REVIEW

Systematic review and research agenda for the tourism and hospitality sector: co-creation of customer value in the digital age

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Abstract

The tourism and hospitality industries are experiencing transformative shifts driven by the proliferation of digital technologies facilitating real-time customer communication and data collection. This evolution towards customer value co-creation demands a paradigm shift in management attitudes and the adoption of cutting-edge technologies like artificial intelligence (AI) and the Metaverse. A systematic literature review using the PRISMA method investigated the impact of customer value co-creation through the digital age on the tourism and hospitality sector. The primary objective of this review was to examine 27 relevant studies published between 2012 and 2022. Findings reveal that digital technologies, especially AI, Metaverse, and related innovations, significantly enhance value co-creation by allowing for more personalized, immersive, and efficient tourist experiences. Academic insights show the exploration of technology's role in enhancing travel experiences and ethical concerns, while from a managerial perspective, AI and digital tools can drive industry success through improved customer interactions. As a groundwork for progressive research, the study pinpoints three pivotal focal areas for upcoming inquiries: technological, academic, and managerial. These avenues offer exciting prospects for advancing knowledge and practices, paving the way for transformative changes in the tourism and hospitality sectors.

Keywords PRISMA, Customer value co-creation, Tourism and hospitality, Artificial intelligence, Metaverse

Introduction

The tourism and hospitality industry is constantly evolving, and the digital age has brought about numerous changes in how businesses operate and interact with their customers [1]. One such change is the concept of value co-creation, which refers to the collaborative process by which value is created and shared between a business and its customers [2, 3]. In order to facilitate the value co-creation process in tourism and hospitality, it is necessary to have adequate technologies in place to enable the participation of all stakeholders, including businesses, consumers, and others [4, 5]. Thus, technology serves as a crucial enabler for value co-creation. In the tourism and hospitality industry, leading-edge technology can be crucial in co-creation value processes because it can facilitate the creation and exchange of value among customers and businesses [6, 7]. For example, the development of cloud computing and virtual reality technologies has enabled new forms of collaboration and co-creation that were not possible before [8–10]. Recent technologies like AI, Metaverse, and robots have revolutionized tourism and hospitality [11–13]. These technologies are used in various ways to enhance the customer experience and drive business success. AI can personalize the customer experience using customer data and personalized recommendations [14]. It can also optimize operations by automating

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tasks and improving decision-making. The metaverse, or virtual reality (VR) and augmented reality (AR) technologies, are being used to offer immersive and interactive experiences to customers [10, 11]. For example, VR and AR can create virtual tours of hotels and destinations or offer interactive experiences such as virtual cooking classes or wine tastings [15]. Robots are being used to aid and interact with customers in various settings, including hotels, restaurants, and tourist attractions. For example, robots can provide information, answer questions, and even deliver room services [12, 16]. The COVID-19 pandemic has underscored the crucial interplay between public health, sustainable development, and digital innovations [17]. Globally, the surge in blockchain applications, particularly in the business, marketing and finance sectors, signifies the technological advancements reshaping various industries [18]. These developments, coupled with integrating digital solutions during the pandemic, highlight the pervasive role of technology across diverse sectors [19–21]. These insights provide a broader context for our study of the digital transformation in the tourism and hospitality sectors. Adopting new technologies such as AI, the Metaverse, blockchain and robots is helping the tourism and hospitality industry deliver customers a more personalized, convenient, and immersive experience [22]. As these technologies continue to evolve and become more prevalent, businesses in the industry need to stay up-to-date and consider how they can leverage these technologies to drive success [23, 24].

Despite the growing body of literature on customer value co-creation in the tourism and hospitality sector, it remains scattered and fragmented [2, 25, 26]. To consolidate this research and provide a comprehensive summary of the current understanding of the subject, we conducted a systematic literature review using the PRISMA 2020 ("*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*") approach [27, 28]. This systematic review aims to explore three primary areas of inquiry related to the utilization of AI and new technologies in the tourism and hospitality industry: (i) From a technology perspective, what are the main types of AI and latest technologies that have been used to enhance co-creation values in tourism and hospitality?; (ii) From an academic viewpoint—What are the future research directions in this sector?; (iii) From a managerial standpoint—How can these technologies be leveraged to enhance customer experiences and drive business success?. In essence, this study contributes valuable insights into the dynamic realm of customer value co-creation in the digital age within the tourism and hospitality sector. By addressing the research questions and identifying gaps in the literature, our systematic literature review seeks to provide novel perspectives on leveraging technology

to foster industry advancements and enhance customer experiences.

The remaining parts of this article are structured in the following sections: "Study background" section outlines pertinent background details for our systematic literature review. In "Methodology" section details our research objectives, queries, and the systematic literature review protocol we used in our study design. In "Results" section offers the findings based on the analyzed primary research studies. Lastly, we conclude the article, discuss the outstanding work, and examine the limitations to the validity of our study in "Discussion and implications" section.

Study background

Amidst the COVID-19 pandemic, the tourism sector is experiencing significant transformations. Despite the substantial impact on the tourism industry, the demand for academic publications about tourism remains unabated. In this recovery phase, AI and novel technologies hold immense potential to assist the tourism and hospitality industry by tackling diverse challenges and enhancing overall efficiency. In this section, the study provides some study background for the review processes.

The relationship between tourism and hospitality

Tourism and hospitality are closely related industries, as the hospitality industry plays a crucial role in the tourism industry [29]. Academics and practitioners often examine tourism and hospitality because they are related industries [2, 30]. Hospitality refers to providing travelers and tourists accommodation, food, and other services [31]. These can include hotels, resorts, restaurants, and other types of establishments that cater to the needs of travelers [32]. On the other hand, the tourism industry encompasses all the activities and services related to planning, promoting, and facilitating travel [31]; transportation, tour operators, travel agencies, and other businesses that help facilitate tourist travel experiences [33]. Both industries rely on each other to thrive, as travelers need places to stay and eat while on vacation, and hospitality businesses rely on tourists for their income [32–34].

