021).

4.1.3 Marketing innovation. An effective marketing innovation can help organizations survive economic crises, but its success depends on the firm's capabilities. According to Tobón Perilla *et al.* (2022), most Colombian tourism SMEs, including lodging, travel agencies, restaurants, and clubs, prioritize investment in ICT and technological innovation in marketing to efficiently improve tourism recovery. Before COVID-19, virtual reality (VR) promoted tourism (Adachi *et al.*, 2022), so crisis adaptation can also be promoted by using virtual technologies in tourism marketing. During the pandemic, many Chinese hotels employed virtual technology like social media to boost sales (Liu and Yang, 2021). Additionally, VR adoption rapidly grew due to COVID-19. Strategies for VR adoption may include free-to-view public and pay-to-view access virtual. The application of free-to-view public access in virtual safari among sub-Saharan Africa conservation operators for marketing purposes is instrumental in communicating the intrinsic value of nature and conservation efforts to a larger audience, increasing access to nature, and fostering and strengthening connections between people and nature. However, pay-to-view access in virtual nature-based tourism (VNBT) is an interim solution to the sudden reduction of revenue streams during the pandemic (Barker and Rodway-Dyer, 2023). Thus, tourism and hospitality SMEs adopted technology as a marketing tool to create new value in line with rising individual interest and travel security (Sheresheva *et al.*, 2021).

In the management of post-complaint customer behavior (PCB), it is proven that vouchers can enhance service recovery (Kenesei and Bali, 2020). Voucher adoption, as an innovative marketing technique, can also be seen as an adaptive response to crisis management strategies beyond PCB management. For instance, as an innovative policy response to the 2007–2008 global financial crisis, China introduced tourism vouchers in 2009, to stimulate domestic tourism development (Yan and Zhang, 2012). During the COVID-19 pandemic, vouchers in countries such as Italy and Slovenia were used as a demand-driven government intervention (UNWTO, 2020) to encourage domestic holiday spending (Cvelbar *et al.*, 2021). Hence, a tourism voucher is an innovative intervention marketing tool that can boost consumer confidence and alleviate low demand (Cvelbar *et al.*, 2021; Hsieh *et al.*, 2010) for domestic tourism amidst a crisis. However, "tourism spending" vouchers are rare (Yan and Zhang, 2012), especially in cross-border tourism marketing. COVID-19 has demonstrated that tourism vouchers can be used as a cross-border marketing tool. To generate new revenue, Jaaron *et al.* (2023) found that most leading cruise organizations in Vietnam introduced inbound vouchers (for example, 3-year inbound vouchers) as a new product, which attracted domestic visitors and

offered incentives to international customers who used it after the pandemic. This innovative strategy allowed cruise companies to receive cashflow in advance and enhance revenue to survive the pandemic (Jaaron *et al*., 2023).

4.2 Service innovation and firm size in COVID-19 (post-)crisis

In literature, organizational characteristics are among the factors conditioning the adoption of innovation. These organizational characteristics, such as age and size, remain important in various contexts, including both developing and developed nations. For example, the usefulness of technology innovation during the pandemic is dependent on the age and nature of the business. According to Dini *et al*. (2022), relatively younger (< ten years old) Italian travel agencies (TAs) perceived new in-store technology products as more effective in combating the pandemic. However, larger TAs considered in-store technology tools more effective during the pandemic, compared to smaller individual and micro TAs (Dini *et al*., 2022). This supports the notion that smaller tourism firms are less likely to implement IT than larger firms (Ezzaouia and Bulchand-Gidumal, 2020).

Moreover, the nature of the business also affects innovation adoption behavior. Italian TAs prioritized in-store technological innovation over tour organizers to survive the crisis (Dini *et al*., 2022). However, this lower priority for technology adoption could be attributed to tour organizers being usually smaller in size. Thus, the differences in firms' innovation adoption behaviors are contingent on the nature of the business.

Regarding the size of the organization, studies suggest that the size of the hotel does not impact technology adoption among Andalusian and Moroccan hotel SMEs (Ezzaouia and Bulchand-Gidumal, 2020; Tejada and Moreno, 2013). This is contrary to larger Spanish hotel chains, which have a greater presence on social media (Escobar-Rodríguez and Carvajal-Trujillo, 2013), corresponding with tourism organizations (TORs) increasingly using social media to engage audiences and overcome COVID-19's challenges (Ryder *et al*., 2021). The effectiveness of social media adoption in a firm's value creation and attractiveness during the crisis is more significant for medium-sized and large TORs, such as Italian museums and cultural institutions (MCIs), compared to small-sized MCIs (Palumbo, 2023). This validates the idea that medium and large-sized firms have a better chance of recontextualizing their relationship with users in the digital space (Orlandi *et al*., 2018), whereas small firms struggle to establish a digital identity and channels to engage their audience (Leoni and Cristofaro, 2021) and lack the resources to create an extensive digital communication strategy via their organizational websites (Argyropoulos and Kanari, 2019). However, despite the correlation between hotel size and website effectiveness (Escobar-Rodríguez and Carvajal-Trujillo, 2013), the attractiveness of small Italian MCIs in post-COVID-19 did not increase with increased online presence and service offerings through organizational websites compared to medium and large MCIs (Palumbo, 2023). Thus, prominent TORs have better tourism proposals with advanced technological products during the pandemic (Dini *et al*., 2022).

In some cases, digitalizing services may have similar effects across firms. Italian TAs found digital travel catalogues as the most effective tool during the crisis (Dini *et al*., 2022). However, the introduction of online digital catalogues did not improve the attractiveness of small, medium, and large-sized MCIs (Palumbo, 2023). Additionally, virtual tours (VTs) and the online delivery of innovative value-added services did not enhance the attractiveness of these MCIs (Palumbo, 2023), despite VTs appealing to travelers who value digital-mediated tourism experiences and are willing to substitute physical visits (Mastroberardino *et al*., 2022). This resonates with the argument of most tourism operators that while virtual safaris communicate the intrinsic value of nature and conservation efforts to a wider audience during the pandemic but cannot fully replace in-person safaris and may not compete with traditional forms of tourism in the future (Barker and Rodway-Dyer, 2023). Therefore, the effectiveness of VTs as a tool for overcoming lockdowns (El-Said and Aziz, 2021) depends on the type of VTs offered and the target segment.

4.3 Service innovation and profitability in COVID-19 (post-)crisis

The essence of adopting crisis-related innovation is that it will offer benefits to adopters by providing a competitive advantage and ensuring survival. In the tourism and hospitality industry (THI), process-oriented innovation (PROCOI) enhances a firm's strategic positioning, and builds, and sustains core competencies while product-oriented innovation (PRODOI) generates immediate and short-term benefits (Wang and Qualls, 2007), such as increased firm value and profitability in jolt times (Dey *et al.*, 2021; Sharma *et al.*, 2021). However, despite the influence of firm type and economic region on service innovation (SI) impact on firm value (Feng *et al*., 2021) during the crisis, the effect varies across innovation type, firm size, and business type. For instance, in the US, hotelier product-process innovation (PPI) adoption significantly increased firm value compared to marketing innovation (MI), while organizational innovation (OI) had a lower effect (Sharma *et al*., 2021). Moreover, the larger the hospitality organization, the higher the returns from COVID-19-related innovation, but there is a threshold after which this growth declines (Sharma *et al*., 2021). In tourism, investment in process improvement and marketing was crucial for Colombian tourism business owners to survive the crisis (Tobón Perilla *et al*., 2022). Surprisingly, while process innovation has no effect on Czech travel and tour operators' profitability, product innovation does (Dey *et al*., 2021). This aligns with the perception that PRODOI, providing immediate and short-term benefits, is often more advantageous than PROCOI (Wang and Qualls, 2007) for surviving in crisis.

