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Smart Tourism Destination from a Systemic Perspective: A Brazilian Case Study

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Abstract

This study examines Natal in Brazil as a Smart Tourism Destination (STD) based on the perception of public and private managers who are members of the City Tourism Council. The research utilizes a systemic perspective of STD proposed by Ivars-Baidal et al. (2016), consisting of three interconnected levels: Strategic-Relational, Instrumental, and Applied. The findings reveal that Natal faces challenges in terms of infrastructure, accessibility, security, connectivity, and sensoring, which hinder its progress as STD. The study also identifies opportunities in the form of governance structures with smart destinations and the inclusion of smartness guidelines in the City Master Plan. The research aims to contribute to the theoretical understanding of STD and its application in destination development. It highlights the need for innovative planning and management in Natal, emphasizing that adopting the STD from a systemic perspective can enhance competitiveness and elevate the level of smartness in the destination.

Keywords

smart tourism destination; smart tourism; smart city; technology

1. Introduction

With the population growth of cities, challenges in planning, management and dynamics also raise. The last demographic census carried out by the Brazilian Institute of Geography and Statistics (IBGE) pointed out that about 80% of the Brazilian population lives in cities (Monzoni & Nicolletti, 2014). According to estimates for 2022, also carried out by the IBGE, around 85% of the Brazilian population lives in urban areas (Colabora, 2022). Thus, a growing trend can be seen in the increase in the population that began to live in urban centers, a reflection of the urban transition that had already been taking place since the end of the 19th century. Thinking about solutions that can be developed to remedy problems in cities and large urban centers, such as congestion, lack of energy, insecurity, etc., becomes necessary. Ivars-Baidal et al. (2021) state that technological evolution and the emergence of new technologies were fundamental to rethink new approaches to city management, with technology as a base pillar.

While Smart Cities aim at benefits for their residents, Smart Tourist Destinations (STD) emerge with the purpose of making use of technologies to improve the tourism experience, offering conditions to the visitor to know the services offered at the destination, providing conditions for managers to carry out actions and make decisions based on the information produced by visitors, bringing more benefits to both parties (Buhalis & Amaranggana, 2014).

In terms of transforming destinations into smart destinations, the Spanish models of the Valencian Institute of Tourism Technologies (INVAT.TUR) and that of the Tourism Innovation and Technologies state-owned company (SEGITTUR) have consolidated themselves as references for other countries in the development and evaluation of STD. From these models others

have emerged with the same objective, to provide information that can guide the development of practices that foster the smartness of destinations (Mendes Filho et al., 2022).

Lee et al. (2021) point out that although governments and companies are aggressively advancing the smart tourism agenda, research in the area is still recent. This highlights the concern to study and understand these innovation phenomena that have contributed to the development of strategies to rethink the organization, structure and dynamics of cities and tourist destinations. These initial reflections lead to the question that guided the development of this research: what is the perception of public and private managers of the city of Natal in Brazil as a Smart Tourism Destination?

Natal is a city located in the Northeast of Brazil, and it is the capital of Rio Grande do Norte (RN) state. The city is situated on the coast of the Atlantic Ocean and is well-known for its sandy beaches and natural resources, which attract thousands of travelers every year. Also, Natal was one of the host cities during the FIFA World Cup 2014 in Brazil.

In 2015, Natal joined the Brazilian Network of Smart and Human Cities, in partnership with the Digital Metropolis Institute of UFRN, becoming part of the circle of global discussions on the future of cities, which are seeking in technology the answers to their growing problems. The city also signed the Technical Cooperation Agreement for the creation of the Natal Smart and Human City Program. The program aims to promote cooperation in knowledge and innovation, through integrated actions for the development of innovative urban solutions, such as public security, urban mobility, tourism, health, education, among other areas (Prefeitura do Natal, 2015).

