ANPTUR 20 years: an overview of publications on tourism and information and communication technologies (ICT) at the ANPTUR seminar

ANPTUR 20 anos: panorama das publicações sobre turismo e tecnologias da informação e comunicação (TIC) no seminário

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ABSTRACT

The present study aims to identify the variety of research that addressed the relationship between tourism and ICTs published in the proceedings of the Seminar of the Association for Research and Graduate Studies in Tourism (ANPTUR), in its 20 years of operation. Characterized as a descriptive study with a qualitative approach, a systematic literature review was used as a methodological strategy, defining as a data source the research published in all the Annals of the ANPTUR Seminar available online. Research in tourism in Brazil is relatively new and when it comes to the theme that involves ICTs and tourism, it is even more recent. With the process of evolution and change of ICTs, there is a need for studies that understand this relationship between new technologies associated with tourism, which have brought several possibilities to the sector.

The classification of the analyzes identified that the theme that concentrates the most significant number of studies is the dimension that focuses on the role of supply and the Commercial Functions of the Industry, with 54.82% of published research, totaling 91 articles. In second place is the dimension of consumer behavior and demand, with 28.31% of research representation; and finally, the Technological Innovations dimension, which comprises studies related to the adoption of new digital technologies by the industry as a whole, representing 16.87% of the research, with 28 articles on this theme. It was possible to identify the evolution of research involving ICTs and Tourism that reinforces the importance that digital technologies have been taking in the management and practice of tourist activity. It is observed that there is still a need for researchers to explore studies on topics related to technological innovations, such as the use of big data for destination management, adoption and acceptance of NFTs and blockchain, wearable technologies.

Keywords: Tourism, Information and Communication Technology, Literature Review, ANPTUR, Technological Innovation.

INTRODUCTION

Just after the turn of the millennium, society was transformed by Information and Communication Technologies (ICTs), especially in conjunction with the growth and expansion of the Internet, which became ubiquitous in all aspects of life (Kuss & Medaglia, 2022). Over the years, the advance of ICTs has made it possible to develop various technological solutions that have become part of everyone's daily life (Soares, Albuquerque, Mendes-Filho & Alexandre, 2022). In the context of the globalization scenario, which on the one hand transforms society's relations and behavior, and on the other, intervenes and alters the environment of companies since it enables structural changes and advances that contribute to the growth and development of these organizations (Masiero, Rangel, Silveira & Medaglia, 2022).

The evolution of ICTs has also had profound implications for tourism. The sector was one of the first to be affected by the Internet, which, together with other technologies, has become fundamental to the development of tourism, given the characteristics of the tourism product and the amount of information needed to make it operational (Buhalis, 2000; Buhalis & Law, 2008; Standing, Tang-Taye & Boyer, 2014; Beni, 2017).

The advent and the evolution of ICTs have favored the bargaining power of customers towards suppliers, due to the possibility of accessing all information in a practical way, as well as enabling tourism suppliers to reach the global market in an economical and creative way, in addition to helping to monitor the competition more assertively, since technology has evolved from the initial focus on functionality and usability to a means of online communication and persuasion with the possibility of accessing a variety of data of different sizes and formats, in real-time (Law, Leung & Buhalis, 2009; Xiang, 2018).

With technological advances, new possibilities have been created for tourism, such as the development of software for the operational management of activities (booking systems for hotels, airlines, tour operators, and travel agencies), changes in the way travel information is distributed and promoted, as well as the disintermediation of information that everyone has access to with the Internet. Today, the Internet has overtaken traditional sources of travel advice, such as magazines and travel agencies, becoming a key influence in the search for information in the travel and tourism sector (Mendes-Filho, Mills, Tan & Milne, 2018).

This ICT revolution has changed the competitiveness of companies and tourist destinations, as it has enabled efficient cooperation and provided tools that have led to globalization (Buhalis, 2000), by empowering suppliers in an economical and creative way (Law, Leung & Chan, 2019). For Sigala (2018), the implications of ICTs have caused fundamental disruptions in tourism, leading some tourism players to think about new forms of management and

competitive strategies. Buhalis (2019) states that technological innovations in tourism have been and still are catalysts for the evolution and competitiveness of the activity, as do Navío-Marco, Ruiz-Gómez, and Sevilla-Sevilla (2018), who believe that ICTs help shape the tourism market.

Technological infrastructures strengthen, facilitate, and underpin various aspects of tourism companies' operations, both inside and outside the organization's physical boundaries. Especially when technology is used strategically, becoming a source of innovation and competitiveness through interaction and engagement between tourists and the destination, changing the tourist experience (Mendes Filho, Silva and Silva, 2019).

Over the years, the development and application of ICTs have enabled companies to become "smarter" by transforming their businesses, as well as increasing performance and competitiveness by automating business processes (Gretzel, Sigala, Xiang & Koo, 2015). For Xiang (2018), the initial role of ICTs has evolved from functionality and usability to an intelligent entity that can understand the needs and desires of travelers.

Leung (2019) argues that intelligence in tourism is associated with the adoption of technologies within the tourism ecosystem, and Sigala (2018) corroborates this, stating that this intelligence is the result of increased connectivity and data resources made possible by technological advances, which in turn have driven the need to convert tourism resources into smart tourism resources.

In this sense, since ICTs are undergoing a process of evolution and change, there is a need for studies that understand this relationship between new technologies and tourism. Buhalis and Law (2008) considered in their study that all research in the thematic areas that relate the use of ICTs in tourism can be considered as eTourism.

