

# Technologies in the Cruise Tourism Services: A Systematic and bibliometric approach

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## ABSTRACT

COVID-19 and the faster evolution of emerging technologies forced companies to create new business models and become more digital. Therefore, companies worldwide have adopted different digital technologies such as online stores, digital assistants, digital panels, or robotic services.

This trend has also impacted the cruise industry, with new cruise ships using digital technologies onboard such as:

### Artificial Intelligence (AI):

- ZOE digital assistance is used in the latest MSC Cruise Ships.
- Virtual Concierge app used on the newest Celebrity Cruises Ships.
- Robotic bartender at the Bionic Bar on Royal Caribbean Cruise Lines.
- Pepper, the humanoid robot at Costa Cruise Line ships.
- Rob the first humanoid robot bartender at MSC Cruise ships.

### Virtual Reality (VR):

- Shore excursions
- Culinary dining

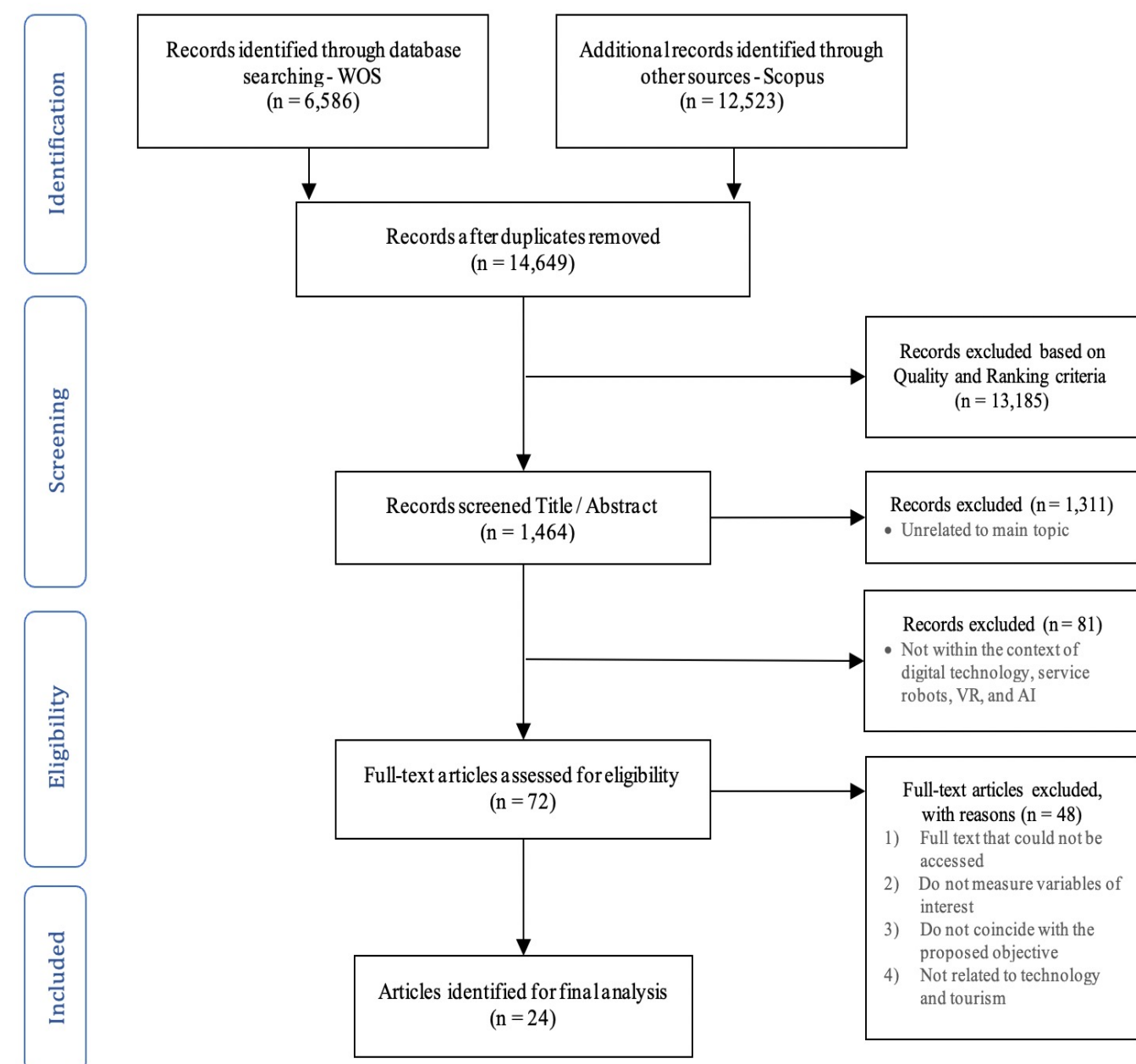
Despite the strong adoption of new technologies in cruise ships, existing studies related to the use of AI, VR, or robots in smart tourism are mostly limited to restaurants, hotels, or airports. Opening an opportunity to develop a systematic and bibliometric review on this topic - Technologies in the cruise tourism services.