Urban Systems, a company focused on market intelligence and real estate business consultancy, in partnership with Necta,

carried out a study called Ranking Connected Smart Cities 2020, which maps all 673 Brazilian municipalities with more than 50 thousand inhabitants, with the aim of define the cities with the greatest development potential in Brazil, analyzing indicators that qualify the smartest cities in the country. The result of the study showed the city of São Paulo (SP) in first place, second place went to Florianópolis (SC), followed by Curitiba (PR). The city of Natal (RN) ranked 6th in the Northeast ranking. (Brazil Lab, 2020).

In 2021 Natal was elected the eighth trending destination in the world by the Travelers' Choice Awards (Panrotas, 2021) and in 2022 the destination gained a position in the ranking, coming in seventh place as the most trending destination in the world, being the first in the Latin America ranking (TripAdvisor, 2022). In the ranking developed by Decolar, the destination Natal occupies the third position among the most searched national destinations for the summer holidays of 2023. Among the 10 most searched, seven cities are in the Northeast of Brazil, and Natal is in second place in the Northeast. (EMPROTUR, 2022).

Thus, the choice of Natal for the study is justified, as the city has been investing in initiatives, as well as in strategies that are being discussed, planned, and executed with a view to transforming and developing the city's intelligence, and consequently, the tourist destination.

To carry out this research, a systemic perspective of STD proposed by Ivars-Baidal et al. (2016) were used as a basis, i.e., Governance, Sustainability, Innovation (Strategic-Relational Level); Connectivity and Innovation, Information System (Instrumental Level); and Tourism Applications and Solutions (Applied Level). Therefore, such dimensions are the key methodological elements to carry out the evaluation of the Natal destination from the point of view of smart tourism destinations.

2. Literature Review

2.1 Smart Tourism Destinations (STD)

One of the biggest transformations that tourism has ever faced was the impact of Information and Communication Technology (ICT), which have completely reshaped not only the way the entire industry works, how destinations operate (Buhalis & Law, 2008), as well as consumer behavior in the processes of decision-making and tourist experiences (Sigala, 2018). Smart tourism emerged from the development of ICTs and e-tourism, making it possible to create, through innovation, a value proposition not only for the tourist, but for all stakeholders (Buhalis, 2020). Smart tourism is revolutionizing the tourism industry, bringing innovative and transformative theoretical-practical approaches, involving ICTs, data and networks to create

personalized, sustainable and competitive experiences for tourists and destinations (Otowicz et al., 2022). For Mehraliyev et al. (2020), the understanding of smart tourism is reflected by the profound impact of ICTs in transforming conventional tourism functions and consequently in the tourist experience.

The interest in STD coincides with a context of non-tourist structural changes, such as: impact of new ICTs, new consumption patterns and consumer behavior, emergence of new business models, greater environmental sensitivity, etc., the which requires new approaches in activity planning and management (Ivars-Baidal et al., 2016). STD initiatives emerge in countries as an alternative form and a social imposition of the intensive use of ICTs that are constantly evolving (Femenia-Serra & Ivars-Baidal, 2021). However, not only technology is the hallmark of STD, but also factors such as sustainability and governance, which cannot be neglected in the strategic planning of tourism (Pereira, 2021). The tourism experience is efficient and rich in meaning in STD. Visitors actively participate in the creation of data and information network (Gretzel et al., 2018), as they not only consume, but also create and enhance the data that forms the basis of the experience (Femenia-Serra et al., 2019; Gretzel et al., 2015a).

In a context in which tourism has been transformed by dynamics of change interrelated with climate change, over tourism in destinations, and more recently with the impacts of Covid-19, there will be an increasingly need to adapt planning and management models facing the new challenges of tourist destinations (Soares et al., 2022). The intention to become a STD involves the adoption of a strategy to enhance the destination through technology and innovation, enabling the destination to increase competitiveness and better use of its resources (López de Ávila & García, 2015). As warned by Gretzel (2022), this transformation requires a change in the tourism management paradigm. There is a need to transform the traditional model of tourism management into smart destinations, based on proactivity, efficiency and integration of actors, reinforcing the need to transform traditional tourism management (Lima et al., 2021).