Depending on the intended purpose, technology innovation can be product or process-oriented. Process-oriented innovations (PROCOI) facilitate the delivery of an outcome, while product-oriented innovations (PRODOI) are the outcome (Wang and Qualls, 2007). During the pandemic, product-process innovation (PPI), which is primarily technology-oriented is more vital than marketing innovation (MI) and organizational innovation (OI), which focuses on managerial actions, as it ensures safe service delivery. Therefore, technology-driven PRODOI aided THOs in surviving COVID-19. For example, technology innovation significantly impacted the corporate profitability of Czech Republic travel and tour operators (Dey *et al*., 2021), and self-service technologies (SSTs) saved labor costs for Chinese hotel hoteliers with largely SST-staffed establishments (Liu and Yang, 2021). Additionally, online virtual nature-based tourism (VNBT) greatly supported conservation operators in sub-Saharan Africa to cope with the COVID-19-related funding deficit, providing an alternative revenue and keeping business afloat (Barker and Rodway-Dyer, 2023). These findings support previous studies conducted in the Moroccan hotel industry, which revealed that technological innovation lowers operational costs, and enhances sales revenue, and overall profitability (Ezzaouia and Bulchand-Gidumal, 2023). However, virtual tourism does not benefit all stakeholders in the same way traditional tourism does. Only 70% of VNBT operators generated alternative revenue from virtual safaris through pay-to-view or stimulating financial support (Barker and Rodway-Dyer, 2023), indicating that the effectiveness of virtual safaris may be influenced by factors such as "business size" and the operators' "marketing reach". Digitally, larger enterprises can access larger audiences (Orlandi *et al*., 2018). The larger the organization, the greater the returns from COVID-19-related innovation (Sharma *et al*., 2021). Moreover, strategic location is crucial for the launching of technological innovations. Using a simulation scenario to find the best locations for the drone launching station, the potential use of drones in Rome for the tourism crisis (e.g. COVID-19) to offer online VTs showed that various scenarios are flagrantly profitable, however, the price rate preferences and demand for virtual visits depends on the location of the virtual tourism activities and attractions (Ilkhanizadeh *et al*., 2020).

4.4 Service innovation role – operators' perception in COVID-19 (post-)crisis

In tourism and hospitality, following Wang and Qualls (2007), the two original constructs of the Technology Acceptance Model (TAM), "perceived ease of use" and "perceived usefulness," are limited in capturing and describing an organization's perception of innovation due to the greater complexity of organization adoption behavior. Therefore, organizations do not only consider the ease of use of the innovation but also the complexity of the adoption process. Similarly, innovation

usefulness is not considered in simple terms but is assessed in multiple dimensions such as market share, customer service, efficiency, productivity, cost savings, etc.

Competitive advantage, for instance, is often a function of market share (Schoeffler *et al*., 1974). Tourism and hospitality SMEs may weather economic downturns, competitive pressure, and maintain market share through effective innovation. The COVID-19 outbreak made service innovation (SI) a critical strategic issue (Bianchi, 2022). Therefore, strategic innovation adoption during the crisis was crucial for the business sustainability of the Jordanian tourism sector (Abusalma, 2021), indicating that it gave most Jordanian hospitality operators (HOs) a competitive advantage to survive the crisis (Alkhatib and Valeri, 2024). Additionally, tourism and hospitality SMEs may maintain market share and weather economic downturns through effective innovation. Adopted innovations during the pandemic, boosted confidence in HO's ability to provide a safe environment (Sharma *et al*., 2021) and preserve guests' visit intention (Esposito *et al*., 2022). Innovations, such as social media and VTs as marketing tools, increased online engagement and generated alternative revenue for Sub-Saharan Africa conservation operators (Barker and Rodway-Dyer, 2023), and improved tourists' attitudes towards destinations, encouraging future purchases and travel (Barker and Rodway-Dyer, 2023; Cenni and Vásquez, 2021; Nunes *et al*., 2022). Similarly, the use of "Inbound vouchers" as a marketing innovation helped Vietnam cruise organizations increase revenue and survive the crisis (Jaaron *et al*., 2023). Hence, THOs considered innovating in services and marketing to achieve efficient recovery (Tobón Perilla *et al*., 2022).

Customer service during a crisis can be improved through the strategic use of product-oriented or process-oriented technology innovation. Lockdown restrictions led to more organizations showing interest in digital transformation efforts (Gabryelczyk, 2020; García-Peñalvo, 2021) to improve service delivery. Technology-based Customer Relationship Management (CRM) plays a crucial role in building long-term customer relationships and developing innovative service and marketing strategies tailored to the challenges posed by the pandemic for Vietnam hoteliers (Chi, 2021). In tourism, operators in Sub-Saharan Africa conservation adopted digital technologies such as virtual services and social networks, etc. to convey the value of their tourism services to a wider audience, strengthen customer relationships and promote sustainable tourism (Barker and Rodway-Dyer, 2023). Digital technology (DT) enabled Italian tourism operators to design and offer memorable experiences, increase customer satisfaction, and engage visitors in local cultural tourism through digital museums. The COVID-19 pandemic disrupted traditional service processes, leading to a shift towards technology-mediated ones (Baratta *et al*., 2022). In the restaurant industry, robotic restaurants in the US and China enhanced service processes using service robots (Ma *et al*., 2023). For Italian restaurateurs, DT facilitated the implementation of innovative services to address customer risk perception, preserve visit intentions, minimize physical interactions, and empower cleanliness for both workers and customers (Esposito *et al*., 2022). However, beyond technology, it is essential to have employees capable of delivering excellent service. Many customers prefer hotels with stringent cleanliness and sanitation protocols and staff that genuinely prioritize guest safety during service delivery (Gupta and Sahu, 2021). Therefore, the implementation of quality development programs is one approach that can help organizations deliver exceptional customer service (Aljasmi *et al*., 2023) during a crisis, as evidenced by the impact of new training programs introduced by Indian hoteliers, such as COVID-19 awareness and environmental management certificate training, on guest re-visit intentions (Gupta and Sahu, 2021). Overall, innovation and development practices in business management and adaptation enable THOs to navigate the pandemic challenges and contribute to economic recovery (Tobón Perilla *et al*., 2022).

Employee efficiency and productivity in service change during a crisis is a function of staff and technology integration. Human resources play a significant role in driving innovation, as poor employee engagement can impede innovation (Pikkemaat *et al*., 2018). Before the pandemic, the adoption of technology improved hotel employees' performance and service quality in Morocco (Ezzaouia and Bulchand-Gidumal, 2023). However, the impact of technological innovation on work

efficiency is affected by situational conditions and the type of technology adopted. In China, many hotel employees initially believed that SSTs (self-service ordering systems and robots) were less efficient than human staff due to their slower movement and were reluctance to use them but the pandemic outbreak, resulted in a change of attitude, as employees began to perceive SSTs as reducing workload, physical contact, and the risk of COVID-19, while also improving staff well-being and providing a sense of novelty (Liu and Yang, 2021). Furthermore, the implementation of digital technology during the pandemic improved work productivity and creativity in tourism SMEs in South Africa (Mbatha, 2022) despite some hospitality organizations (HOs) criticizing SSTs for being over-standardized and lacking emotional service (Liu and Yang, 2021).

5. Service innovation and consumer-based factors in COVID-19 (post-)crisis

5.1 Service innovation and socio-demographic in COVID-19 (post-)crisis

Before COVID-19, literature in tourism and hospitality suggests that personal innovativeness has a positive medium impact on technology use., but this effect does not vary across age groups, cultures, technology types, tasks (with/without transaction function), and industries such as restaurants, hotels, and travel and tourism (Ciftci *et al*., 2021). However, during the COVID-19 era, new findings have emerged. Various socio-demographic characteristics play a role in service innovation (SI) adoption. For instance, gender affects the use of self-service technologies (SST) in the hotel industry, with male consumers choosing them for their user-friendliness and female consumers for safety concern (Oliveira *et al*., 2021). Interestingly, lower education levels decrease privacy, security, trust in performance, and effort expectancy concerns when using tourism-related apps for safety purposes (TASP) (Nunes *et al*., 2022). Education level does not affect the willingness to pay a price premium (WTPp) for robot services in restaurants, but gender affects WTPp, with men showing a higher WTPp than women (Chuah *et al*., 2022b).