In recent years, the tourism industry has undergone significant changes due to the increasing use of digital technologies, enabling the development of new forms of tourism, such as "smart tourism" [8, 10]. Smart tourism refers to using digital technologies to enhance the customer experience and improve the efficiency and effectiveness of the industry [1]. These technologies, including AI and Metaverse, can be used in various aspects of the tourism industry, such as booking and reservation processes, customer service, and the management of tourist attractions [4, 11]. The hospitality industry, which

includes hotels and restaurants, is closely linked to the tourism industry and is also adopting intelligent technologies to improve the customer experience and increase efficiency [1, 22]. Recent studies have explored the impact of these technologies on the tourism and hospitality sectors and have identified both benefits and challenges for stakeholders [10, 35, 36].

Customer value co-creation in tourism and hospitality

Customer value co-creation in tourism and hospitality refers to the process by which customers and businesses collaborate to create value by exchanging services, information, and experiences [2, 33]. This process involves the customer and the business actively creating value rather than simply providing a product or service to the customer [37]. Studies have found that customer value co-creation in tourism and hospitality can increase customer satisfaction and loyalty [2]. When customers feel that they can contribute to the value of their experience, they are more likely to feel a sense of ownership and involvement, which can lead to a more positive overall evaluation of the experience [5, 38]. In the tourism industry, customer value co-creation can increase satisfaction with the destination, trips, accommodation, services, and overall experiences [4]. These can be achieved by allowing customers to choose their room amenities or providing opportunities to interact with staff and other guests [5, 39]. Customer value co-creation in tourism and hospitality can be a powerful solution for businesses to increase customer satisfaction and loyalty. By actively involving customers in creating value, businesses can create a more personalized and engaging experience for their customers.

AI, Metaverse, and new technologies in tourism and hospitality

The impact of AI, the Metaverse, and new technologies on the tourism and hospitality industries is an area of active research and debate [2, 4, 29, 40]. First, using AI and new technology in tourism and hospitality can improve the customer experience, increase efficiency, and reduce costs [13, 41–43]. For instance, chatbots and virtual assistants facilitate tasks like room bookings or restaurant reservations for customers. Concurrently, machine learning (ML) algorithms offer optimized pricing and marketing strategies and insights into customer perceptions within the tourism and hospitality sectors [44–47]. However, there are also concerns about the potential negative impact of AI on employment in the industry [48]. Second, The emergence of the Metaverse, a virtual shared space where people can interact in real time, can potentially revolutionize the tourism and hospitality industries [10]. For

example, VR and AR experiences could allow travelers to visit and explore destinations without leaving their homes [15, 49], while online events and social gatherings could provide new business opportunities to connect with customers [11]. However, it is unclear how the Metaverse will evolve and its long-term impact on the tourism and hospitality industries [4, 10, 11]. Last, other emerging technologies, such as blockchain, AI-Robotics, and the Internet of Things (IoT), can potentially transform the tourism and hospitality industries [18, 45, 48]. For example, blockchain could be used to secure and track the movement of travel documents [18], while IoT-enabled devices could improve the efficiency and personalization of the customer experience [50]. As with AI and the Metaverse, it is difficult to predict the exact impact of these technologies on the industry, but they are likely to play a significant role in shaping its future [18, 40]. In the aftermath of the pandemic, the healthcare landscape within the tourism and hospitality sector is undergoing significant transformations driven by the integration of cutting-edge AI and advanced technologies [38, 51, 52]. These technological advancements have paved the way for personalized and seamless experiences for travelers, with AI-powered chatbots playing a pivotal role in addressing medical inquiries and innovative telemedicine solutions ensuring the well-being of tourists [52, 53].

This study background provides essential context for the subsequent systematic literature review, as it contextualizes the field's key concepts, frameworks, and emerging technologies. By examining these aspects, the study aims to contribute valuable insights into the post-pandemic recovery of the tourism and hospitality industry, paving the way for future research opportunities and advancements in the field.

Methodology

This study meticulously adopted a systematic literature review process grounded in a pre-defined review protocol to provide a thorough and objective appraisal [54]. This approach was geared to eliminate potential bias and uphold the integrity of study findings. The formulation of the review protocol was a collaborative effort facilitated by two researchers. This foundational document encompasses (i) Clear delineation of the study objectives, ensuring alignment with the research aim; (ii) A thorough description of the methods used for data collection and assessment, which underscores the replicability of our process; (iii) A systematic approach for synthesizing and analyzing the selected studies, promoting consistency and transparency.

Guiding the current review process was the PRISMA methodology, a renowned and universally esteemed

framework that has set a gold standard for conducting systematic reviews in various scientific disciplines [27, 28]. The commendable efficacy of PRISMA in service research substantiates its methodological robustness and reliability [55]. It is not only the rigorous nature of PRISMA but also its widespread acceptance in service research that accentuates its fittingness for this research. Given tourism and hospitality studies' intricate and evolving nature, PRISMA is a robust compass to guide our SLR, ensuring methodological transparency and thoroughness [56, 57]. In essence, the PRISMA approach does not merely dictate the procedural intricacies of the review but emphasizes clarity, precision, and transparency at every phase. The PRISMA methodology presents the research journey holistically, from its inception to its conclusions, providing readers with a clear and comprehensive understanding of the approach and findings [58].

Utilizing the goal-question-metrics approach [59], our study aims to analyze current scientific literature from the perspectives of technicians, researchers, and practitioners to comprehend customer value co-creation through the digital age within the Tourism and Hospitality sector. In order to accomplish this goal, we formulated the following research questions:

RQ1 What are the main types of AI and new technologies used to enhance value co-creation in the tourism and hospitality industries?

RQ2 What are the future research directions in customer value co-creation through AI and new technologies in the tourism and hospitality sector?

RQ3 How do managers in the tourism and hospitality sector apply AI and new technologies to enhance customer co-creation value and drive business success?