2.2 STD from a Systemic Perspective

As the concepts of smart destinations gained strength in the academy and industry, and the models were applied in practice in destinations, mainly in Spain (a pioneer in this new management model), there is a need to adapt such models according to the reality of each country and destination. As new possibilities for the management of tourism destinations, Ivars-Baidal et al. (2016) propose a theoretical model composed of three levels, which are interrelated and have technology as a meta factor (Figure 1).
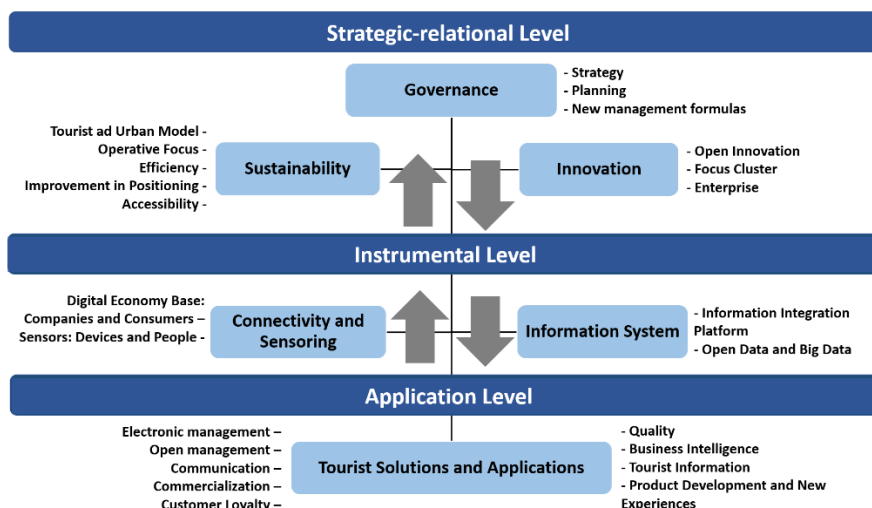

Fig. 1. Smart Tourism Destination from a systemic perspective (Ivars-Baidal et al., 2016)

The first level is the strategic-relational, linked to leadership and collaboration between actors to raise the destination's smartness level; the second level, which is instrumental in nature, focused on technology; and the third level expresses the concrete application of intelligent solutions developed by the other levels (Neiva et al., 2021). The registration of public and private instances is an essential factor in all areas of the model.

The strategic-relational level encompasses the pillars of governance, sustainability and innovation, through public-private cooperation in an open environment that facilitates the transformation of the destination (Ivars-Baidal et al., 2016). This level defines the appropriate governance conditions so that it is possible to establish destination strategies that incorporate the sustainability of the urban-tourism model, innovation in an open system and universal accessibility (Ivars-Baidal et al., 2016).

Through the use of technologies, the governance of a STD can use the information generated between the destination and the visitors to foster innovative strategies to effectively meet the expectations and needs of visitors (Lee et al., 2021; Nunes et al., 2020). In this scenario, the perception of the need for a new management model is the key to changing the different levels of the model, since the intelligence of the destination goes beyond the application of technologies, it requires changing different levels of processes (public-private sector, tourism positioning and strategy, vision of innovation), and the need to invest in a new management model, aiming to guarantee the sustainability and environmental quality of the destination.

The Instrumental level includes the infrastructure of connectivity and sensors, which allows the development of intelligent solutions and an area connected to the information system that has several possibilities as a data source, which becomes essential for decision-making at the strategic and applied levels of the model (Ivars-Baidal et al., 2016). The advancement of ICTs has enabled the development of various tools, devices and technological solutions that have become part of everyday life for all individuals (Soares et al., 2023).