Thus, the aim of this study is to identify research that has addressed the relationship between tourism and ICTs published in the annals of the Seminar of the Association for Research and Postgraduate Studies in Tourism (Seminário

da Associação de Pesquisa e Pós-Graduação em Turismo – ANPTUR) in its 20 years of operation, available online. This work will use the analysis model created by Buhalis and Law (2008) and replicated by Navío-Marco et al. (2018) in international articles, but never applied in the context of Brazilian research.

According to Buhalis (2000), more than 20 years ago the tourism industry underwent a revolution as a result of the adoption of ICTs, so that the dynamics of managing and operating tourist destinations were drastically altered.

In this context, the ENTER e-Tourism conference was created 29 years ago with the aim of sharing, generating exchanges, and challenges for research into the application of ICT in travel and tourism. This event opened up an important international agenda for discussions on the relationship between tourism and ICTs, bringing together governments, organizations, academia, and companies in the sector. Since then, the conference has been held on an annual basis, organized by the International Federation of IT and Travel and Tourism (IFITT), and in 2023 it will reach its 30th edition.

In Brazil, the ANPTUR Seminar is considered to be the main event in the academic field of tourism, and its aim is to disseminate knowledge, as well as facilitate the discussion of its most relevant themes through scientific divisions and their thematic groups, one of which is Technologies and innovation in tourism, which concentrates research on ICTs applied to travel and tourism (Anptur, 2022).

In the study published by Biz and Corrêa (2016), a survey was carried out of publications involving ICTs and tourism in the 10 years of the ANPTUR seminar, classifying them into seven thematic categories: Digital promotion and marketing, E-commerce, Virtual hospitality, Consumer, ICT and management, ICT and teaching, and Mobile tourism. As a finding of the research, the authors state that most of the research can be considered as generic or regular literature.

Considering Biz and Corrêa's (2016) assertion that tourism research in Brazil is relatively new and that the theme involving ICTs and tourism is even more

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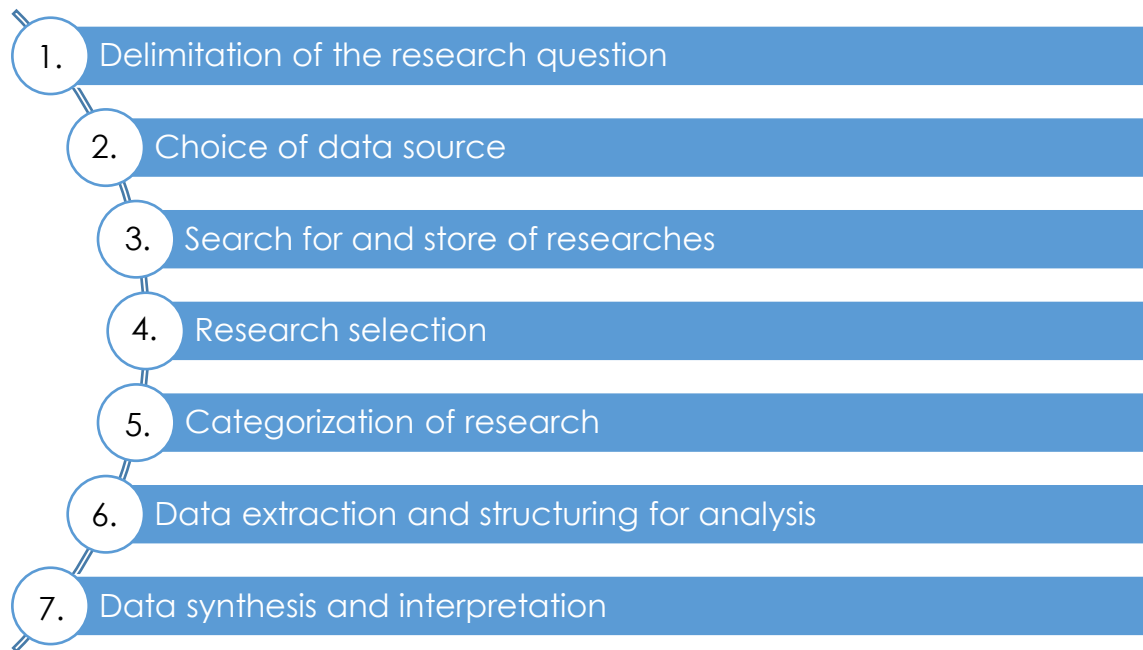
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recent, this research will contribute to understanding the progress of research carried out in this field in Brazil, as well as developing the literature on ICTs and tourism, given the need to understand the theoretical structure of the research in question.

METHODOLOGY

This study is defined as descriptive (Gil, 2007), with a qualitative approach (Minayo, 2001), and the method used is a systematic review (Costa & Zoltowski, 2014), as it allows us to draw up an overview and understand the state of research on information and communication technology in tourism in the context of the ANPTUR Seminar in its 20 years.

The data was collected in April 2022 and did not use a time filter or keywords, given the intention of analyzing all the research on the event in question. As a methodological procedure for the systematic review of the literature, seven stages were established, which are followed in this study, carried out from the adaptation of the Systematic Review model by Costa and Zoltowski (2014), as illustrated in Figure 1.