The subsequent subsections will provide further details regarding our search and analysis strategies.

Search strategy and selection criteria

We collected our data by searching for papers in the Scopus and Web of Science databases, adhering to rigorous scientific standards. We included only international peer-reviewed academic journal articles, excluding publications like books, book chapters, and conference proceedings [60–62]. The research process covered the period from 2009 to 2022, as this timeframe aligns with the publication of the first studies on value co-creation in the tourism industry in 2009 and the first two studies on value co-creation in general in 2004 [63, 64]. The selection of sources was based on criteria such as timelines, availability, quality, and versatility, as discussed by Dieste et al. [2]. We employed relevant keywords, synonyms, and truncations for three main concepts: tourism and hospitality, customer value co-creation, and AI and new technologies in smart tourism and hospitality. To ensure transparency and comprehensiveness, we followed the PRISMA inclusion criteria, detailed in Table 1, and utilized topic and Boolean/phrase search modes to retrieve papers published from 2009 to 2022. The final search string underwent validation by experts to ensure accuracy and comprehensiveness:

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(1) (tour* OR hospitalit* OR travel* OR trip* OR voyage* OR journey* OR visit* OR holiday* OR entertainment OR leisure) AND (2) ("value co-creat*" OR "value cocreat*" OR "value-co-creat*" OR "co-creat* of value" OR "co-creat* value") AND (3) ("artificial intelligence" OR AI OR "machine learning" OR "data mining" OR "deep learning" OR "natural language processing" OR NLP OR robot OR chatbot OR "virtual assistant" OR "recommend* system" OR "metaverse" OR "virtual reality" OR VR OR "augmented reality" OR AR OR "mixed reality" OR MR OR "smart tour*").

A PRISMA diagram was produced to understand better this study's search strategy and record selection.

Table 1 PRISMA inclusion criteria

Topic criterion	Topic criterion
Field and Subject area	(1) tourism and hospitality area, (2) Value Co-creation, and (3) AI and new technologies applied in smart tourism and hospitality (or similar terminology); as a fundamental aspect of analysis, the title, abstract, or keywords of a publication should include this unit
Location of study	Studies from any geographical locations
Document and Source types	Only publications from peer-review (both open access and standard subscription journals that are indexed in WoS or Scopus)
Methodology	Quantitative, qualitative, and mixed methods
Topic	Publications must furnish theory or empirical data that can substantiate the research question. It is preferred that articles provide proof of the co-creation value through AI and new technologies in the tourism and hospitality industry
Language	Only written in English
Date	Published in the period from 2009 to Oct 2022
Publication Stages	Only final paper

Study selection and analysis procedure

The current study utilized the PRISMA framework to document our review process. One hundred two papers were retrieved during the initial search across the databases. Table 1 outlines the criteria for selecting the studies based on scope and quality. The study adhered to the PRISMA procedure (as shown in Fig. 1) and applied the following filters:

(i) We identified and removed 17 duplicate records during the 'identification' step.

(ii) We excluded 27 publications in the 'Screening' step based on the title and abstract.

(iii) We excluded 31 publications based on the entire text in the eligibility step.

As a result, we were left with a final collection of 27 journal articles for downloading and analysis. Two trained research assistants conducted title and abstract screenings separately, and any disagreements about inclusion were resolved by discussing them with the research coordinator until an agreement was reached. Papers not in English, papers from meetings, books, editorials, news, reports, and patents were excluded, as well as unrelated or incomplete papers and studies that did not focus on the tourism and hospitality domain. A manual search of the reference lists of each paper was conducted to identify relevant papers that were not found in the database searches. After this process, 27 papers were left for a full-text review.

This study used the Mixed Methods Appraisal Tool (MMAT) to evaluate the quality of qualitative, quantitative, and mixed methods research studies included [65, 66]. According to the findings, the quality of the study met the standards of a systematic review. Additional information can be obtained from Additional file 1: Appendix 1.
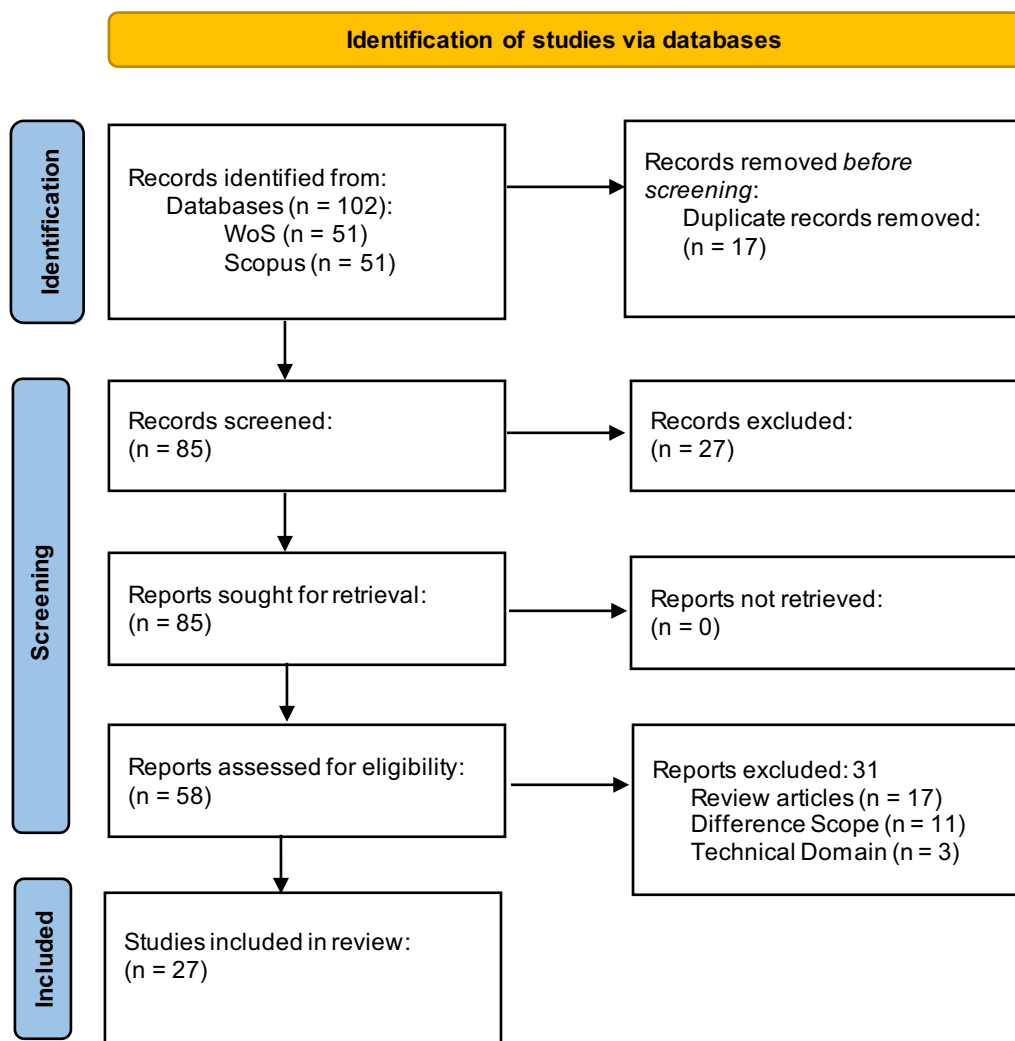