Gretzel et al. (2015a) state that sensor technology plays a critical role in smart destinations, since the provision of real-time data for processing, modeling, visualization, and analysis of big data can be used to support decisions. Sensorization is directly linked to connectivity. INVAT.TUR (2015) points out that connectivity is increasingly being applied to tourism destinations, but always associated with specific services, lacking the comprehensive view that a STD requires. From STD's perspective, the destination must have the ability to intelligently collect, store, process, combine and analyze big data with large amounts of data, as well as interpret the insights derived from the data for business management, and innovate (Park, 2021).

The technological aspect in STD can contribute transversally to the exchange, dissemination, and coordination of information among the actors involved in the chain (Soares et al., 2017). It is at the instrumental level that information transits between the other levels to enable the exchange of information and the creation of strategies and actions for the destination.

The applied level allows for the development of smart solutions in several areas that are fundamental in local tourism management, such as: electronic administration and governance; tourism communication and marketing; integral quality of the destination; accessibility; target intelligence; customer loyalty, or product development and new tourist experiences (Ivars-Baidal et al., 2017).

Ivars-Baidal et al. (2021) state that the indicators of the three levels of the systemic perspective of STD (Figure 1) were developed based on the adaptation of existing indicators in the literature of smart cities and smart destinations, and the collaboration with INVAT.TUR.

3. Methodology

This research is based on the systemic perspective of smart tourist destinations proposed by Ivars-Baidal et al. (2016). It was sought to evaluate the destination Natal as a smart tourist destination based on the perception of public and private managers. It employed a case study approach to explore and gather current practices of a smart tourism destination (Gretzel et al., 2015b).

To reach the target audience of the research, in August 2022 contact was made via email to collect information from board members, such as email and telephone number. After visiting the secretariat and contacting the council secretary, it was possible to collect the list of council members, completing this process in September 2022. With the list of board members in hand, an invitation letter was prepared to be sent via email to all board members, requesting their participation to contribute to the research. The invitation letter was sent in October.

A semi-structured interview script was elaborated, based on the levels and dimensions of the theoretical framework of Ivars-Baidal et al. (2016), which was applied with the members of the Natal City Tourism Council for the 2021/2022 biennium. In total 12 out of 26 council members were interviewed, data collection took place between November 2022 and January 2023 (Table 1).

Table 1. Presentation of the interviewees.

Interviewee	Members of the City Tourism Council
Counselor 01	Brazilian Association of Travel Agents of RN - ABAV/RN
Counselor 02	Brazilian Association of Bars and Restaurants of RN – ABRASEL/RN
Counselor 03	Bank of Northeast Brazil – BNB/RN
Counselor 04	Federation of Commerce, Services and Tourism of RN - FECOMÉRCIO/RN
Counselor 05	Higher Education Institutions of RN - IES/RN
Counselor 06	National Historical and Artistic Heritage Institute - IPHAN/RN
Counselor 07	State Secretary for Tourism - SETUR/RN
Counselor 08	City Secretary of Tourism - SETUR
Counselor 09	Brazilian Support Service for Micro and Small Companies of RN – SEBRAE/RN
Counselor 10	RN Tourism Companies Union – SINDETUR/RN
Counselor 11	RN Professional Buggy Union - SINDBUGGY/RN
Counselor 12	RN Tourist Guides Union – SINGTUR/RN

The data were classified into three levels and six categories, following the theoretical model proposed by Ivars-Baidal et al. (2016), i.e. 1) <u>Strategic-Relational Level</u>: Governance, Sustainability, and Innovation; 2) <u>Instrumental Level</u>: Connectivity, and Sensoring; 3) <u>Applied Level</u>: Information System, and Tourism Applications and Solutions. The technique used for data analysis was content analysis with the aid of the Iramuteq software (version 0.7 alpha 2) for lexicometric analysis, with the purpose of synthesizing and interpreting the data that emerged from the established analysis categories.