## METHOD

The systematic review followed the PRISMA guidelines.

- Electronic databases Web of Science (WoS) and Scopus were used.
- Extracted data analysed with the VOSviewer 1.6.17 software

Figure 1. PRISMA flow diagram



### Selection criteria

#### Inclusion

- First, the authors consider only those papers published in top-quality journals in the marketing, technology, and tourism field.
- Second, the authors only included English-language articles.
- Third, only journals within the rank of first and second quartile (Q1 and Q2) verified at SCImago Journal and Country Rank (SJR) were considered, along with articles rated as 3, 4, and 4\* according to the ABS 2021 list from in the Journal Quality List of Anne-Wil Harzing.
- Finally, all the articles published over the years were included.

#### Exclusion

- The authors excluded any other non-English language articles.
- In addition, articles from Proceedings papers, conference articles, book chapters, and other non-academic articles were excluded.

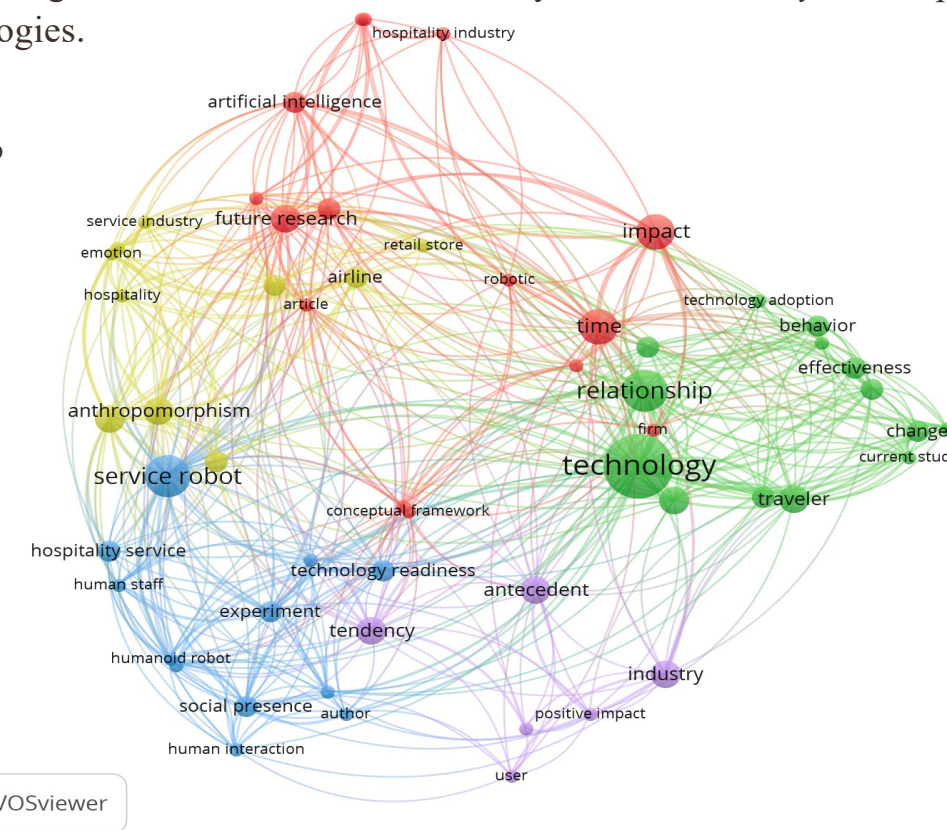
## RESULTS

The systematic search identified 24 articles for the final analysis. The articles retrieved were published in 8 different journals related to technology and tourism studies.