Fig. 1 PRISMA flow diagram

Results

In this section, we will report the results of our data analysis for each research question. We will begin by describing the characteristics of the studies included in the systematic literature review, such as (1) publication authors, titles, years and journals, topics, methods, and tools used in existing studies. Then each facet was elaborated by the following questions: (i) What are the main types of AI and new technologies used to enhance value co-creation in the tourism and hospitality industries? (ii) What are the future research directions in customer value co-creation through AI and new technologies in the tourism and hospitality sector? (iii) How do managers in the tourism and hospitality sector apply AI and new technologies to enhance customer co-creation value and drive business success?

Studies demographics

Figure 2 shows the yearly publication of articles on customer co-creation of value in tourism and hospitality through AI and new technologies. The chart's data suggests two main findings. Firstly, the research on customer value co-creation in tourism and hospitality through AI and new technologies is still in its early stages (1 paper in 2012). However, the annual number of published articles from 2017 to the present appears to be generally increasing. This trend implies that the application of value co-creation in this field is gaining academic attention and is becoming an emerging research area. Based on this trend, we anticipate seeing more studies on this topic published in the following years.

Regarding research type, 14 papers (52%) conducted quantitative research, employing statistical analysis, structural equation modeling, and data mining methods. Meanwhile, 11 papers (41%) conducted qualitative research using interviews, thematic analysis, and descriptive analysis. Only two papers (7%) used mixed research (combining quantitative and qualitative methods). The survey and interview methods (both individual and group) were found to be more common than other research methods. This suggests that interviews provide greater insight into participant attitudes and motivations, enhancing accuracy in quantitative and qualitative studies. Additionally, certain studies employed content analysis, big data analysis using UGC, and data from online platforms, social media, and big data.

Regarding the publishing journals, we found that 27 papers were published in 22 journals (refer to Table 2), where three journals had more than one paper on co-creation value through AI and new technologies in tourism and hospitality, indicating their keen interest in this topic. Most publications were in the Journal of Business Research, with four studies on co-creation value through AI and new technologies in tourism and hospitality. Two related studies were published in the Tourism Management Perspectives and Journal of Destination Marketing & Management. This distribution indicates that most current research on co-creation value through AI and new technologies in tourism and hospitality was published in journals in the tourism and hospitality management field. However, some journals in the computer and AI field have also published papers on co-creation value through AI and new technologies in tourism and hospitality, including Computers in Industry, Computers in Human Behavior, Computational Intelligence, and Neuroscience.

Regarding data analytics tools, SmartPLS, AMOS, NVivo and PROCESS tools are the 5 most popular software graphic tools used in studies, while Python and R are the two main types of programming languages used. In total, 27 studies, 14 refer to using AI applications and data analytics in this research flow. Metaverse and relative
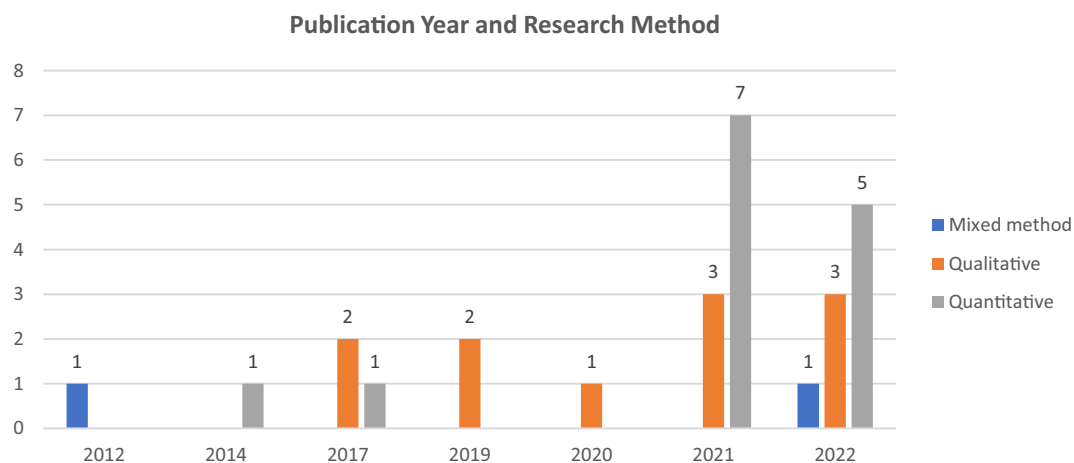