A documentary survey was carried out on rules and regulations of the City Master Plan (CMP) of Natal, Complementary Law No. 208 of 7th March 2022, and the talking of the City Tourism Council meetings for the 2021/2022 biennium.

4. Results and Discussion

The next topics analyze and discuss the elements of the systemic perspective of smart tourism destinations based on Ivars-Baidal et al. (2016) found in the collected data, i.e., secondary sources (city council documents), and the data collected through the interviews with public and private managers, who are members of Natal City Tourism Council.

4.1 Strategic-Relational Level

4.1.1 Governance

In the City Master Plan of Natal, agreement was observed with the Governance dimension, when its objectives describe the promotion of citizen participation in the city's construction process, as well as the encouragement of the public and private sectors to work together. Section X presents the attributions of the tourism council, which highlights the need for organization and public and private articulation for the development of tourism, along with the improvement and enhancement of management capacity city administration and governance instances, with the aim of increasing income from tourism.

INVAT.TUR (2015) states that the local management of tourism in a STD occurs with greater involvement and co-responsibility when both spheres are involved, in an integrated manner with processes aligned with public and social services, in a transparent and participatory manner. Despite the obstacles, public-private collaboration in the Natal destination exists, as can be seen in the statements of the counselors:

> I would say that the government has really understood in recent years the importance of tourism for the city, which is leaving a little speech for practice. I can see that because I have been here since 2015 and I have held several positions within the secretariat. I see that there is an evolution that before tourism was not even mentioned in the government plan or in the mayor's message to the city council. So, in other years we already saw this placement, and it is important we take the speech to practice (Counselor 08).

It is understood that the transformation of traditional destinations into STDs involves several factors. It can be a lengthy and complex process for management and the actors involved in the activity, crossing different paths, facing some barriers and finding some opportunities. Gretzel (2022) recognizes that developing smart destination requires a paradigm shift, as it challenges current forms of management and requires significant changes in governance practices. It should be noted that the CMP considers the concept of smart cities from the perspective that it uses technological resources (data and internet of things) to improve the quality of life of its residents, and to optimize management with the use of available resources and services, developing solutions in a creative and sustainable way.

Regarding the initiatives that the destination Natal develops aiming to become a STD, one of the interviewees mentioned that since 2015 Natal began negotiations with the Ministry of Tourism (MTur) for the development of STD initiatives. When carrying out the search for information about this destination request with the MTur, it was not possible to identify such action. However, the city of Natal joined the Brazilian Network of Smart and Human Cities, in partnership with the Metropole Digital Institute of the Federal University of Rio Grande do Norte through the Technical Cooperation Agreement "Natal, Smart and Human City," to subsidize the actions of the municipality aiming to raise the degree of smartness of the city.

Therefore, the actions that destination is developing are in line with what the STD development models recommend. It is important to point out that the action strategies must be in line with the governance strategies, as raising the degree of smart destination is a process that must be planned and not an overnight transformation (Ivars-Baidal et al., 2016).

From the perception of the members of the City Tourism Council, together with the data contained in the minutes of meetings and in the CMP of Natal, it is possible to perceive that despite pointing out initiatives that encourage participatory and integrated management, there are still barriers for the development of a consolidated model of governance, as guided by the STD model. Thus, it is suggested that, as stated in the CMP, a strategic plan be drawn up with objectives and actions to achieve this, aiming at an innovation environment based on data integration and that allows access to all.

4.1.2 Sustainability

The CMP covers issues of sustainability since it treats the document as a basic instrument of the municipality's sustainable urban development policy. In its 2nd article, sustainable development is pointed out as a principle that underlies the plan, as well as the promotion of the Sustainable Development Goals and the New World Urban Agenda.

Chapter II of the document deals with the Sustainable Socioeconomic Development of the municipality, and Art. 5 lists 15 guidelines of the Sustainable Socioeconomic Development Policy, which are in line with what is perceived in the STD development models, because they deal with development in its tripod: economic, social, and environmental.