As an initial stage in the systematic review process, the research question was defined, which consists of understanding the development of research on information and communication technologies and tourism in Brazil, based on the Annals of the ANPTUR Seminar in its 20 years of operation. The second stage of the review consisted of choosing the data source, and as the aim was to map and analyze the academic production on ICT and Tourism published at the ANPTUR Seminar, the Annals of the seventeen editions of this event, available online, were taken as the basis for data collection.

1. Delimitation of the research question
2. Choice of data source
3. Search for and store of researches
4. Research selection
5. Categorization of research
6. Data extraction and structuring for analysis
7. Data synthesis and interpretation

Figure 1. Stages of the Systematic Review.
Source: Adapted from Costa and Zoltowski (2014).

For the third stage of the review, characterized as the search and storage of research, for greater credibility of the findings, the search was carried out by peers and individually by consulting the proceedings of all editions of the event, available online on the association's website, from the second edition in 2005 to the last one available online up to the date of data collection, published in 2021.

As a criterion for inclusion in the sample, the titles, keywords and abstracts of all the articles in each issue were read. The data was stored using Google Sheets, organized in a column structure with the categories and characteristics that would be used for analysis, such as: year of publication of the work, title, keywords, abstract and name of the author(s).

This study did not opt for a keyword search, as it sought a more in-depth analysis of the topic, and because it considered that keyword searches, in some cases, do not cover all the works. From this perspective, after analyzing the criteria, the sample resulted in 179 studies.

In the fourth stage, we selected the studies that met the objective of this study. To form the final sample, we excluded studies characterized as bibliographical and systematic reviews, as well as those that were not directly related to the subject of ICTs, which for some reason were considered in the initial sample. Thus, after defining the exclusion criteria, 13 studies were removed from the initial sample. Therefore, this study considered a total of 166 relevant and appropriate studies for analysis, as shown in Figure 2.
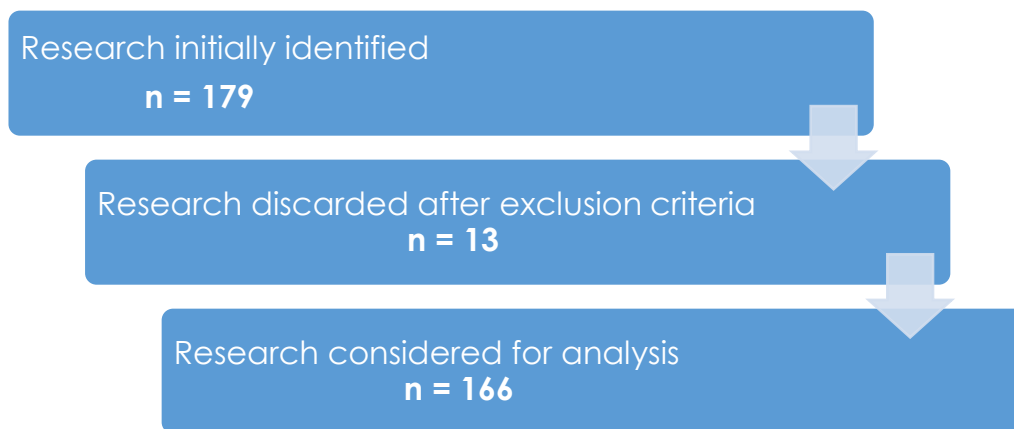
Figure 2. Research selection stages.
Source: Prepared by the authors

In the fifth stage, the research resulting from the final sample was classified. As a categorization criterion, the same classification used by Buhalis and Law (2008) and replicated by Navío-Marco et al. (2018), who identified three main dimensions as the axes of research into ICTs in tourism, namely: 1) Consumers and demand, which includes studies whose main objective is to reflect on the behaviour of consumers and tourists and aspects related to tourism demand in the face of technologies; 2) Technological innovation, which includes research related to the adoption of new digital technologies available to tourism activity; 3) Commercial functions of the industry, a dimension that encompasses research related to the performance of entities, companies and organizations in the sector, with actions to adopt new technologies for the promotion, dissemination and marketing of products, services and tourist destinations, among others.

The sixth and seventh stages of the review, characterized as the extraction and structuring of data from the sample for analysis, as well as the synthesis and interpretation of the data, were carried out using Google Sheets, with the aim of supporting the organization and mapping of the data, contributing to its interpretation, which emerged from the categories of analysis established in the research. In this way, the results will be presented through a discussion of the research findings.

RESULTS AND DISCUSSION

Based on the total number of papers published in the annals of the ANPTUR Seminar in all its editions available online, we found a total of 3,080 published studies, of which we identified a total of 166 articles related to the theme of ICTs and Tourism, which represents a total of 5 percent, as can be seen in Table 1 below. This was also an average percentage of papers presented per year involving ICTs, except for the 2019 and 2021 editions, which had the highest representation in the historical series, with a representation of 11.82% and 9.50% respectively, with 2019 standing out with the highest absolute number of articles published, both in terms of the ratio between the total number of research papers that year.

Table 1. **Survey of research published in the ANPTUR Annals 2005-2021.**

ANPTUR ANNALS - 2005 to 2021				
Edition	Year	Total Research	Involving ICTs	Representativeness
2	2005	35	1	2.86%
3	2006	160	0	0.00%
4	2007	198	4	2.02%
5	2008	201	0	0.00%
6	2009	192	6	3.13%
7	2010	174	7	4.02%
8	2011	186	8	4.30%
9	2012	133	8	6.02%
10	2013	126	9	7.14%

11	2014	147	7	4.76%
12	2015	162	10	6.17%
13	2016	182	14	7.69%
14	2017	177	13	7.34%
15	2018	208	12	5.77%
16	2019	220	26	11.82%
17	2020	337	18	5.34%
18	2021	242	23	9.50%
Totals		**3080**	**166**	**5.39%**

Source: Prepared by the authors.