Race also plays a role in the use of service technology. Chinese consumers show a greater intention to visit restaurants and hotels with service robots compared to their American counterparts, however, both groups agree that robots reduce the risk of COVID-19 by minimizing interpersonal contact (Wan *et al*., 2021). In addition to race and gender, COVID-19 safety concerns influenced young people's propensity to use TASP (Nunes *et al*., 2022). However, they use SSTs more (Oliveira *et al*., 2021) and have higher WTPp for pandemic-focused robot-delivered services (Chuah *et al*., 2022b). The WTPp is also higher among consumers with higher incomes (Chuah *et al*., 2022b). Moreover, according to Chuah *et al*. (2022b), married consumers with children have a higher WTPp.

5.2 Service innovation and psychographics in COVID-19 (post-) crisis

5.2.1 Attitude. The emergence of COVID-19 brought consumer attitudes into play. During the crisis, motivations such as social motivation (SM) and functional motivation (FM) predicts consumer attitudes toward robotic restaurants (Chuah *et al*., 2022a) and drone food delivery services (DFDS) (Hwang *et al*., 2021). While it is observed that socially driven consumers favored robotic restaurants and DFDSs both before and after COVID-19 (Chuah *et al*., 2022a; Hwang *et al*., 2021), FM is more effective in enhancing consumer attitudes toward robotic restaurants and DFDS after than before, COVID-19 (Chuah *et al*., 2022a; Hwang *et al*., 2021). Additionally, hedonic motivation improved attitudes toward DFDSs before and after COVID-19, (Chuah *et al*., 2022a). Contrary to pre-pandemic studies (Lyu *et al*., 2017), which indicate that cognitive motivation (CM) enhances attitudes toward new technology, Hwang *et al*. (2021) found that CM has no significant impact on attitudes toward DFDSs before and after COVID-19. This suggests that consumers may not have logically considered the pros and cons of DFDSs.

Furthermore, values such as conditional, epistemic, emotional, and co-creation have been shown to influence attitudes toward robotic restaurants, before and after COVID-19 pandemic, according

to Chuah *et al*. (2022a). However, crisis-specific antecedents such as physical distancing and mysophobia made conditional value the second most important factor in predicting attitudes toward robotic restaurants (Chuah *et al*., 2022a).

5.2.2 Satisfaction. Hotels must innovate their services to satisfy customer needs during the pandemic (Marie *et al*., 2021). This can be achieved through product-process innovations, such as technology. Research by Astor *et al.* (2022) and Suksutdhi (2022) suggests that customers in tourism and hospitality are satisfied with the adoption of technology and innovation during COVID-19. Suksutdhi (2022) also found that SST innovations improved customer satisfaction in the hospitality industry during the pandemic. Moreover, smart hotel technologies (SHT) can enhance guest experiential satisfaction (ES) during challenging times like the COVID-19 crisis, as indicated by Chang *et al*. (2022). Chang *et al*. (2022) also discovered that SHT can particularly increase guest experiential satisfaction (ES) when they are motivated and confident. Also, Cheng *et al*. (2022) found that destination service innovation enhances tourist satisfaction during the pandemic.

5.2.3 Enjoyment and emotion. Perceived hazards and unacceptable personal risk levels can prompt preventive action search in environmental jolts (Lindell and Perry, 2012). This also can involve seeking technological innovations to manage the impacts of crises such as emotional collapse, viral infections, and disruptions in tourism and hospitality caused by events like the COVID-19 pandemic. However, it's important to note that while technological innovation can be beneficial in these situations, certain characteristics of the technology may hinder users' positive psychological state. For instance, in the tourism industry, El-Said and Aziz (2021) found that consumers' ease of using (PEOU) virtual tours (VTs) during the pandemic is linked to their perceived enjoyment (ENJ) of VTs. Similarly, virtual tourism products such as Airbnb Online Experiences (OE) considerably increased users' ENJ and evoked positive emotional responses during the pandemic (Cenni and Vásquez, 2022). In hospitality, Yoo *et al*. (2022) discovered that while robot barista coffee shops (RBCS) increased storytelling by appealing to consumers' positive emotions, experiential values such as atmosphere and consumer return on investment (CROI) significantly enhanced consumers' positive emotions. Hence, RBCS became more appealing when accompanied by a better atmosphere and a perceived economic value for the money spent on fast and convenient services (Yoo *et al*., 2022). However, Yoo *et al*. also found that using robot baristas for escapism did not enhance positive emotions. This suggests that while the experience is delightful, it lacks features that can provide enough relaxation to escape the daily routine in challenging times.

5.2.4 Experience and delight. In pre-, during-, and post-COVID-19, improvements in infrastructure, innovation, and the macro-environment enhanced the tourists' experiences. This, in turn, influenced the competitiveness of the hospitality system (Cuomo *et al.*, 2021). To better understand how innovation impacts the tourism experience, Torabi *et al*. (2022) confirmed that the use of destination smart tourism technologies (STTs) in an explorative and exploitative manner creates memorable experiences for tourists, particularly in challenging times. Furthermore, customized tourism experiences can be technology-mediated. For instance, virtual online experiences during the COVID-19 pandemic increased tourists' perception of customization (Cenni and Vásquez, 2022).

Additionally, Chang *et al*. (2022) discovered that the innovativeness of smart hotels (time-saving features, hedonic-seeking experiences, and trendiness) predicts experiential quality. Thus, fast and seamless access, hedonic feelings, and the futuristic and stylish nature of smart technologies helped smart hotels provide high-quality stay experiences during challenging times. Contactless service during the COVID-19 pandemic was not only safer but also more enjoyable. Consumer delight increased with the use of contactless service (Hao and Chon, 2021). However, consumers' low readiness to adopt new technologies can impair their experiences and satisfaction.

5.2.5 Motivation and engagement. The COVID-19 (post) pandemic requires smart-service innovation, such as service technology, to motivate and engage consumers. According to Chang

et al. (2022), post-pandemic visitors show more interest in smart hotels after experiencing high-quality stays, therefore, experiential quality boosts experiential motivation. Additionally, Afaq *et al*. (2023) found that hotel guests' perceptions of social customer relationship management (SCRM) significantly enhance customer engagement.

5.2.6 Perceived trust. In distressed times, trust is fundamental in the THI because it signifies transparency, reliability, and a commitment to consumer needs. The adoption of new technologies and heightened health concerns due to COVID-19 have increased the impact of customer equity on brand trust in contactless hospitality services among high-technology-ready customers in China (Hao and Chon, 2021). In essence, Innovative consumers are more likely to trust innovative service offerings, as innovativeness can help them deal with difficult situations. This is also evident in the sharing economy, where users' technology-seeking behavior has bolstered trust in the sharing economy platform (SEP) (Dabija *et al*., 2022). Furthermore, Dabija *et al*. discovered that depite the weak and insignificant influence of COVID-19 on trust in SEP, consumers' perceived value and experience of SEP increased trust in SEP during the COVID-19 pandemic.

During a crisis, engaging with customers can be a profitable way to build and maintain consumer trust. Social customer relationship management (SCRM) involves using social media (SM) to engage people. However, research in psychology shows that the benefits of SM on psychological state during the COVID-19 crisis vary, for being a source of social support and anxiety (Drouin *et al*., 2020) and fear (Lelisho *et al*., 2022), mental health issues (Zarocostas, 2020) positive (Yang *et al*., 2020) and a negative (Pennington, 2021) effects on wellbeing. While trust is a psychological or mental construct (Evans and Krueger, 2009; Lewis and Weigert, 1985) and a powerful social resource (Heyns and Rothmann, 2021) during a crisis, SCRM could be a powerful tool for crisis management to enhance trust. Afaq *et al*. (2023) confirmed that SCRM helped global hotel chains increase customer engagement, which in turn boosted customer trust during the COVID-19 crisis.