### Bibliometric analysis of technologies in the cruise tourism services

The text data visualization map was made to identify the relationship among topics. There are five main clusters. *Technology* was the most discussed term among the articles, followed by *service robots* and *anthropomorphism*. The last clusters are related to the *impact* of new technologies in the tourism/hotel industry and the *tendency* of companies to acquire new technologies.

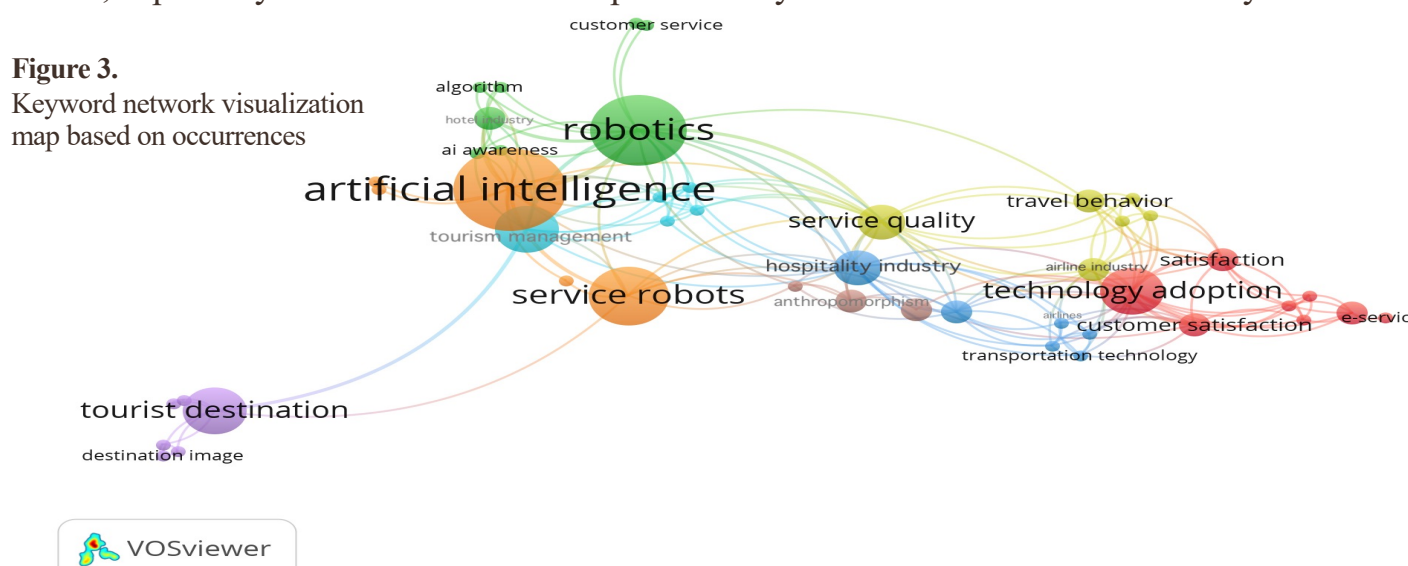
Figure 2. Text data visualization map based on occurrences



### Bibliometric analysis of keyword

In total, eight clusters were found in this analysis. The main keywords are *robotics*, *artificial intelligence*, *hotel industry*, *technology adoption*, *service quality*, and *tourist destination*. Thus, the main topic is related to the technologies and robots used during travel, especially related to the service provided by the hotel and tourism industry.