Considering that this is one of the main technical-scientific events in the academic area of Tourism in Brazil (Biz & Corrêa, 2016), and that it currently includes 22 working groups, distributed in 5 scientific divisions, it is believed that this participation demonstrates the relevance of this theme in Brazilian research, although it is still incipient. It is worth noting that since its first edition, the Seminar has featured a study about ICTs in tourism.

In addition to the representativeness and the total amount of research published, we identified the timeline of the evolution of the amount of research presented over the years, as shown in Figure 3.

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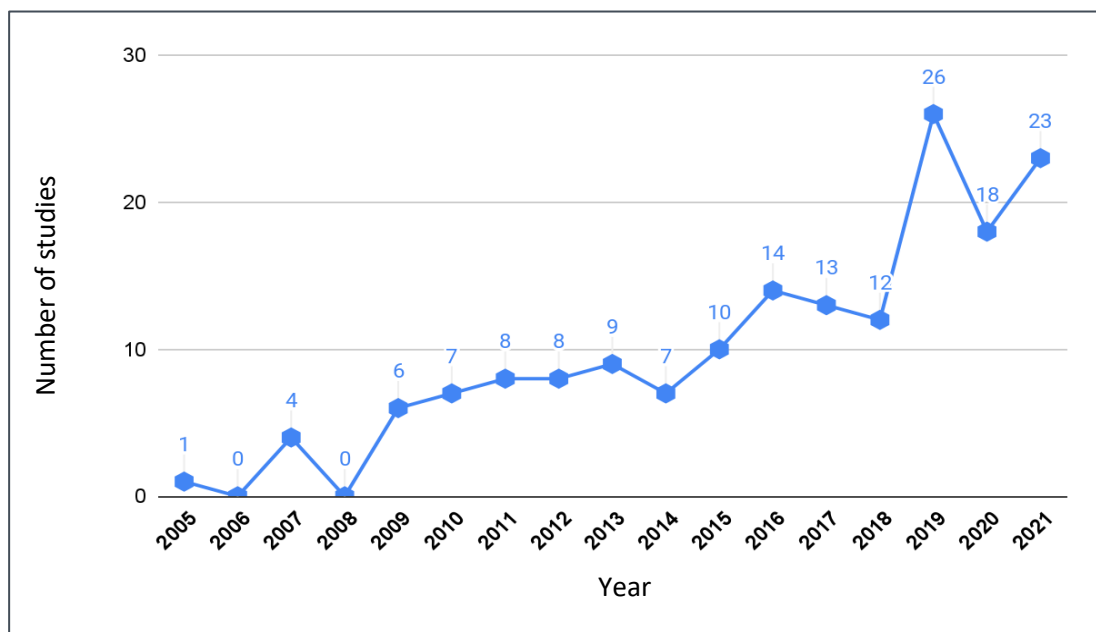
**Figure 3.** Evolution of research involving ICTs
Source: Prepared by the authors.

We can see a growing trend, with the highlight being the jump between 2008 and 2009, from when we see a progressive increase in the number of publications and constant growth. It can also be seen that 2019 was the most relevant year for publications involving ICT-related analysis at the Seminar. In addition, it is possible to justify the progress of the topic, with the growth in the absolute and relative number of articles in the proceedings of the event.

Based on the data presented in Figure 4, we can see that the theme that concentrates the largest number of studies published in the Seminar proceedings is the dimension that focuses on the role of supply and the commercial functions of the industry, with 54.82% of the published research, totaling 91 articles. This dimension encompasses research related to the actions of entities, companies, and organizations in the sector, with actions to adopt new technologies for the promotion, dissemination and marketing of tourism products, services, and destinations (Buhalis & Law, 2008).

In second place is the dimension that concentrates studies related to consumer behavior and the understanding of demand, which accounted for 28.31% of the research published in the Seminar proceedings, i.e., 47 articles. The dimension with the lowest number of publications was Technological innovations, which includes studies related to the adoption of new digital technologies by the industry as a whole, with only 16.87% of the research, i.e., 28 articles on this subject.
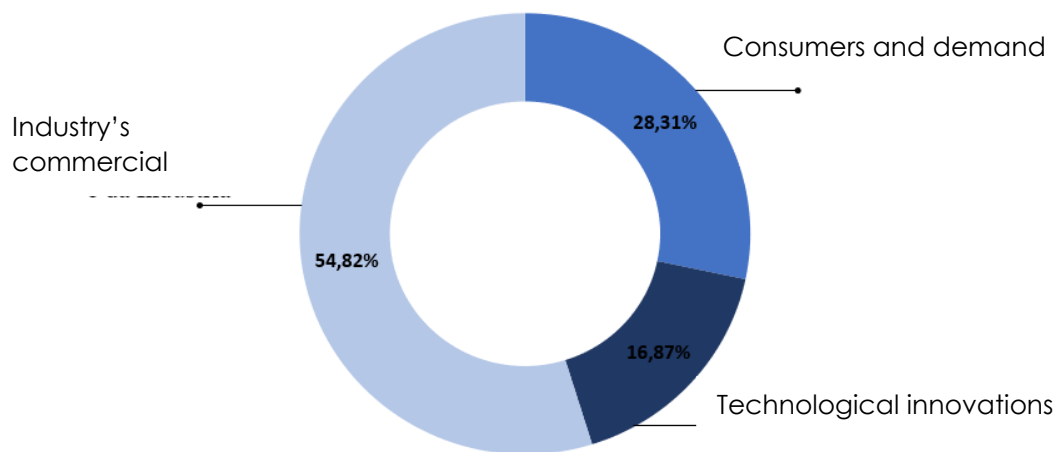
Figure 4. Distribution of research in the dimensions of Buhalis and Law (2008) and Navío-Marco *et al.* (2018).
Source: Prepared by the authors.