5.2.7 Risk perception. Tourism hospitality risk management benefits from service innovation (SI) aimed at reducing customers' perceptions of COVID-19 risk. According to the Protection Action Decision Model (PADM), hazardous environments motivate people to take protective actions search when they perceive a real and unacceptable risk (Lindell and Perry, 2012). As part of the protective actions search, customers sought safe and hygienic services, which proliferated technological innovation as a situational facilitator (COVID-19 risk prevention). For example, digital technology (DT) used in restaurants has been shown to reduce customers' risk perception (Esposito *et al*., 2022). According to Shin and Kang (2020), low expected interaction levels through technology-mediated systems result in lower perceived health risk, while high levels of expected cleanliness due to advanced cleaning (robot cleaning) technologies contribute to lower risk perception, however, the perception of employee cleaning leads to a higher perceived health risk. DT helps manage expected interaction and cleanliness, thereby helping consumers deal with the risk of viral exposure (Esposito *et al*., 2022; Shin and Kang, 2020).

5.2.8 Consumer decision. COVID-19 boosted consumers' travel and tourism variety choice decisions (Kim *et al*., 2022). According to PADM (Lindell and Perry, 2012), social and environmental hazards affect a person's threat perception, prompting protective decisions. Consequently, tourism innovations can have a positive impact on consumer decision-making. Smart-virtual reality-based tourism factors such as smart tourism, information quality and service credibility (IQSC), and cost advantages can enhance consumers' travel decision-making support mechanisms (TDSM), but characteristics such as interactivity and accessibility (IA) did not (Paliwal *et al*., 2022). Therefore, perceptions of IQSC, cost benefits, and smart tourism enhanced travel decision-making during the crisis, even though certain features of technological innovation may be an impediment.

5.2.9 Perceived value. "Technology adoption is value-oriented", meaning people or organizations embrace technology for its perceived value rather than purely for its novelty or trendiness. In this

sense, individuals value innovation more when it aligns with perceived situational conditions (for example, COVID-19 risk prevention). Van *et al*. (2020) found that hygienic usability and safety usability, assurance of secure service, individualistic involvement, update information sharing, empathetic service, and tangibility attributes of human–machine interactive (HMI) devices significantly enhance tourists perceived value for money in Vietnam. Thus, the perceived value of technology innovations surged during the pandemic due to safety concerns and travel restrictions. Surprisingly, tourists sought novel and unique experiences despite risks and travel constraints. Technology-seeking tourists and novelty-seekers continued to perceive a higher value in using the Airbnb sharing platform during crisis in Romania (Dabija *et al*., 2022). This may contradicts the idea that novelty boosts motivation but diminishes once the user becomes accustomed to the product (Jeno *et al*., 2019). Moreover, people will adopt technology if they are ready and find it useful (Nouraldeen, 2023) during crisis.

Despite the crisis, technological innovation has been rapidly accepted, leading to a more tech-driven experience for people. For both high and low-technology readiness, pleasant customer experience (CX) and delight (CD) derived from contactless hotel services in mainland China during the pandemic improved customer equity (value, brand, and relationship) (Hao and Chon, 2021, 2022). When guests are delighted by these services, the impact is even higher among low-technology readiness guests (Hao and Chon, 2021, 2022), despite the initial discomfort in using new technology (Kaushik and Agrawal, 2021). Furthermore, Airbnb's virtual online experiences (OE) were embraced as they were seen as a good value to satisfy the increased desire for exploration, entertainment, and unique experiences (Cenni and Vásquez, 2022).

Furthermore, smart hotels are a recent innovation in the hospitality industry. The adoption of smart hotel technology is still driven by value rather than by its trendiness. Thus, supporting the consumer values theory that people buy what they value (Sheth *et al*., 1991). During the crisis, Papagiannidis and Davlembayeva (2022) found that guests prioritize perceived price, control over experience, usefulness of smart features, external control over service quality and sustainability when evaluating the functional value of smart hotels. Also, the sense of control over experience, entertainment, playfulness of smart technologies, sustainability, and aesthetics of the smart hotel shape customers' emotional value (Papagiannidis and Davlembayeva, 2022). Surprisingly, surveillance in smart hotel technology did not reduce guests' emotional or functional value utility (Papagiannidis and Davlembayeva, 2022) despite the COVID-19 viral thoughts on identity.

5.2.10 Value cocreation. During the crisis, innovativeness in services can lead to the cocreation of tourism and hospitality activities. For example, participants (users and hosts) in online food activities cocreate value together through virtual online experiences (OE), fostering a sense of social connectedness (Cenni and Vásquez, 2021; Nunes *et al*., 2022) and knowledge expansion and sharing among tourism and hospitality consumers (Cenni and Vásquez, 2021). Therefore, product-process innovation such as OE is linked to knowledge sharing and value cocreation.

5.2.11 Service quality and improvement. Organizations must use quality and management tools to maintain service quality and value (Aljasmi *et al*., 2023) in challenging times. Hoteliers are increasingly turning to social customer relationship management (SCRM) to establish new and improved customer relationships through engagement on social media (SM). The use of SCRM during the crisis had a positive impact on consumers' perception of improved customer service (ICS) provided by global hotel chains (Afaq *et al*., 2023). Additionally, the use of SST during the COVID-19 pandemic significantly influenced the perceived service quality of hotel guests in Thailand (Suksutdhi, 2022). In essence, improvements in service quality lead to improved efficiency and customer satisfaction (Aljasmi *et al*., 2023) during a crisis.

5.2.12 Perceived image and corporate reputation. Consumers rely on company and product/service information to reduce their perceived risk during purchase decisions (Jung and Seock, 2016). Thus, uncertainities in crisis handling can harm a brand's image when customers activate their protective actions behavior. Service innovation (SI) is seen as a firm or destination's response

to crisis management and how consumers evaluate it may differ. Destination SI enhanced the destination image (Cheng *et al*., 2022), while consumers' perception of SI improved the corporate reputation of Indonesian hotels during the crisis (Marie *et al*., 2021). However, characteristics of product-process innovation (PPI) can impact the product innovation image differently. Choe *et al*. (2021) discovered that consumers' perception of privacy, time, and financial risks associated with drone food delivery services (DFDS) did not affect the image of DFDS in Korea. However, before the pandemic, performance and psychological risks did have an impact, but only perceived performance risks had a negative effect on the image after the COVID-19 outbreak (Choe *et al*., 2021). The image of DFDS in combatting COVID-19 was unaffected by consumer perceptions of time, financial, psychological, and privacy threats (Hwang *et al*., 2021).

5.3 Service innovation and behavioral intention in the COVID-19 (post-)crisis

5.3.1 (Re-)visit intention. PADM (Lindell and Perry, 2012) states that social and environmental hazards affect how people perceive threats, prompting protective decisions. The outcome of the protection decision process, together with situational facilitators and impediments, produces a behavioral response (Lindell and Perry, 2012). During a crisis like COVID-19, the impact of people's tourism inclination on their revisit intention to a destination resulted in less visits (Rahimizhian and Irani, 2021). However, innovative technologies can act as situational facilitators to help individuals cope, preparing them to visit destinations post-pandemic. The significance of innovative technology as a situational facilitator is contingent on how people perceive its characteristics. For example, the tendency to visit actual tourism sites (TenAS) is significantly linked to the online experience (OE) of virtual tours (VTs) (Cenni and Vásquez, 2021; Nunes *et al*., 2022), perceived usefulness, ease of use, enjoyment, and hazard-related attributes through intention to adopt VTs (El-Said and Aziz, 2021). Thus, VTs enhance tourists' motivation for future purchase and travel intention (Cenni and Vásquez, 2021; Nunes *et al*., 2022). The influence of the intention to adopt VTs on TenAS is stronger when users find VTs enjoyable and useful (El-Said and Aziz, 2021). Also, memorable experiences from using destination SST stimulate revisit intention (Torabi *et al*., 2022). However, technology as a situational facilitator may not always promote positive post-crisis behavior. For instance, while interactive VTs are preferred during COVID-19 mortality threats, they do not necessarily lead to intention to visit museums after the lockdown (Nanni and Ulqinaku, 2021). Thus, Individuals' knowledge of the threat induces protection action (Lindell and Perry, 2012), either decision not to visit.