In this sense, when contemplating the sustainability guidelines in the CMP, encompassing economic, social, and environmental factors, it indicates a development effort focused on current global agendas, in addition to what advocates the development models of smart destinations. Regarding the urban problems associated with tourist activity, there was a consensus among the councilors' opinions represented in Figure 2 by means of a cloud of words containing the main urban problems pointed out by the councilors.

Fig. 2. Word cloud of urban problems associated with tourism.

Among the problems pointed out by the interviewees, it was considered important to present opinions divided into themes, namely: infrastructure, mobility, accessibility, security, and professional qualification. For example, regarding problems related to infrastructure:

The issue of infrastructure and public lighting is still a challenge. (Counselor 02).

The fattening project is a service that will certainly bring improvements, because we would have a larger margin. So, we must conduct some different actions, promote sports and other things. Today, due to the very short tide range, we don't have it, but we need it, like better lighting, paving, hygiene, garbage management, traffic management. (Counselor 02).

The problems mentioned range from public lighting to access to the beach, through the footpath, etc. Besides the little space on the sand strip that limits access to the beach and causes problems with the footpath is collapsing. Figure 3 presents a photo, which shows access to the beach at high tide.

Fig. 3. Access to Ponta Negra beach at high tide in 2012.

As mentioned by the Councilors, the rockfill and fattening projects are identified as possible solutions to infrastructure and accessibility problems in Ponta Negra, the destination's main beach. The rockfill project aims to build a wall of precast concrete blocks in a two-kilometer strip. For protection against erosive effects caused by water flows. Another point mentioned was mobility, as can be seen in the following interviewee comments:

The issue of transportation, connections are horrible, schedules of our stops are bad. (Counselor 05).

Paving the streets of Ponta Negra is a serious matter. It's not just paving, it's a question of the traffic itself in Ponta Negra, which is blocked. Ponta Negra is at a peak hour from 8 am to 10 am, and now towards the end of the afternoon, it stops. (Counselor 11).

When analyzing the talking of the City Tourism Council, it was possible to verify that the works of rockfill and fattening of Ponta Negra beach are always discussed in the meetings, as can be found in minutes XXV, XXVII and XXVIII, which the researcher had access to. Urban mobility is also a topic that has been constantly debated, and the XXVII Meeting of the Natal Tourism Council had urban mobility as the main agenda.

Continuing to identify the urban problems pointed out in the interviews, Councilors 01 and 09 point to obstacles about accessibility, as per the comments below:

One of the biggest is inclusion, accessibility. I work a lot with clients with special needs [...] most hotels, restaurants, in short, tourist equipment and monuments are not prepared to receive tourists who have this need. (Counselor 01).

As in any larger city, I think the question of access, accessibility, public safety. I think maintenance and control of the attractions, especially those that have a certain fragility. (Counselor 09).

Accessibility is one of the principles underlying CMP. Article 2 brings in items III and IX the principles of Accessibility, Equity and Social and Territorial Inclusion, and Accessibility as a Social Function, respectively. The Plan provides for the guarantee of accessibility for all citizens and establishes the use of urban and environmental instruments as a guideline to achieve these objectives, which respect the accessibility regulations and accompany the dynamics of the city.

It is noticed that the destination Natal has few actions aimed at accessibility, inclusion, and sustainability. It is important to emphasize that, as supported by Neiva et al. (2021), sustainability is not seen only as the conservation of natural resources, but encompasses factors such as the economic and social vision, in addition to accessibility, which is not limited to ease of physical access, but also digital access, with the availability destination information. Therefore, establishing a sustainable and smart tourism platform is an opportunity for destinations to be more competitive (Shafiee et al., 2019).

4.1.3 Innovation

In terms of Innovation, the counselors point to the Place Branding initiative as a highlight that the Natal destination is developing.