Fig. 2 Publication Years with research methods

Table 2 List of published journals and the total number of papers in each journal

ID	Journal	Total (27)
1	Journal Of Business Research	4
2	Journal Of Destination Marketing & Management	2
3	Tourism Management Perspectives	2
4	Computational Intelligence and Neuroscience	1
5	Computers In Human Behavior	1
6	Computers In Industry	1
7	Electronic Markets	1
8	European Journal of Tourism Research	1
9	International Journal of Contemporary Hospitality Management	1
10	International Journal of Hospitality Management	1
11	International Journal of Intelligent Enterprise	1
12	International Journal of Tourism Research	1
13	Journal Of Hospitality and Tourism Technology	1
14	Journal Of Hospitality Marketing & Management	1
15	Journal Of Place Management and Development	1
16	Journal Of Service Management	1
17	Journal Of Travel Research	1
18	Psychology & Marketing	1
19	Sustainability	1
20	Technological Forecasting and Social Change	1
21	Telematics And Informatics	1
22	Tourism Analysis	1

technologies such as AR and VR were included in 8 studies. Three studies used service robots to discover the value co-creation process. There are include two studies that have used chatbots and virtual assistants.

Publication years and journals

In recent systematic literature reviews focusing on general services, tourism, and hospitality, there has been a notable emphasis on traditional factors shaping customer experience [26, 67, 68]. However, this study uniquely positions itself by emphasizing the digital age's profound impact on value co-creation within this sector. The subsequent part digs more into the specifics of this study, building on these parallels. The detailed findings offer nuanced insights into how value co-creation in tourism and hospitality has evolved, providing a more extensive understanding than previous works.

Result 1—technology viewpoints: What are the main types of AI and new technologies used to enhance value co-creation in the tourism and hospitality industries?

Several types of AI and new technologies have been used to enhance co-creation values in the tourism and hospitality industry. Nowadays, AI, ML, and deep learning can all be used to enhance customer value co-creation in the tourism and hospitality industry [42, 69, 70]. There are some AI applications identified through the review process:

First, personalization and customized recommendations: AI and ML can be used to analyze customer data, such as their past bookings, preferences, and reviews, to personalize recommendations and experiences for them [7, 69, 71, 72]. Cuomo et al. examine how data analytics techniques, including AI and ML, can improve traveler experience in transportation services. Applying AI and ML can help customers discover new experiences and activities they may not have considered otherwise [13]. Relating to data mining applications, Ngamsirijit examines how data mining can be used to create value in creative tourism. Moreover, the study also discusses the need for co-creation to create a successful customer experience in creative tourism and ways data mining can enhance the customer experience [73].

Second, user-generated content and sentiment analysis: ML and Natural Language Processing (NLP) can be used to analyze user-generated content such as reviews and social media posts to understand customer needs and preferences [12, 37]. This can help businesses identify opportunities to create customer value [74]. NLP can analyze customer reviews and feedback to understand the overall sentiment toward a hotel or destination [75]. This can help businesses identify areas for improvement and create a better customer experience [70]. In the study using NLP to analyze data from Twitter, Liu et al. examine the impact of luxury brands' social media marketing on customer engagement. The authors discuss how big data analytics and NLP can be used to analyze customer conversations and extract valuable insights about customer preferences and behaviors [74].

Third, recent deep learning has developed novel models that create business value by forecasting some parameters and promoting better offerings to tourists [71]. Deep learning can analyze large amounts of data and make more accurate predictions or decisions [39, 41]. For example, a deep learning model could predict the likelihood of a customer returning to a hotel based on their past bookings and interactions with the hotel [72].

Some applications of the latest technologies that have been used to enhance co-creation values in tourism and hospitality include

Firstly, Chatbots and virtual assistants can enhance customer value co-creation in the tourism and hospitality industry in several ways: (i) *Improved customer service:*

Chatbots and virtual assistants can be used to answer customer questions, provide information, and assist with tasks such as booking a room or making a reservation [45]. These tools can save customers and staff time and improve customer experience [76]; (ii) *Increased convenience:* Chatbots and virtual assistants can be accessed 24/7, meaning customers can get help or assistance anytime [50]. These tools can be handy for traveling customers with questions or who need assistance outside regular business hours [44]; (iii) *Personalization:* Chatbots and virtual assistants can use natural language processing (NLP) to understand and respond to customer inquiries in a more personalized way [45, 70]. This can help improve the customer experience and create a more favorable impression of the business. Moreover, this can save costs and improve customers [16].

Secondly, metaverse technologies can enhance customer value co-creation in the tourism and hospitality industry in several ways: (i) *Virtual tours and experiences:* Metaverse technologies can offer virtual tours and experiences to customers, allowing them to visit and explore destinations remotely [77]. This technology can be beneficial for customers who are unable to travel due to pandemics or who want to preview a destination before deciding to visit in person [49]; (ii) *Virtual events:* Metaverse technologies can be used to host virtual events, such as conferences, workshops, or trade shows, which can be attended by customers from anywhere in the world [9]. This can save time and money for businesses and customers and increase the reach and impact of events; (iii) *Virtual customer service:* Metaverse technologies can offer virtual customer service, allowing customers to interact with businesses in a virtual setting [25]. This can be especially useful for customers who prefer to communicate online or in remote areas; (iv) *Virtual training and education*: Metaverse technologies can offer virtual training and education to employees and customers [41]. Metaverse can be an effective and convenient way to deliver training and can save time and money for both businesses and customers [7]; (v) *Virtual reality (VR) experiences:* Metaverse technologies can be used to offer VR experiences to customers, allowing them to immerse themselves in virtual environments and participate in activities that would be difficult or impossible to do in the real world [77]. This can enhance the customer experience and create new business opportunities to offer unique and memorable experiences [71].