In the hospitality sector, the perception of SI influences guests' behavioral intentions. The actual implementation of behavioral responses depends not only on people's intentions to take action but also on the conditions in their social and physical environment that can impede or facilitate action (Lindell and Perry, 2012). For instance, health risk perception greatly impacts the intention to visit restaurants (Esposito *et al*., 2022) and hotel bookings (Shin and Kang, 2020). However, the implementation of health protocols (cleanliness, health, safety, and environmental sustainability) in the hotel environment strengthens the effect of SI on hotel purchase intention (PI) in the Indonesian hotel industry (Marie *et al*., 2021). While it is argued that customer satisfaction (CS) enhances purchase intention (PI) under normal circumstances (Hu, 2011) or weakens purchase intention (PI) when uncertainty increases (Tudoran *et al*., 2012), corporate reputation (CR) can aggravate consumers' PI (Jung and Seock, 2016) or resolve decision-making uncertainties in PI (Yi, 2023). To reduce perceived risk during purchase decisions, consumers rely on company and product/service information (Jung and Seock, 2016). Therefore, crisis handling uncertainties can affect brand satisfaction and image when consumers take protection action. Hotel's crisis-related SI perception enhances CS, which leads to PI; however, the impact of hotel SI on CR does not automatically boost PI (Marie *et al*., 2021), highlighting the relevance of CS as a key mediator between SI and crisis-related purchase behavior. Hence, CR's impact on the consumer decision process remains diverse and unique (Jung and Seock, 2016), particularly in challenging times.

Similarly, using innovation services like DT (or SSTs) as situational facilitators in navigating pandemic challenges (for example, virus infection) significantly reduces expected interactions (EI) and increases expected cleanliness (EC), which reduces customer risk perception (CRP) of

COVID-19, and increases restaurant visit intention among Italians (Esposito *et al*., 2022), Americans and Chinese guests (Wan *et al*., 2021), as well as increases hotel booking intention (Shin and Kang, 2020), and visit intention among Americans and Chinese (Wan *et al*., 2021). Specifically, robot barista coffee shops (RBCS) experiential values and WOM storytelling result in positive emotions, leading to an intention to visit and recommend them (Yoo *et al*., 2022). Furthermore, the term "contactless" has become prominent due to COVID-19, with unmanned hotels being viewed as the future of hospitality. These hotels are expected to improve guests' behavior in the post-pandemic world. However, as per cognitive appraisal theory, literature has established that motivation and confidence are key drivers of behavior (Kim and Hall, 2019). Despite this, the study conducted by Chang *et al*. (2022) on unmanned smart hotels in China aimed at COVID-19 revealed that guests' experiential motivation (EM) and confidence (EC) in such establishments could not directly translate into experiential loyalty (EL). This means that market maturity and consumers' readiness for smart hotel services could influence the value consumers place on motivation and confidence in their behavior towards these hotels.

Furthermore, an individual's assessment of products and services impacts their behavior (Chen *et al*., 2022; Gu *et al*., 2009). In tourism hospitality, individuals' level of innovativeness affects their technology innovation adoption behavior (Ciftci *et al*., 2021). Therefore, individual innovativeness is an internal stimulus that affects assessments of the quality of innovative products or services. In essence, guest perception of high experiential quality in unmanned smart hotels sequentially creates high EM, EC, and experiential satisfaction (ES), ultimately fostering loyalty (Chang *et al*., 2022). Additionally, consumers' belief that smart hotels offer functional utility and positive emotional value increases their intention to stay in smart hotels during crises (Papagiannidis and Davlembayeva, 2022). This appeals to the theory of consumption value, which suggests that perceived utility and emotional responses associated with products and services primarily drive consumer behavior (Sheth *et al*., 1991). Finally, the pandemic disrupted services and made guests wary of hotels. Social Customer Relationship Management (SCRM) is considered a powerful tool to stimulate customer engagement, leading to improved perceptions of customer service and customer trust reinforcement, ultimately enhancing customer loyalty towards global hotel chains during the pandemic (Afaq *et al*., 2023).

5.3.2 Intension to (adopt and) use. Social and environmental hazards create a threat perception and prompt protective decisions, according to PADM (Lindell and Perry, 2012). COVID-19 has changed the way people adapt to new services. Thus, situational conditions affect the adoption of innovative services. Research has shown that consumers preferred robot-staffed (vs human-staffed) hotels in "high risk" than "low risk" salience of COVID-19 and highly preferred robot-staffed hotels "during" than "after" the pandemic (Kim *et al*., 2021). However, due to the perceived greater threat to human identity from humanoid service robots (HSRs) compared to non-humanoid service robots (NHSRs) in high mortality salience (for example, under the COVID-19), consumers preferred service provided by NHSRs (Liu *et al*., 2022). On the other hand, low mortality salience, such as post-pandemic, consumers favored service provided by HSRs over NHSRs (Liu *et al*., 2022). Furthermore, El-Said and Aziz (2021) found that CRP related to COVID-19 concerns increases consumers' tendency to use VT as a temporary and safer alternative during crises in countries like Oman and Germany.

Innovation characteristics impact the rate of innovation diffusion, including consumer resistance to innovation (Abbas *et al*., 2017). Amid the crisis, innovation characteristics such as users' PU and ENJ of VTs and their consideration of VT's Hazard-related attributes (HRA) for COVID-19 prevention significantly induce intention to adopt VTs (El-Said and Aziz, 2021). The PU and ENJ are intervening factors in the relationship between PEOU and the intention to adopt VTs via PU and ENJ (El-Said and Aziz, 2021), supporting the relevance of the TAM model in VT adoption during challenging times. Additionally, tourists' willingness to use human-machine interactive (HMI) devices aimed at reviving the Vietnam tourism industry is driven by the perception that it provides better value for money compared to traditional services post-pandemic, and it offers characteristics of empathetic service and updated information-sharing for hygiene purposes (Van *et al*., 2020). With the emergence of COVID-19, self-service points are seen as a thing of the

past in the hotel industry. The importance of SSTs during COVID-19 increased consumer technology adoption (PU and PEOU) in Thailand's hotel industry (Suksutdhi, 2022). In China, innovation and consumer characteristics drove the adoption of contactless services. For example, facilitating conditions, optimism, hedonic motivation, trust, and price value, directly and indirectly, improved the intention to adopt contactless technologies through performance (PE) and effort expectancy (EE). However, Social influence, directly and indirectly, affected behavioral intention only through PE (Hao, 2021), reinforcing previous studies showing that innovation and consumer characteristics affect the rate of technology innovation diffusion (Abbas *et al*., 2017).

Unlike technology acceptance during the COVID-19 crisis (Hao, 2021), consumers' technology innovation resistance is contingent on innovation characteristics (Abbas *et al*., 2017) during challenging times. The hospitality sector experienced postponement in the adoption of innovative services during the COVID-19 crisis. For instance, perceived barriers related to usage, image, visibility, and privacy significantly contributed to the postponement of consumers' adoption of mobile payment services (MPS), while barriers related to tradition, risk, and value did not (Khanra *et al*., 2021). However, the impact of innovation image on tourism and hospitality innovation diffusion depends on the type of technology innovation. The postponement of MPS adoption proportionately increases with image barrier when security concerns are medium-to-high, but remains unchanged when they are low (Khanra *et al*., 2021). Interestingly, consumers with a favorable image of drone food delivery services (DFDS) developed an intention to use DFDS in the post-pandemic period (Choe *et al*., 2021).

The TAM model suggests that adoption leads to actual usage. Due to the pandemic, consumers primarily use SSTs because they are faster (58%), safer (44%), and easier (43%) (Oliveira *et al*., 2021). In addition, 73.15% of visitors explored and 7.36% exploited SSTs during travel, confirming that SSTs lead to technology adoption (PU and PEOU), which leads to the intention to use hotel services repeatedly (Suksutdhi, 2022). During the COVID-19 pandemic, consumers' actual use of innovative services is not solely determined by "PEOU" and "PU" as per the TAM model but by multiple dimensions. Guest satisfaction from SSTs in the Indian hotel industry induces repeat service use intention (Suksutdhi, 2022). In Indonesia during the crisis, satisfaction mediates the effects of technology, innovation, and experience quality on tourists' behavioral intentions towards tourist attractions (Astor *et al*., 2022). Furthermore, consumer trust enhances the intention to use sharing economy platforms (SEP) (Dabija *et al*., 2022) and to continue using and recommending MPS in Kazakhstan (Suyunchaliyeva *et al*., 2021). Suyunchaliyeva *et al*. (2021) confirmed that personal innovativeness strongly influences the intention to continue using and recommending MPS, while social influence was insignificant, reinforcing the finding that social influence can lead to consumer resistance to innovation (Abbas *et al*., 2017). However, outcome expectancy strongly enhanced the intention to recommend, but not to continue using MPS (Suyunchaliyeva *et al*., 2021). The perceived value of service technologies enhances consumers' desire to use HMI devices in Vietnam's tourism sector (Van *et al*., 2020) and SEP in times of crisis (Dabija *et al*., 2022). While attitude is a major component in customer innovation resistance (Abbas *et al*., 2017), attitude is crucial to South Koreans' strong intention to use DFDS (Hwang *et al*., 2021) and the willingness to use robotic restaurants in COVID-19 conditions.