Consumers and demand

The theme of Consumers and Demand appears in the seminar proceedings from the 2011 studies, when research emerged seeking to understand the relationship between consumer/tourist behavior and technologies, in order to identify points of attention in relation to tourist demand. Souza, Melo, and Barbosa (2011) discuss the Theory of Risk and the purchasing process, focusing on the acquisition of hotel services on virtual platforms, relating the importance of searching for information on the Internet and the risk reduction strategies used by consumers, concluding that the more motivated the individual is to search for information, the greater their effort will be to try to reduce the perception of risk in the decision-making process when acquiring hotel services on virtual shopping.

In 2012, studies emerged on user-generated content (UGC), which refers to all types of data, information, and media (comments, posts, photos, videos, and ratings) that a user/consumer spontaneously produces for a company and publishes on the internet (Arriga & Levina, 2008). Mendes Filho, Tan, and Mills (2012) conclude that this type of content is helping travelers make decisions

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about their travel plans, contributing to the development of a theory of online consumer behavior based on the Theory of Planned Behavior.

Paes, Matias, and Aguiar (2012) sought to understand consumer behavior on virtual platforms using UCG about retaliation against airlines by consumers on digital social networks. According to the authors, the main motivators for retaliation against airlines in virtual communities were related to the services provided, verifying the influence and pressure of comments generated by users on social networks on companies' marketing strategies (Paes et al., 2012).

For Limberger and Anjos (2015), the recommendations available in Online Travel Reviews (OTR), which are also a type of UCG, are highly influential for new customers (Hays, Page & Buhalis, 2012). Through their study, the authors found that value for money, location, ambience, food, and service are the main categories of gastronomic experience found in the comments posted by users on OTRs about the destination of Natal (RN).

Another topic also presents in research in the context of UGC, eWOM, or electronic word-of-mouth, which refers to online recommendations or reviews (and only that), is also arousing academic interest. For Araújo, Farias, and Mendes Filho (2018) there is still constant questioning about the main factors that influence online users' purchasing intentions.

Few articles have focused on analyzing changes in the consumer profile and consumption habits, such as Barbosa and Medaglia (2018), who analyzed the impact of digital technologies on the consumption habits of contemporary travelers, presenting how digital platforms have given travelers autonomy and contributed to the construction of a collaborative culture, which in turn is responsible for intensifying social relations, allowing the exchange of experiences and moving a worldwide network of travelers, contributing to the emergence of a highly connected, demanding and collaborative traveler profile.

Other studies have sought to understand how some digital technologies have influenced the purchasing decision process of this new tourist, such as Andrade-Matos, Barbosa, and Perinotto (2019) who identified that users are making frequent use of social media to conduct research and exchange information with other consumers, since the experiences of others end up influencing the purchasing decision process in some way since the stage most influenced by social media is the search for information, in which consumers look for references for their purchasing decisions. The authors' study also found that the social media most used by these users to obtain information are WhatsApp, Instagram, and Facebook, respectively.

Another study in this area is by Silva, Silva, Marques Junior, and Mendes Filho (2020), which presented a practical and adapted instrument capable of investigating the purchasing behavior of hotel service consumers when watching online videos. As well as Almeida and Leal's (2021), which consider that the contemporary tourist is already adapted to the current context induced by social media, and this has influenced and altered the concept and conceptions related to authenticity.

However, studies of the consumer and demand dimension have little variety and are mostly concentrated on research using UGC, either with a focus on analyzing the online reputation of businesses (restaurants, hotels, and tourist attractions) using the evaluations provided by users on public online platforms such as Tripadvisor and Google, or with the aim of identifying the image of destinations and tourist attractions as perceived by tourists and visitors, through the publications and images made available on the internet on social platforms such as Instagram and Twitter, the latter seeking to associate the content with evaluations and feelings about the visit experience.

Technological Innovations

Despite being the topic with the fewest studies published in the annals of the Seminar, in these 20 years of ANPTUR, research on Technological Innovations began to appear in 2009, with Lanzer, Teixeira, Sbersi and Schäfer (2009) highlighting the application of geoprocessing, as a new technology integrated with Geographic Information Systems (GIS) for making tourist maps, locating and characterizing tourist attractions, indicating the quantity and spatial distribution of the destination's tourist potential, confirming that geoprocessing offers technological support which, when applied to tourism, can contribute to the planning and management of tourist destinations.

The use of geotechnologies was also discussed by Teixeira and Ahlert (2011) as a successful strategy for identifying, assessing, and recording environmental impacts on trails resulting from a lack of planning and many visitors.