Thirdly, IoT and robots can enhance customer value co-creation in the tourism and hospitality sector in several ways: (i) One way is by providing personalized and convenient customer experiences [12]. For example, hotels can use IoT-enabled devices to allow guests to control the temperature and lighting in their rooms, as well as access hotel amenities such as room service and concierge services [50]; (ii) *In addition,* robots can be used to provide assistance and enhance the customer experience in various ways [16, 40]. For example, robots can be used to deliver items to guest rooms, assist with check-in and check-out processes, and provide information and directions to guests [12]; (iii) Both IoT and robots can be used to gather customer feedback and data in real-time, which can help to improve the quality and effectiveness of tourism and hospitality services [76]. For example, hotels can use IoT-enabled devices to gather data on guest preferences and needs, which can be used to tailor services and experiences to individual customers. This can help to improve customer satisfaction and loyalty [76]. Overall, using IoT and robots in the tourism and hospitality sector can help improve the industry's efficiency and effectiveness and enhance the customer experience.

Result 2—academic viewpoints: What are the future research directions in customer value co-creation through AI and new technologies in the tourism and hospitality sector?

From an academic perspective, there are several potential future research directions in customer value co-creation through the digital age in the tourism and hospitality sector. Some possibilities include: (1) *Understanding how different technologies and platforms facilitate co-creation:* Researchers could investigate how different technologies and platforms, such as social media, mobile apps, or virtual reality, enable or inhibit co-creation in the tourism and hospitality industry; (2) *Investigating the impact of co-creation on business performance:* Researchers could examine the relationship between co-creation and business performance in the tourism and hospitality sector and identify the factors that drive success in co-creation initiatives; (3) *Investigating the impact of AI and automation on co-creation:* As AI and automation technologies become more prevalent in the industry, research could focus on the impact these technologies have on co-creation and value creation, including the potential for AI to facilitate or hinder co-creation; (4) *Investigating the impact of the Metaverse on customer behaviour:* Research could focus on understanding how the Metaverse affects customer behaviour and decision-making, and how companies can use this information to facilitate co-creation and value creation [9]; (5) *Analysing the use of social media and other digital platforms for co-creation:* Researchers could study how companies in the tourism and hospitality sector use social media and other digital platforms to facilitate co-creation with customers, and the impact that these platforms have on value creation [7, 45, 78]. Researchers could investigate how social interactions and communities in the Metaverse enable or

inhibit co-creation in the tourism and hospitality industry and the impact on customer satisfaction and loyalty; (6) *Examining the ethical implications of the Metaverse and AI:* Researchers could explore the ethical considerations surrounding the use of the Metaverse and AI in the tourism and hospitality sector, such as issues related to privacy and data security, and the potential for these technologies to perpetuate or exacerbate societal inequalities [48, 75, 77].

Result 3—Management viewpoints: How do managers in the tourism and hospitality sector apply AI and new technologies to enhance customer co-creation value and drive business success?

There are several ways managers in the tourism and hospitality industry can apply AI and new technologies to enhance customer experiences and drive business success. We suggest four main possibilities: (1) *Implementing chatbots or virtual assistants to encourage customer co-creation:* Managers can use chatbots or virtual assistants to provide quick and convenient customer service, helping businesses respond to customer inquiries and resolve issues more efficiently [76]. Then, encourage customer co-creation by inviting customers to participate in the creation of new experiences and products by gathering feedback and ideas through online forums and focus groups [45]. This can help build a sense of community and engagement and can also lead to the development of new, innovative products and experiences that will attract more customers [50, 79]; (2) *Leveraging personalization technologies and using predictive analytics:* Managers can use AI-powered personalization technologies to analyze customer data and preferences and offer personalized recommendations and experiences [42, 72, 80]. This can help businesses better understand and anticipate customer needs and create more tailored and satisfying experiences that drive co-creation value. Managers can leverage AI-powered predictive analytics technologies to analyze data and predict future customer behavior or trends [75]. This can help businesses anticipate customer needs and make informed decisions about resource allocation and planning, enhancing co-creation value. Managers can use personalization technologies and predictive analytics to analyze customer feedback and identify areas for improvement [37]. These can help businesses better understand customer needs and preferences and create more satisfying and valuable experiences that drive co-creation value [7, 36, 41]; (3) *Using the Metaverse to facilitate co-creation:* Managers can leverage the Metaverse to allow customers to design and customize their own experiences, which can help create value in collaboration with customers [25, 71, 77]. Managers can use VR and AR technologies to create immersive and interactive

customer experiences in the Metaverse [81]. This can help businesses differentiate themselves and stand out in a competitive market. Managers can use data analysis tools to understand how customers behave in the Metaverse and use this information to create more personalized and satisfying experiences [9]. Managers can leverage the Metaverse to facilitate co-creation with customers, for example, by enabling customers to design and customize their own experiences [49, 81]. This can help businesses create value in collaboration with customers; (4) *Integrating AI-robotics into operations to support value co-creation:* Analyse your business processes to identify tasks that can be automated using AI-powered robotics, such as check-in and check-out, room service, or concierge services [12, 82]. Managers can consider using AI-powered robots for tasks such as check-in and check-out or for delivering amenities to guests. Use AI and the latest technologies to streamline the booking and check-in process, making it faster and more convenient for customers [16]. This can include using virtual assistants to handle booking inquiries or facial recognition technology to allow customers to check in at their hotel simply by showing their faces. These can help businesses reduce labor costs and improve efficiency, enhancing co-creation value [16]. We summarize three viewpoints in Fig. 3 below.

Combining these three viewpoints as a research agenda for tourism and hospitality in the AI and digital age holds immense potential. It addresses critical aspects such as customer experience enhancement, leveraging customer-generated content, and exploring cutting-edge technologies to create value co-creation opportunities. Researching these areas allows the industry to stay at the forefront of the digital revolution and deliver exceptional customer experiences that drive business success in the next few years.