5.3.3 Willingness to pay (-more). The characteristics of innovation, such as price, are important indicators of consumer innovation resistance (Abbas *et al*., 2017). Thus, service innovation (SI) profitability depends on consumer willingness to pay (WtP). In Thailand's robotic restaurants, 36.7% of guests are willing to pay a high price (positive price premium), 33% will pay the same price for human-delivered services (neutral price premium), and 30.3% request a price discount (negative price premium) (Chuah *et al*., 2022b). However, various factors can affect WtP for innovation adoption and can be context-specific. For example, during COVID-19, tourists were more willing to pay for virtual tours (VTs) as "mortality threats" and "the importance of technological adoption to self-esteem" increased (Nanni and Ulqinaku, 2021). Situation factors like perceived health risks and COVID-19-related self-protection behavior also contributed to the willing to pay for robotic restaurants in Thailand (Chuah *et al*., 2022b) as innovations that address pressing needs or

make life more convenient are adopted faster (Sharma and Gandhi, 2023). This challenges the idea that customer resistance to innovation increases with the price of innovation (Abbas *et al*., 2017; Chen *et al*., 2013; McTaggart, 2012).

The advantages and complexities of innovation could influence customer adoption and resistance (Abbas *et al*., 2017). Service robots have been used to combat COVID-19. In a study in Thailand, robot advantages significantly contributed to pay a price premium (WTPp), while the robot disadvantages were negatively and significantly related to WTPp for robotic restaurants (Chuah *et al*., 2022b). This supports the notion that the complexity of new technology can enhance consumer resistance to innovation (Abbas *et al*., 2017; Gu *et al*., 2009). Additionally, attitudes towards existing products are insignificant to consumer resistance to innovation (Abbas *et al*., 2017). This suggests that customers' attachment to human staff and emotional connection with them before the pandemic may not affect their attitudes towards new technology in certain situations. In Taiwan, consumers' attitudes towards robotic restaurants enhanced their willingness to pay more for robotic services (Chuah *et al*., 2022a). Service robots were seen as necessity to combat COVID-19 and enhance consumer value through technology adoption. Consumers in Taiwan exhibited a favorable attitude and were highly willing to pay more for robotic restaurants due to the perceived value of service robots and the functional, emotional, and conditional benefits they offer such as reducing physical contact (Chuah *et al*., 2022a).

In some cases, innovation, price value and behavior may be driven by consumer characteristics but not necessities, such as preventing COVID-19 virus. In the case of Thailand's robotic restaurant customers, their high levels of personal innovation and openness to new experiences drove their WTPp. Interestingly, extraversion has a significant negative impact on WTPp (Chuah *et al*., 2022b). Thus, the suggestion that less-priced innovations may find easy adopters since users are willing to experiment at cheap prices (Sharma and Gandhi, 2023) may not hold among highly innovative and receptive to experience consumers, especially when they have high affordance.

6. Service innovation in recovery and future of contemporary tourism and hospitality

6.1 Work and innovation

The tourism and hospitality industry (THI) is increasingly shifting from labour-intensive to technology-intensive service. According to a report by Aaron Allen and Associates Consultant, service technology innovation is expected to replace about 80% of hospitality jobs (PMQ Pizza Magazine, 2020). The crisis has proliferated service innovation (SI), especially in THI COVID-19 risk management. Consequently, this review suggests that SI adoption is crucial for the recovery and transformation of tourism. However, careful implementation of these innovations is needed. SST is one of the major technology advancements in tourism and hospitality during the pandemic, which promoted highly contactless service and an increasing reduction in human-staff. As the THI is highly contact-intensive, an overreliance on technology innovations may harm the hospitality experience due to limited in-person encounters and convivial experiences. This aligns with the view that while innovations like virtual safaris had a significant impact during the crisis, many tourism operators believe they cannot fully replace in-person safaris or compete with traditional tourism in the future (Barker and Rodway-Dyer, 2023). Therefore, excessive reduction of human-staff and over-dependence on service technologies, such as robots, may usher incomplete customer experience due to the lack of emotional service provision and over-standardization, despite the effects of technological advancements on the provision of services and experiences within the THI.

This study suggests that although technological innovations played a crucial role during the COVID-19 crisis, it should not be an absolute measure for rapid technological innovation in tourism and hospitality services. Consumers' acceptance of service technologies is contingent on their perception of situational conditions and the characteristics and/or type of the service technology in relation to their environment. For example, customers preferred hotels with robot staff "during" or in

"high-risk" over "after" the pandemic or in "low-risk" salience of COVID-19 (Kim *et al*., 2021). In high mortality salience, such as during the COVID-19 pandemic, consumers perceived a stronger threat to human identity from hotel service technologies and preferred non-humanoid service robots (NHSRs) over humanoid service robots (HSRs) (Liu *et al*., 2022). However, in low mortality salience, such as post-pandemic, HSRs were preferred (Liu *et al*., 2022). Additionally, before the pandemic, self-service technologies (SSTs) in hotels were less efficient than staff, but during the pandemic, SSTs significantly improved staff work efficiency due to COVID-19-related work routines such as social distancing and hygiene (Liu and Yang, 2021). Therefore, certain innovations may be irrelevant in certain environments. Thus, this study suggests a highly responsive learning approach for implementing service innovation (SI). Secondly, service technologies should not replace human-staff but augment their efficiency. Hence, tourism and hospitality operators (THOs) must reflect their coordinating capabilities in service technologies and human-staff configuration. They should rigorously evaluate the service technology-task fit for seamless service delivery and customer experience.

6.2 Governance

Before COVID-19, tourism businesses faced numerous challenges, including limited potential for diversification and innovation, limited access to capital markets, and economies of scale and scope (Tejada and Moreno, 2013). Service innovation (SI) potentially helped tourism businesses with innovation capacity to mitigate the crisis and facilitate tourism recovery and transformation. Unfortunately, COVID-19 has significantly disrupted the business situation for many small and medium-sized tourism enterprises (SMEs) and destinations that lack the capabilities and support to refocus service provision toward innovative customer experiences. In light of this, the current study proposes refocusing government intervention, as governance may help markets "overcome entrenched market failures" (Detotto *et al*., 2021) associated with the tourism crisis. To effectively address the risks associated with tourism, it is recommended to integrate government structures and the tourism industry using a multi-stakeholder approach (Becken and Hughey, 2013). To this end, while consumers are important drivers of innovation (Kallmuenzer, 2018), and tourism and hospitality organizations (THOs) strive to innovate to maintain competitiveness (Thomas and Wood, 2014) and survive the crisis, the significant and transformative changes that can disrupt and create new paradigms require the introduction of radical innovation (Hedman *et al*., 2021). Unfortunately, due to limited financial opportunities and capacities, these innovations are typically incremental (Breier *et al*., 2021), as evidenced by the perceived lack of government involvement/support, such as financial support, which affected the THOs business continuity during COVID-19 (Bianchi, 2022; Sheresheva *et al*., 2021; Tobón Perilla *et al*., 2022), as most THOs could not survive the pandemic effects due to the perceived high investment costs associated with adopting technology innovation (Liu and Yang, 2021) and the lack of technical resources (Sheresheva *et al*., 2021). Given this, good governance is seen as a means to enhance tourism performance (Detotto *et al*., 2021). Therefore, the successful recovery of tourism and hospitality requires the government's ability to allocate financial, human, and technical resources effectively (Ritchie and Jiang, 2019).