They did place branding work, but anyway, I won't call it innovative, but let's say it's a recent work that I found interesting, educational work I see a lot. Anyway, but I'll tell you, it is a very complex destination, and innovative. There is work, as I told you, there is the Orla project, but I don't know to what extent it is innovative (Counselor 04).

The concept of *place branding* can be defined as marketing that values the characteristics of a given location, and it is seen as a process of enhancing the identity of a place, according to the particularities of the region. Thus, when developing the Place Branding of Natal, the destination seeks to consolidate the identity of the place to be used as a marketing strategy for the destination, aiming to boost the identity of the city and the destination. Another innovation factor mentioned was the interest in transforming Natal in smart tourism destination.

At the moment, I can only recall the city's interest in participating in the selection of the public notice of the Inter-American Development Bank with the Brazilian Support Service for Micro and Small Companies (Sebrae) for the transformation of the destination into a Smart Tourism Destination through the consultancy and support that will be given (Counselor 09).

By consulting CMP, it was possible to identify elements present in the regulatory framework that refer to actions aimed at generating innovation for the city. With an innovation bias to the City Hall added Natal to the National Digital Government Network, which now offers digital public services and simplifies service to users of these services.

For Cavalheiro et al. (2020), the overall objective of a STD is the development of an integrated and cooperative tourist information platform, which supports the entire tourist experience and all phases of the business, thus generating innovation and competitiveness for the destination.

4.2 Instrumental Level

4.2.1 Information System

It was possible to identify elements of information systems present in the CMP, as shown in Table 2.

Table 2. Elements of the Information System mentioned in the Master Plan of Natal.

Information System
TITLE III - URBAN AND ENVIRONMENTAL SYSTEMS **CHAPTER VI - THE URBAN AND ENVIRONMENTAL INFORMATION SYSTEM** **Art. 227.** The electronic planning system should be integrated among all Municipal Departments and allow for transparency with the city's reading data, becoming an essential planning tool.

Also, it was identified the use of management tools with the support of information systems to improve planning, transparency and the unification and integration of data. As Borges-Tiago et al. (2022) mention, technology is a basic infrastructure that supports the creation of value for smart destinations.

The perception of the City Tourism Council members regarding the importance of information and communication technologies for the development of the tourist destination, can be seen in the following interviewee comments:

I believe it helps with security, with management, transportation, and regarding information, the government, in that sense, comes out with a tool that is obviously worked with us, which is Sírio. So, I can work on

inferential statistics, advanced algorithms, search for a profile, but it is from the government (Counselor 04).
We have a connected world, a generation that increasingly has access to new technologies. We must adapt to it and be increasingly technological. So, I consider it of paramount importance that the destination bet on technology (Counselor 03).

There was unanimous opinion on the importance of ICTs for the planning and development of the destination, as well as for raising its level of smart. The board members were asked about initiatives aimed at promoting actions that focus on seeking information about the destination, open data, or big data actions to support management. The following interviewee comments is about the Sírio system:

We have Sírio system, despite not being exactly from Natal, but the destination benefits, not least because it is the capital and main gateway for tourism in Rio Grande do Norte. We have the tourism observatory, but it is not an initiative of the destination either, but that gets from this source (Counselor 05).

Ten out of 12 interviewees did mention Sírio as an information systems initiative. The Sírio - Rio Grande do Norte Tourist Smart System (Figure 4) is a public platform with data related to local tourism, the result of a partnership between the Fecomércio-RN System, Senac-RN, and the State Government.

Fig. 4. Sírio – Rio Grande do Norte Tourist Smart System

The information in Sírio is made available through interactive dashboards with an interface with its own panels and reports (EMPROTUR, 2022). Based on the definitions and guidelines on information management systems and technologies of the STD development models proposed by INVAT.TUR and SEGITTUR, Sírio is a prominent action for the Rio Grande do Norte state in the consolidation of the destination as STD (Albuquerque et al., 2022). Sírio's data are important for the management of the destination and the actors involved in the tourist chain, since it makes it possible, from the extraction and analysis of the data, to understand the profile of the visitor to the state in order to assist in decision making (Albuquerque et al., 2022).