Discussion and implications
Discussion

This study aimed to develop a systematic literature review of customer value co-creation in the hospitality and tourism industry using the PRISMA protocol [27]. The study findings highlighted that tourism and hospitality should take advantage of AI and new technologies, as it brings significant advantages. Value co-creation in the tourism and hospitality sector refers to creating value through the collaboration and participation of multiple stakeholders, including tourists, employees, and the industry [2]. AI, Metaverse, and other new technologies can significantly enhance value co-creation in this sector by enabling more personalized, immersive, and efficient tourist experiences [40, 80, 81].

From a technology viewpoint, the study reveals that manifestations of customer value co-creation through
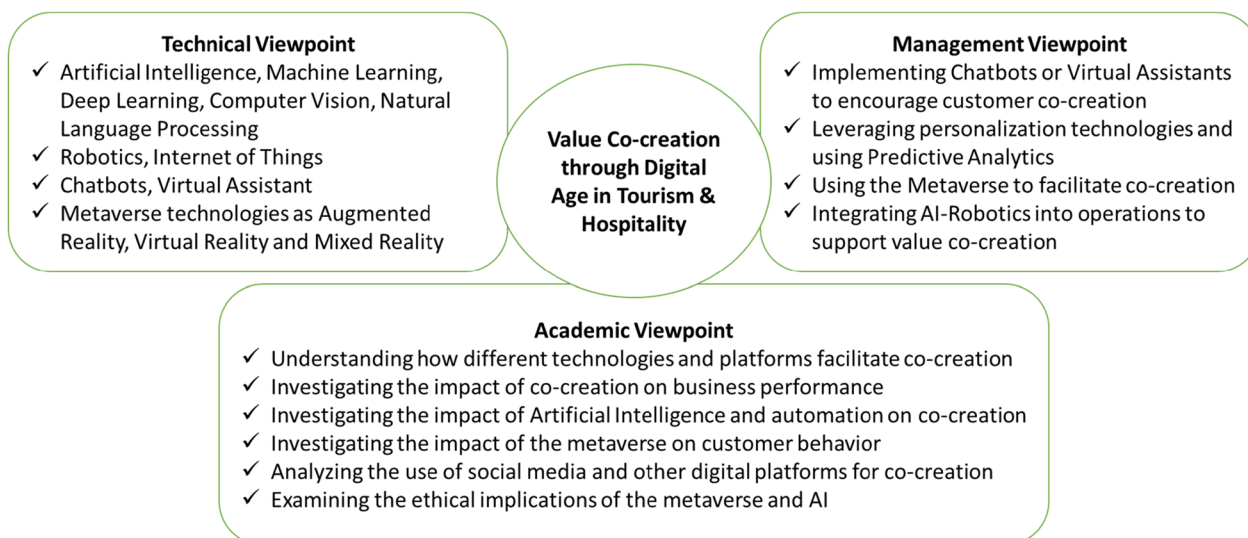
Technical Viewpoint
- ✓ Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Natural Language Processing
- ✓ Robotics, Internet of Things
- ✓ Chatbots, Virtual Assistant
- ✓ Metaverse technologies as Augmented Reality, Virtual Reality and Mixed Reality

Value Co-creation through Digital Age in Tourism & Hospitality

Management Viewpoint
- ✓ Implementing Chatbots or Virtual Assistants to encourage customer co-creation
- ✓ Leveraging personalization technologies and using Predictive Analytics
- ✓ Using the Metaverse to facilitate co-creation
- ✓ Integrating AI-Robotics into operations to support value co-creation

Academic Viewpoint
- ✓ Understanding how different technologies and platforms facilitate co-creation
- ✓ Investigating the impact of co-creation on business performance
- ✓ Investigating the impact of Artificial Intelligence and automation on co-creation
- ✓ Investigating the impact of the metaverse on customer behavior
- ✓ Analyzing the use of social media and other digital platforms for co-creation
- ✓ Examining the ethical implications of the metaverse and AI

Fig. 3 Summary of value co-creation through the Digital Age in Tourism and Hospitality

the digital age are related to AI and the latest technologies such as Metaverse, robots, IoT, chatbots, intelligence systems, and others that shape co-creation [42]. AI applications and new technologies can help shape customer value co-creation in this sector. AI can follow the rules, think like an expert, learn from data, and even create virtual and augmented reality experiences [4, 10]. Chatbots, personalization, predictive analytics, and robotics are examples of how AI and technology can create unique and fun travel experiences [16, 40, 74, 83].

From an academic viewpoint, researchers look at ways technology can help people enjoy their travels and stay in hotels by boosting the value co-creation process [2]. They are looking at how different technologies, like social media, can help people create value for themselves and others [45, 84]. They are also looking at how AI and the virtual world can change people's decisions and how companies can use this information to help people [77, 80]. Finally, researchers are looking into the ethical issues of using technology in tourism and hospitality [48, 75, 77].

From the manager's viewpoint, managers in the tourism and hospitality industry can use AI and new technologies to create better customer experiences and drive success [70, 80]. These can include using chatbots or virtual assistants to help customers and get their feedback [50, 76], using personalization technologies to understand customer needs [69], using the Metaverse to have customers design their own experiences [10], and using AI-robotics to automate tasks [16, 82].

In light of the findings from this systematic literature review, policymakers in the tourism and hospitality sectors must revisit and revitalize current strategies.

Embracing digital age technologies, especially AI and metaverse tools, can significantly enhance customer value co-creation. This necessitates targeted investments in technology upgradation, capacity-building, and skilling initiatives. While the initial resource allocation may appear substantial, the long-term returns regarding elevated customer satisfaction, increased tourism inflow, and industry-wide growth are undeniable. Policymakers must ensure a collaborative approach, engaging stakeholders across the value chain for streamlined adoption and implementation of these advancements.

Overall, the use of AI, Metaverse, and other new technologies can significantly enhance co-creation value in the tourism and hospitality sector by enabling more personalized, immersive, and efficient experiences for tourists and improving the efficiency and effectiveness of the industry as a whole [15].

Theoretical implications

The systematic literature review using the PRISMA method on customer value co-creation through the digital age in the tourism and hospitality sector has several theoretical implications.