Consequently, bureaucracy is a major obstacle to innovation (Pikkemaat *et al*., 2018). To encourage broader participation in tourism recovery and transformation, the government must ensure that services are provided professionally and safely. However, innovation is needed in the way that governments operate to make them facilitators rather than blockers (Crick, 2022), because bureaucracies have the nature of increasing red tape, which may stifle responsive and innovative tourism development. Though the role of government in innovation is a substantial weakness in understanding innovation systems (Hall and Williams, 2019) in tourism recovery and transformation, the facilitation process can begin with government involvement in open innovation to support tourism operators in innovation development and transformation. Open innovation is a viable approach to adapting to rapidly changing market environmental and uncovering emerging opportunities during a crisis (Chesbrough, 2020) to facilitate tourism recovery. Following

Turley and O'Donohoe (2017), leadership styles that are empowering, responsible, and innovative will promote SI, while bureaucratic and centralized leadership styles are significant barriers to SI.

6.3 Recovery marketing strategy

The COVID-19 crisis is a catalyst for resetting the tourism and hospitality industry (THI) market, prompting a need for continuous learning and innovation to recover and reassure travelers of safe and enjoyable experiences. This period has led to changes in consumers' value orientation (WHO, 2023), preferences (Skare and Riberio Soriano, 2022), and variety seeking (Kim *et al*., 2022), setting the stage for a new era in consumer trends. As a result, strategic marketing is crucial for THI to adapt and recover from the pandemic. The outbreak has disrupted the THI, but virtual technology has helped attract new breeds of customers, with studies suggesting that 90% of people will continue to use virtual tourism post-pandemic (Lu *et al*., 2022). Thus, in this COVID-19 recovery phase, targeting loyal and local customers is essential, as loyal and local customers are proven important in crisis recovery (Alonso-Almeida and Bremser, 2013) and target marketing has proven to be effective in mitigating perceived travel and tourism risk as seen after the 2011 Japan earthquake.

Moreover, during the crisis, investing in marketing innovation was crucial for the survival of most tourism and hospitality organizations (THOs), including those in Colombia (Tobón Perilla *et al*., 2022). However, open innovation, inspired by external stakeholders, is a significant form of innovation compared to traditional in-house innovation (Chesbrough and Bogers, 2014). Customers are important innovation drivers, often evoked by the informal exchange of ideas (Binkhorst and Den Dekker, 2009; Kallmuenzer, 2018). The pandemic greatly increased online engagement between tourism SMEs and consumers through investments in social networks and virtual tours (Afaq *et al*., 2023; Barker and Rodway-Dyer, 2023). This increased engagement can be used to generate new marketing ideas for tourism recovery. However, despite these opportunities, most THOs struggle, as they were unable to adopt technological innovation (Liu and Yang, 2021) or transition to online services (Sheresheva *et al*., 2021). These organizations must adapt their service delivery to the "New Normal" by employing a highly responsive learning strategy. This is because COVID-19 has rapidly accelerated the need for variety in travel and tourism experiences, particularly for those with prior destination experiences (Kim *et al*., 2022).

To meet the evolving demands of the tourism market, organizations must engage both existing and new breeds of customers, particularly through open innovation. To implement an open innovation approach, tourism and hospitality organizations (THOs) should first establish a culture and processes to systematically follow this approach (Iglesias-Sánchez *et al*., 2020). For example, investing in Social Customer Relationship Management (SCRM) can build relational capital and aid open innovation in tourism recovery and the future. THOs can use SCRM to create an extensive digital communication strategy and better recontextualization of destination tourism and hospitality (DTH) relationships with consumers to effectively convey DTH innovations in the digital space, such as newly added values, to influence consumers' perceptions of improved services. This can help boost consumer confidence and trust, enhance the DTH image, and increase visit intentions. In addition, the growing consumer confidence in using virtual technology services, such as virtual tourism, after the pandemic, with the main reasons to increase destination awareness in advance and plan trips before visiting, means that at the product-process level innovation, virtual tourism can be a promising product to provide immersive experiences for consumers. At the marketing innovation level, it can be used as a "try-before-you-buy" experience and a "sneak-preview of destination" marketing strategy to encourage in-person visits, and to create new work routines and job opportunities at the organizational level. Continued SI is expected to boost tourism recovery and transformation.

6.4 Knowledge and information gap

The global tourism industry is recovering from the pandemic, but the crisis's VUCA has left much to learn. The possession of knowledge through research is the key to drive innovation and its implementation. However, the issue of knowledge gaps is detrimental to the tourism and

hospitality operators' innovation efforts (Pikkemaat *et al*., 2018). It's important to recognize that the availability of information through research can impact the decisions to adopt innovation in tourism and hospitality, especially in shaping perceptions of innovation. The current study emphasizes the need to address knowledge gaps. For example, there's inconclusive evidence in the literature about the theoretical argument for the importance of good governance in tourism (Shah, 2023), especially in tourism innovation. The COVID-19 pandemic significantly disrupted the livelihood of tourism and hospitality SMEs and players, making recovery very challenging for tourism businesses and communities. It's worth noting that major external developments, rather than internal strategic management initiatives, mainly drive innovation in destinations (Pikkemaat *et al*., 2018). Despite claims of government intervention via measures like tourism vouchers to boost domestic tourism spending, many tourism practitioners were dissatisfied with the government's position. Hence, the debate on the nature of government involvement during the crisis indicates the need for more research to determine the ways in which governance can effectively facilitate the recovery and transformation of tourism communities and businesses, especially for micro-organizations and communities that struggled to survive the pandemic. Given that each destination has unique resources and capabilities, the research should consider the contextual nature of these challenges.

The impact of service innovation (SI) on transforming the tourism and hospitality industry (THI), and post-crisis consumer behavior, is an area of interest for researchers. However, this review found limited empirical evidence of SI in THI, especially in the context of tourist destinations. The influence of technology innovation on tourist behavior towards actual tourism destinations is still not well understood. Virtual tours (VTs) seldom lead to physical visits to destinations, so innovations must be implemented using a highly responsive learning strategy. Therefore, further research is needed to understand the types of VT and their designs influencing tourists' perceptions and behavior towards destinations. Furthermore, while tourism recovery is surging in the US and Europe, many Asian destinations are still struggling to recover (Gunia, 2022). This raises questions about the resilience of individualistic societies compared to collective ones in recovering from crises. Therefore, it is important to explore the role of cultural implications in tourism recovery and to understand which society is more receptive to innovations in tourism recovery.

The COVID-19 pandemic has brought significant changes to tourism and hospitality, leading to the emergence of conscious consumers with evolving tastes and behaviors. As a result, the COVID-19 crisis has precedent for a new era of change in value orientation (WHO, 2023), preference (Skare and Riberio Soriano, 2022), consumer habits (Sheth, 2020), and high variety-seeking intention in tourism activities and travel choices, especially for visitors with previous destination experience than those without (Kim *et al*., 2022). In light of this, tourism and hospitality organizations (THOs) must examine and ensure that their existing products and services meet the increasing expectations of these new consumers. This may involve adding value to current products or repositioning the destination's competitiveness. In many instances, tourism products have become obsolete, but due to a knowledge gap, many THOs have failed to identify this issue (Pikkemaat *et al*., 2018). There is a need for tourism product development to meet the new consumer expectations post-pandemic. However, the lack of knowledge on how to manage ideas into innovative products is a major impediment to innovation (Pikkemaat *et al*., 2018). Thus, knowledge gained via research is the principal factor in innovation, and its implementation is crucial to creating new products and services (Pikkemaat *et al*., 2018). Consequently, more research is needed to understand the SI's influencing mechanisms.