Reflections on the adoption of new technologies cover many facets of tourism, from the use of competitive intelligence tools to the use of robotization in hotels. According to Cruz and Anjos (2010), at the time Competitive Intelligence tools were not being used strategically, in the sense of obtaining intelligence to aid the decision-making process. Neves, Biz and Bettoni (2011) highlighted the need to explore 3G technology in tourism from the perspective of the Self Guided Walking Tour (SGWT), which was still little used.

Also along these lines, Corrêa, Araújo, and Aldrigui (2013) point out that mobile technological devices are emerging as an important distribution platform for mTourism (a concept referring to tourist experiences supported by mobile devices), emphasizing that travel apps can provide relevant information about destinations to help tourists plan and also make decisions during their trip and that these devices can generate a rich tourist experience for foreign tourists due to their command of the language and the possibility of exploring sounds, images, maps, among others.

Mendes Filho, Batista, and Cacho (2015) point out that the use of mobile apps in tourism has grown significantly in recent years, because of

technological advances. Using the Theory of Planned Behavior (TPB), they analyzed the intention to use mobile apps and identified that the variables attitude and subjective norms positively influence the intention to use tourism apps on smartphones during trips.

When analyzing the structure of the content of mobile apps about tourist attractions in the city of Curitiba (PR), Biz, Azzolim, and Neves (2016) concluded that the city is still developing in terms of mobile apps, highlighting those factors such as improving the infrastructure of mobile networks, as well as the diversity of mobile apps, are necessary.

Still about technological innovations, we found the 2017 studies on the use of QR Codes (Quick Response Codes) in tourism, based on a Smart Tourist Destinations (STI) approach. Mello (2017) emphasizes that digital marketing applied to unique tourist attractions adds a significant boost to the commercial potential of the highlighted location. By spreading the word about a smart tourist destination with geographical indications through QR Codes, a differentiated experience is offered to visitors and travelers, as well as the enhancement of tangible and intangible assets for both the local community and its economic and sustainable representativeness.

Monteiro and Teles (2017) discuss the importance of using the QR Code to provide information for tourists and for the operation of tourism-related activities, considering the facilities promoted by the spread of smartphones and their connection to the Internet, contributing to greater access and use of this type of technology, indicating space for the dissemination of technology and a widespread perception of its importance for the dissemination of tourism information.

In addition to these approaches, more recent studies have found research on wearable technologies, NFTs (non-fungible tokens), and blockchain, gamification, and robotization as technological innovations. On the subject of wearable technologies, Guebel, Cavalheiro, and Mayer (2022) point out the need for further study in this area, but list some experiences in the world of

tourism, such as Disney World, which has adopted wearable technology in its theme parks, as well as other cases identified in Brazil, such as the NADA bracelet, developed for the payment system on the island of Fernando de Noronha-PE, and the Lollapalooza music festival, which adopted the cashless system as the only purchase currency during the event. However, it is still an emerging area that needs more in-depth research.

Blockchain and NFT technologies are recent, and the study addresses the issue from the perspective of impact on the constructs of adoption and outsourcing of trust, but it is still a technology that has not spread in society, according to Picinini and Baptista (2021). The studies on gamification by Santos, Silva, Guedes and Marques (2020) as well as Sampaio, Rosa, Santanna and Silva (2020) are restricted to educational challenges, addressing the use of gamification strategies as academic methodological alternatives, not actually addressing tourism use.

Regarding robotization in tourism, Paixão and Salazar (2021) show that robots are seen as a differentiator in hotels that have them, and that they can be a channel for extraordinary experiences and that they influence the guests' consumption experience.

Although we found some innovative topics, we realized that there is still a lot to be explored by Brazilian researchers in studies for publication at the ANPTUR Seminar on the subject of new technologies, addressing in more depth the adoption and acceptance of NFTs and blockchain, as well as the use of big data, wearable technologies, voice command, support technologies for tourists' experiences during travel, the use of applications, among others, especially in view of the prospect of 5G technology becoming available in Brazil.

No studies were found on performance and evaluation in the areas of augmented and/or virtual reality, or metaverse issues.

Industry's commercial functions

Commercial functions of the industry were the theme that grouped together the largest number of studies involving ICTs and Tourism at the Seminar over these 20 years, with more than half of the studies from this perspective. The first article had already been published in the first edition of the association's event, which dealt with the interference of the Internet in the development of tourism activity, showing the need for studies to support the use of the Internet as a space for making tourist information available, which could have repercussions on tourism planning actions, the daily life of the municipality, the imaginary about the place, as well as the population's perspectives on the environment (Costa, 2005).

There are three strands to this dimension: an analysis of websites, both of DMOs (Destination Management Organizations) and of the destinations themselves and companies in the sector (such as accommodation providers, travel agencies, etc.); analysis and studies on social media and the construction of the image and imagery of destinations, companies, and events. And finally, studies on distribution channels and the impact of the internet on this aspect, covering hotels, travel agencies, and new business models, among others.

In the first strand, Dantas, and Chagas (2009) stated that the image of Brazil as a tourist destination on the Internet was underutilized, focusing on a few of the country's attractions and that it was mostly linked to natural aspects such as the sun, beaches, forests, waterfalls and some cultural manifestations. As for the Brazilian states, Montoro and Tomikawa (2010) state that they have not exploited the internet properly, with sites that are difficult to access and little use of web resources and their marketing and mobilizing potential. The others identified limited content both in terms of tourist information, especially on sustainability, and in the itineraries available, damaging the image of the destination and failing to offer new opportunities to visitors.