Figure 3. Keyword network visualization map based on occurrences

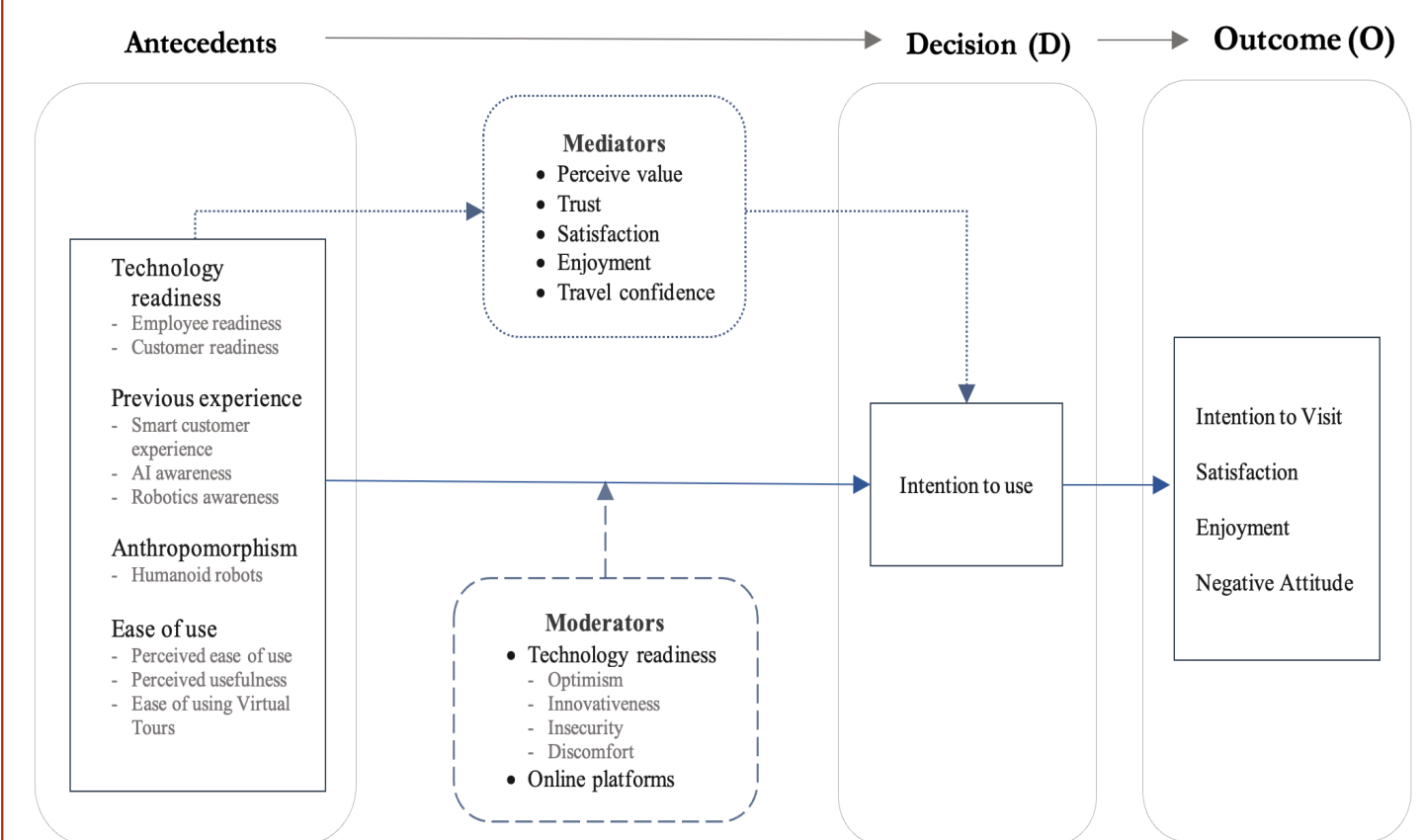


### Antecedents, decision, and outcomes (ADO) framework of cruise tourism services

To analyze the findings of the selected articles, the authors adopted the ADO framework (Paul & Benito, 2018) to help identify the main constructs used as antecedents, decisions, and outcomes. A conceptual framework was created from this analysis, which includes the main mediator's and moderator's variables used in the articles (Figure 4).