First, this research paper addresses earlier suggestions that emphasize the significance of further exploring investigations on customer value co-creation in the hospitality and tourism sector [2, 85].

Second, the review highlights the importance of adopting a customer-centric approach in the tourism and hospitality industry, in which customers' needs and preferences are central to the design and delivery of services [35, 86]. This shift towards customer value co-creation is

driven by the increasing use of digital technologies, such as the IoT, AI, and ML, which enable real-time communication and data gathering from customers [1, 40].

Third, the review highlights the role of digital technologies in enabling personalized and convenient customer experiences, which can help improve satisfaction and loyalty [87]. Using AI-powered chatbots and personalized recommendations based on customer data can enhance the customer experience, while using IoT-enabled devices can allow guests to control and access hotel amenities conveniently [12].

Fourth, the review suggests that adopting digital technologies in the tourism and hospitality sector can increase the industry's efficiency and effectiveness [88]. Businesses use ML algorithms to automate tasks and analyze customer data, which can help streamline processes and identify areas for improvement [39, 80].

Overall, the systematic literature review using the PRISMA method sheds light on adopting a customer-centric approach and leveraging digital technologies for customer value co-creation in tourism and hospitality. Over the next five years, researchers should focus on exploring the potential of emerging technologies, developing conceptual frameworks, and conducting applied research to drive meaningful transformations in the industry. By aligning strategies with these implications, organizations can thrive in the dynamic digital landscape and deliver exceptional customer experiences, ultimately contributing to their success and competitiveness in the market [2, 4, 15, 29, 33, 89].

Practical implications

The systematic literature review using the PRISMA method on customer value co-creation through the digital age in the tourism and hospitality sector has several management implications for organizations in this industry.

First, the review suggests that adopting a customer-centric approach, in which customers' needs and preferences are central to the design and delivery of services, is crucial for success in the digital age [40, 86]. Therefore, managers should focus on understanding and meeting the needs and preferences of their customers and consider how digital technologies can be leveraged to enable real-time communication and data gathering from customers [15, 80].

Second, the review highlights the importance of using digital technologies like the IoT, AI, and ML to enable personalized and convenient customer experiences [40, 50]. Managers should consider how these technologies can enhance the customer experience and improve satisfaction and loyalty [36, 39].

Third, the review suggests that adopting digital technologies in the tourism and hospitality sector can lead to increased efficiency and effectiveness in the industry [7, 16]. Therefore, managers should consider how these technologies can streamline processes and identify areas for improvement [42]. Further, regarding privacy concerns, managers must spend enough resources to secure their customers' data to help boost the customer value co-creation process [48, 77].

Fourth, policymakers can foster an environment conducive to value co-creation by incorporating customer-centric strategies and leveraging digital technologies. Effective policies can enhance customer experiences, promote sustainable growth, and drive economic development, ensuring a thriving and competitive industry in the digital age.

The practical implications of applying AI and new technology for managerial decision-making in the tourism and hospitality industry are vast and promising [90]. Managers can navigate the dynamic digital landscape and drive meaningful co-creation with customers by embracing a customer-centric approach, leveraging personalized technologies, addressing efficiency and data security considerations, and strategically adopting AI-powered tools. By staying abreast of technological advancements and harnessing their potential, businesses can thrive in the next five years and beyond, delivering exceptional customer experiences and enhancing value co-creation in the industry.

Limitations and future research

The research, anchored in the PRISMA methodology, significantly enhances the comprehension of customer value co-creation within the digital ambit of the tourism and hospitality sectors. However, it is essential to underscore certain inherent limitations. Firstly, there might be publication and language biases, given that the criteria could inadvertently favor studies in specific languages, potentially sidelining seminal insights from non-English or lesser-known publications [91]. Secondly, the adopted search strategy, governed by the choice of keywords, databases, and inclusion/exclusion guidelines, might have omitted pertinent literature, impacting the review's comprehensiveness [57]. Furthermore, the heterogeneous nature of the studies can challenge the synthesized results' generalizability. Finally, the swiftly evolving domain of this research underscores the ephemeral nature of the findings.

In light of these limitations, several recommendations can guide subsequent research endeavors. Scholars are encouraged to employ a more expansive and diverse sampling of studies to curtail potential biases. With the digital technology landscape in constant flux, it becomes imperative to delve into a broader spectrum of innovations to discern their prospective roles

in customer value co-creation [18]. Additionally, varied search strategies encompassing multiple databases can lend a more holistic and inclusive character to systematic reviews [27]. Moreover, future research could investigate the interplay between political dynamics and the integration of novel technologies, enriching the understanding of value co-creation in a broader socio-political context. Lastly, integrating sensitivity analyses can ascertain the findings' robustness, ensuring the conclusions remain consistent across diverse search paradigms, thereby refining the review's overall rigor.

Conclusion

In conclusion, this review highlights the pivotal role of digital technologies in customer value co-creation within the tourism and hospitality sectors. New AI, blockchain and IoT technology applications enable real-time communication and personalized experiences, enhancing customer satisfaction and loyalty. Metaverse technologies offer exciting opportunities for immersive interactions and virtual events. However, privacy and data security challenges must be addressed. This study proposed a comprehensive research agenda addressing theoretical, practical, and technological implications. Future studies should aim to bridge research gaps, investigate the impact of co-creation on various stakeholders, and explore a more comprehensive array of digital technologies in the tourism and hospitality sectors. This study's findings provide valuable insights for fostering innovation and sustainable growth in the industry's digital age. Despite the valuable insights gained, we acknowledge certain limitations, including potential biases in the search strategy, which underscore the need for more inclusive and diverse samples in future research.

Abbreviations
AI   Artificial intelligence
AR   Augmented reality
IoT   Internet of Things
ML   Machine learning
PRISMA Preferred Reporting Items for Systematic Reviews and Meta-Analyses
VR   Virtual reality

Supplementary Information

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Additional file 1. Quality assessment of included studies.

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