For Aguiar, Farias, and Costa (2011), based on the Practical Guide to Sustainable Development Indicators for Tourist Destinations (UNWTO), the

content of the Fernando de Noronha - PE website includes information related to most of the indicators listed and that it can be a didactic tool for tourists on aspects of the destination's sustainability. However, Cacho, Anjos, and Mendes Filho (2014) state that the official portals of the host cities and states of the 2014 World Cup did not have enough information to meet the information needs of tourists, making it necessary to make some adjustments to improve the quality of these portals.

Still about websites, but looking at companies, Goldenberg, Pinotti and Wada (2015) confirm that the composition of a service provider's website contributes to generating a competitive advantage in service provision. However, this is a topic that has lost its relevance in recent years.

Another area of concentration in this strand is social media studies. Gonçalves and Mazaro (2013) had already predicted that its use would increase over time and the trend was for its participation in the communication mix of destinations to become predominant over conventional media. Thomaz, Biz, Bettoni, and Pavan (2014) found an evolution in promotion strategies by the DMOs analyzed during the study period.

Mendes Filho et al. (2015) state that the use of social media by DMOs to support destination management can help them to identify the presence of tourists during a certain time without having to carry out field research. In addition to providing a daily overview of tourist demand in the destination, just like in a smart destination. According to Assis and Silva (2021), the Covid-19 pandemic has contributed to the adoption of social media by companies, mainly in the search for a closer relationship with the consumer market, which was prevented from traveling due to the pandemic restrictions.

As for the use of websites as distribution channels, we see studies focused mainly on hotels and travel agencies. Araújo et al. (2018) observed that travel agencies in Rio Grande do Norte are outdated when it comes to using ICTs. Garcia and Sohn (2019) studied Booking.com, an Online Travel Agency (OTA), and confirmed the company's excellent performance, one of the leading OTAs

in the sector. However, they also identified the increased dependence of hotels on OTAs, especially smaller and independent hotel companies, which have reduced bargaining power compared to hotel chains, which can prove to be a problem for the latter.
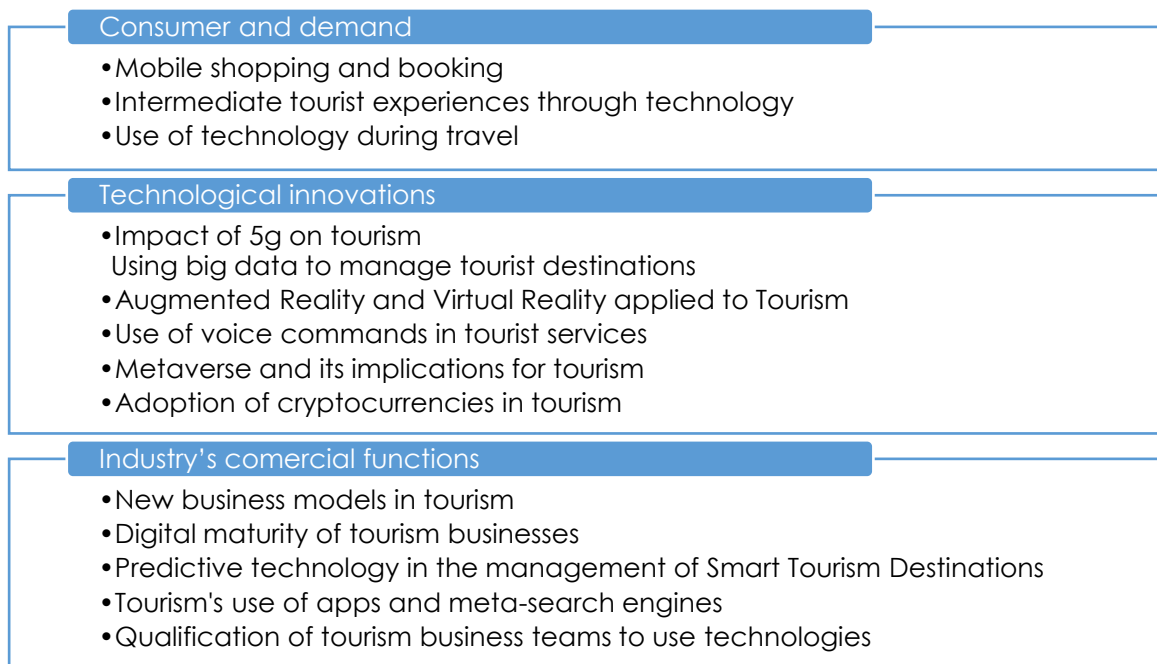
From a hotel perspective, there have been several studies on the impact of the sharing economy on the sector. Oliveira, Bauer, and Sohn (2018) observed that the impact of the sharing economy on tourism and hospitality, in particular, has attracted recent attention because of the speed of growth and also found that Airbnb is a new business model that has emerged as a disruptive innovation that could redefine the hospitality sector. In addition, Andrade and Panosso Netto (2019) present the dimensions of comfort, authenticity, and special relationship as the main differentiators and elements most highly rated on the platform.