Furthermore, technological innovations cannot be merely adopted as a "black box" solution. Instead, they impose a significant knowledge burden on would-be adopters (Wang and Qualls, 2007). The availability of information about the technology being adopted will greatly influence the adopting firm's ability to assess the technology's characteristics, particularly its perceived benefits and ease of adoption. Despite COVID-19 increasing consumer innovativeness, the impact of socio-demographic parameters on types of innovation remains unclear. This review revealed that consumers' willingness to pay a price premium (WTPp) for robot-delivered restaurant services is

still low, posing a challenge to innovation adoption. In the tourism industry, willingness to pay (WtP) for certain SI is influenced by situational conditions. Consumers are more willing to pay for VT services when concerns about COVID-19 mortality threats increase. The current review also found crisis-era innovation adoption postponement. Thus, many innovations may be irrelevant in certain environments. For example, contextual factors (such as COVID-19) affect consumer acceptance of certain robotic services, particularly in hotels. Consequently, our understanding of consumers' willingness to adjust and adapt to innovation-driven services is incomplete. This study suggests a highly responsive learning approach when adopting and implementing service changes.

7. Limitation of the study

The selection of a suitable search database is crucial for the success of evidence-synthesis research. While WoS and Scopus are highly important research databases, especially for their international and multidisciplinary nature for accessing literature (Burnham, 2006; Carrera-Rivera *et al*., 2022; Gusenbauer and Haddaway, 2020), we recommend that future research should consider exploring the use of ScienceDirect. The utilization of bibliometrics and meta-analysis could prove beneficial in making further contributions to the research field. To the best of the authors' knowledge, this current paper is one of the first to extensively discuss the role of SI in mitigating the impact of COVID-19 on the THI.

8. Summary

Literature suggests organizations do not only think of the innovation's ease of use but also focus on the complexity of the adoption process. Similarly, the usefulness of innovation is assessed in multiple dimensions rather than in simple terms. The perceived usefulness of innovation depends on a firm's age, size, and nature of business. For example, relatively young and large firms consider technology innovation adoption more effective in combating the pandemic. However, this effect may be insignificant for certain innovations. For instance, virtual tours (VTs) did not enhance the attractiveness of small-, medium-, and large Italian museums and cultural institutions (MCIs). Firm culture and financial capacity are the major impediments to some service innovation (SI) adoption. However, competitive pressure, management support, and government regulations are the drivers of SI adoption in challenging times. In the hospitality sector, product-process innovation (PPI) was found to be more significant to firm value and profitability. In tourism, process and marketing innovations are more significant to firm value and profitability in the Americas, whereas only product innovation was found to be more significant. Furthermore, product innovation, particularly technology innovations, is the most significant to corporate profitability. In general, the larger the hospitality or tourism firm, the higher its COVID-19-related innovation returns.

When it comes to consumer behavior in the hospitality industry, gender plays a significant role in the adoption of Service Innovation (SI). Men tend to show a higher WTPp for SI compared to women, while education does not seem to have an impact. Additionally, the use of technology innovation in the industry is influenced by race, with Chinese consumers showing a higher intention to visit restaurants and hotels with robotic services compared to Americans, even though both races agree that robots can reduce the risk of COVID-19. Moreover, young people tend to have a WTPp for robot services and use them more. Interestingly, high-income consumers and married consumers with children also show higher WTPp for these robotic services, challenging the lack of demographic-based research on SI.

Furthermore, the significance of innovation (like technology innovation) as a situational facilitator in producing a positive consumer behavioral response is contingent on how consumers perceive the innovation characteristics. Studies have found that the users perceived usefulness, ease of use, experience, and enjoyment of Virtual Tours (VTs) are associated with TenAs. However, a specific study on VTs in museums indicated that despite consumers preferring VT during COVID-19, it does not necessarily lead to in-person visits. This suggests that more research is needed to

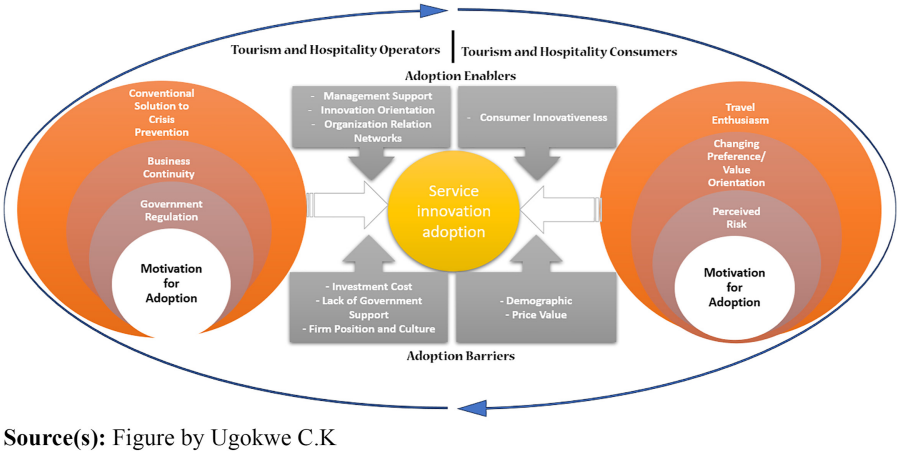
determine the factors that can enhance VTs and lead to actual tourism destination visits, as this area is currently underexplored in tourism research. Moreover, consumers' motivation and confidence in service innovation (SI) were found not to always translate into a positive behavioral response. Therefore, further studies are needed to understand the mediating mechanism through which these factors can lead to behavioral responses.

During challenging times, such as the COVID-19 pandemic, technology adoption is more value-oriented. For instance, the perceived value of technological innovation increased due to safety concerns and travel restrictions. This shows that technology adoption is driven by its benefits rather than just being a trend in time of crisis. In the tourism and hospitality industry (THI), customer experience plays a vital role in competitiveness. The rapid acceptance of technology during the pandemic made customer experience more technology-driven. Characteristics of innovation, like technology, can enhance the quality of experience in the hospitality industry. For instance, guests are more interested in smart hotels after a high-quality stay. Surprisingly, even low technology readiness consumers derive higher favorable experience and delight from contactless services, despite the discomfort of using new technology. In tourism, the mechanism through which Service innovation (SI) can play a significant role in creating memorable destination experiences and competitiveness has received less attention. Though SI viewed as a firm's or destination's response to crisis management can also improve a destination's image or a firm's corporate reputation in times of crisis. However, the image consumers hold for a specific technological innovation is influenced by the characteristics of that technology and this image can change with time. For example, the perceived psychological and performance risks associated with DFDs affected the DFD's image before COVID-19 but were insignificant during the pandemic.

9. Conclusion

Based on the objective and pertinent questions for the review, we discovered that service innovation (SI) is indeed a conventional solution for crisis prevention and coping strategies in the tourism and hospitality industries (THI), especially for tourism and hospitality operators (THOs) with strong capabilities. For example, adoption enablers were important factors that reinforced THOs motivations for adopting SI for crisis management. However, some THOs faced adoption barriers that weakened their motivation to adopt SI for crisis management (See Figure 2). Furthermore, product-process innovation (PPI), particularly technology innovation (e.g. SSTs), is the most

Figure 2 Illustration of service innovation adoption in climate of VUCA



Source(s): Figure by Ugokwe C.K

influential type of innovation adopted to mitigate crisis disruptions in tourism. PPI was primarily used for the safe delivery of services and was found to be more important than marketing and organizational innovations, which focused on broader managerial actions. In addition, marketing innovation was the second most important type of innovation.

Our review also indicated that SI mitigated consumers' perceptions of THI "during" and "post" COVID-19. SI represents the only way for managing both employee and customer risk perceptions (CRP) of COVID-19. For example, the emergence of COVID-19 significantly influenced the need for consumer innovativeness to cope with the pandemic, which promotes SI adoption. CRP significantly contributes to the intention to adopt SI. However, adoption barriers also weakened SI adoption (see Figure 2). Consumers' characteristics and the price value of innovative services were not favorable in strengthening motivation for SI adoption. For instance, less than 40% are willing to pay a premium for innovative services. Overall, SI strategies are relevant for mitigating crisis, but there are still grey areas in the understanding of innovation systems. For instance, most innovations may be irrelevant in certain environments. Consumers' acceptance of certain types of robotic innovations is affected by contextual factors (COVID-19), as well as their willingness to pay for certain innovations. Generally, consumers' readiness to Wtp or Wtpp remains low.

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