In summary, the finding of the framework reveals that: previous experience, consumer readiness, or how easy it is to use these technologies (A) can influence the decisions (D) of the consumer to use or not to use these technologies (behavioral response), which in turn leads them to consumer satisfaction, enjoyment, visit intention or negative attitude towards the technologies as an (O) outcome.

Figure 4. Conceptual framework – (ADO) antecedents, decisions, and outcomes



### Major domains and future research agenda

Future research directions are suggested once the state of knowledge is systematized, and the ADO framework is used to understand existing studies' main antecedents, decisions, and outcomes.

Based on the findings, the present study proposes a list of research questions, which are organized into four domains (Table I): (i) Human-like services; (ii) Travel technology; (iii) Outcomes of technologies; and (iv) Privacy perception and knowledge expertise.

Table I. Research questions and future topics on cruise tourism service

| Domain area                                | Future topics                             | Future research questions  |
|--|---|--|
| Human-like services                        | Anthropomorphism on service robots        | • RQ1: How can cruise companies and their managers onboard reduce the negative impact of anthropomorphism in service robots?<br>• RQ2: The anthropomorphism of service robots influences the cruise traveler experience?   |
|  | Attitudes towards humanoid service robots | • RQ3: How do cruise ship workers react to the humanoid service robots, does it help them to do their jobs better, or on the contrary, does it give them more work?<br>• RQ4: Can the replacement of human labor by a robot influence the passengers and cruise ship worker attitudes towards humanoid service robots? |
|  |   | • RQ5: Do cruise ship passengers perceive or use the technologies available at cruise ships or port terminals?   |
|  |   | • RQ6: Can these cruise technologies enhance cruise ship passenger satisfaction or speed up their service?<br>• RQ7: How do cruise ship passengers feel about the new technology services that have replaced cruise ship workers?  |
| Travel technology                          | Cruise technologies                       | • RQ8: How do cruise passengers feel when they are denied the use of human-support and are obliged to use tech instead?<br>• RQ9: What influences cruise passengers to share their positive or negative experiences on social media or cruise blogs?   |
| Outcomes of technologies                   | Online passenger behavior                 | • RQ10: How much does e-WOM influence the purchase intention of cruise passengers?<br>• RQ11: What influences cruise passengers to share their private information on the cruise app?<br>• RQ12: Does the AI system implement onboard cruise ships is safe?  |
| Privacy perception and knowledge expertise | Trust in sharing private information      | • RQ13: How do cruise passengers feel when a robot or virtual concierge onboard cruise ships remember their preferences and suggest future activities?<br>• RQ14: Are social robots becoming knowledge experts in tourism services?  |

## IMPLICATIONS

### Theoretical Contributions

- Despite the increase in research articles on technology in the cruise industry, existing studies on AI, VR, or robots are mostly limited to restaurants, hotels, or airports. In addition, most of the articles analyzed just focused on the robotic arm bartender of Royal Caribbean Cruise line, without paying more attention to other types of technologies that are currently available on cruise ships, such as cruise lines apps, interactive touch screens, facial recognition, or VR. Therefore, the findings of this review suggest that additional research is needed between cruise tourism and smart services onboard cruise ships.

- Lastly, the major theoretical contribution of this study includes the creation of a conceptual framework and the identification of four domains derived from the analysis of the ADO framework. The framework allowed the authors to address the understanding related to the adoption of new technologies in the cruise tourism service.

This allow to address gaps that need further development while also suggesting future research questions to be evaluated in future studies. Therefore, researchers may further explore the suggested questions to extend the proposed conceptual framework and thus provide additional contributions to this area.

### Managerial Contributions

- First, the findings suggest that the appearance of robots plays an essential role in the service industry, so humanoid robots have the most positive impact as they provide more confidence and trust to the consumer. Therefore, cruise managers should consider providing humanoid service robots but simultaneously with human service, since it has been proven that they can further enhance customer trust and experience.

- Second, few studies indicate that VR is a powerful marketing tool since it allows tourists the option of *trying before buying*. So, marketers should consider this option to adapt their strategies, promote their cruise vacations, and attract cruisers.

- Finally, cruise managers should consider the above-mentioned managerial implications, as cruise ships are considered floating hotels with similar activities and features as a hotel.

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