However, recent years have seen the emergence of new themes in this dimension, especially those related to the concept of Intelligent Tourism Destinations (ITD). Paes and Ladeira (2017) have already made some observations, identifying that countries such as Spain and China, among others, have already begun to develop innovative actions using technological resources to promote new tourism experiences and destination management, which would be in line with the concept of DTI. Lima and Mendes Filho (2020) identified the Spanish model of the Valencian Institute of Tourism Technologies (Instituto Valenciano de Tecnologias Turísticas – INVAT.TUR) as one of the tools for developing an implementation and management strategy for transforming traditional tourist destinations into DTIs.

Thus, we can see that in this dimension the subject of DTIs, as well as the sharing economy and its impacts, are still on the rise and have growing prospects for further development. However, in view of the growing discussion about digital transformation, it was noticed that this expression is not used in tourism studies, which could be a gap and an opportunity for research.

Research into the adoption of technology by companies in the tourism sector is also scarce. Delving deeper into studies on DTI models and the possibilities for their application/implementation and adaptability to the Brazilian context has emerged as a very relevant research front.

Finally, Figure 5 shows the distribution of new trends identified in research based on publications in the Annals of the ANPTUR Seminar in its 20 years.

Consumer and demand
- Mobile shopping and booking
- Intermediate tourist experiences through technology
- Use of technology during travel

Technological innovations
- Impact of 5g on tourism
  Using big data to manage tourist destinations
- Augmented Reality and Virtual Reality applied to Tourism
- Use of voice commands in tourist services
- Metaverse and its implications for tourism
- Adoption of cryptocurrencies in tourism

Industry's comercial functions
- New business models in tourism
- Digital maturity of tourism businesses
- Predictive technology in the management of Smart Tourism Destinations
- Tourism's use of apps and meta-search engines
- Qualification of tourism business teams to use technologies

Figure 5. New research trends in the dimensions of Buhalis and Law (2008) and Navío-Marco *et al.* (2018).
Source: Adapted from "Progress in information technology and tourism management: 30 years on and 20 years after the internet-Revisiting Buhalis & Law's landmark study about eTourism", by Navío-Marco, J., Ruiz-Gómez, L. M., & Sevilla-Sevilla, C., 2018, p. 467.

The new trends mentioned above in Figure 5 open avenues for study and research, especially in areas where there is a lack of scientific depth focused on technological innovations developed in recent years, which make the market more innovative and competitive.

From the perspective of consumers and demand, research into the use of apps in the travel phases, either before, through the use of apps for purchasing and managing bookings on mobile devices; or during travel, which impacts on the experience at the destination, is proving to be relevant. In addition, there

is a lack of research and studies from the perspective of consumer behavior, which has also had its dynamics altered due to the pandemic phase faced in recent years.

New research possibilities in the Technological Innovation dimension should focus on analyzing the entry of new technologies into the market and how tourism companies and destinations can incorporate them into their activities, with a view to generating new experiences and challenges for the activity. In addition to consolidating the theme of the development and application of new technologies to improve the tourist experience in the management of destinations, with a focus on DTI studies, especially the development of technologies for the use of Big Data, mainly with predictive technologies that help in the decision-making of DMOs and companies in the sector. Also considered are the impacts of 5g on tourism; the use of augmented reality and virtual reality applied to tourist experiences; the use of voice commands in tourist services; the metaverse and its implications for tourism and the adoption of cryptocurrencies in tourism.

In the commercial functions of the industry, research should be related to the adaptation of businesses to new technologies, understanding the new business models in tourism, the use of technology to aid strategic and intelligent decision-making in tourist destinations and businesses. It also seeks to understand the importance of training the workforce in the use of technology in tourism businesses. In addition to further investigating the adoption and impact of technologies on business management, the digital transformation of the sector, as well as the digital maturity of companies and destinations.

CONCLUSION

With this study, it was possible to understand the development of research into ICTs and tourism, as well as to identify the main themes studied in Brazil and to follow the growth and evolution of studies based on the Annals of the ANPTUR Seminar in its 20 years of operation, the main technical-scientific

tourism event in Brazil. By reproducing the international classification methodology used by Buhalis and Law (2008) and replicated by Navío-Marco et al. (2018), this study brings the contribution of applying the model to the Brazilian reality, based on the proceedings of the Seminar, contributing to understanding the concern and gaze of academia on the impacts of ICTs on tourism and on the tourist experiences offered to consumers, as well as their reflexes on the other actors in the tourism production chain.

As far as the findings are concerned, it can be identified that there is a concentration of research in the area of the industry's commercial function, which deals with mature topics, but it can be seen that the subject needs to be explored in more depth and with more targeted methodologies, given the high concentration of research using secondary data analysis. In the dimension of technological innovations, in addition to presenting few studies, there is a need for more research focused on current technologies, especially given the changes experienced in recent years with the anticipation of technologies that the Covid-19 pandemic has forced the market to adopt. In the Consumer and demands dimension, there has been progress in studies on user-generated content, but little research on consumer behavior in the face of new technologies.

This systematic review has therefore made it possible to analyze the evolution of research publications involving ICTs and tourism, as well as to identify recurring themes and research gaps in this area.

As a limitation of the research, it can be mentioned that in the selection of the sample, this study used the Annals of the Seminar of the Association for Research and Postgraduate Studies in Tourism (ANPTUR), available online, as the basis for data collection, not considering other types of work such as full articles, dissertations, and thesis, which could be used to generalize the results.

In this sense, it is suggested that future studies could broaden the universe and include samples of other types such as theses, dissertations, and articles,

both available online and in print. Another suggestion is to carry out quantitative research to compare with the qualitative results of this study.

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