As stated in the CMP, encouraging information system initiatives that integrate and are transparent, involving the participation of different actors, is a fundamental principle for the development of the city., Councilor 03 mentioned the application of information systems aimed at the demands of the Natal population:

Natal has a project called "Natal Digital," but I don't have enough information to comment (Counselor 03).

The "Natal Digital" app (Figure 5) is in operation since February 2020, and aims to improve and expand communication between the city public administration and the population of Natal.
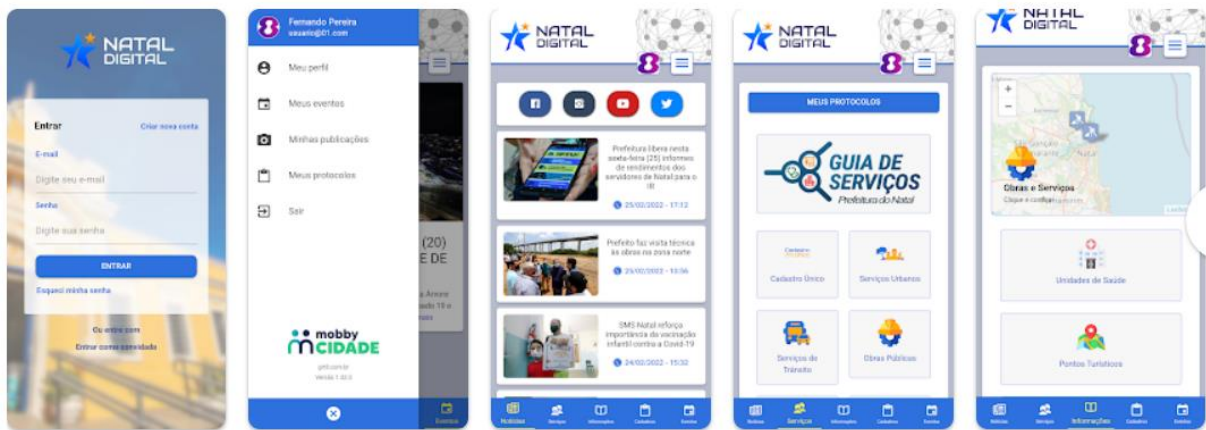
Fig. 5. Natal Digital App.

According to the City Council of Natal, in July 2022 the Natal Digital app reached the milestone of 100,000 downloads, which demonstrates that the user public has been approving this way of accessing the services offered by the City Hall. The initiative of the application aimed at the population is salutary because it allows access to information and services for free, online and at any time, being used by tourists to obtain information about the destination, and relevant information to the use of public transport. Hence, initiatives such as Sírio system and the Natal Digital App encourage smarter management.

4.2.2 Connectivity and Sensoring

Cavalheiro et al. (2020) argue that smart tourism applications allow tourists to collaborate in the co-creation of their own experiences, and offer the destination the possibility of tracking behavior, decision support, automated control, and optimized consumption of resources. The interviewees considered it important for the destination to have an application that makes it possible to boost tourist activity, and a source of information for tourists:

With the globalized world, every day we need more technological tools that can promote our tourism. I think it's important for the destination to invest in an application, but it needs to be constantly updated, since information is the basis for using such technological solutions. (Counselor 03).

With so many possibilities that we have today on the internet and Google itself that you can collect all the information without having to download an application, I believe that destination can have an application if it is constantly updated and receives feedback from users, so that can always be improved. (Counselor 04).

In this scenario, the counselors were asked about the knowledge of any application that the destination has developed aimed at boosting tourist activity and is a source of information for visitors. Figure 6 shows the screens of the Play Natal app, mentioned by counselor 02, where it is possible to observe on the left screen the scenery that portrays Morro do Careca, Natal's postcard, and on the right screen the one that portrays the Forte dos Reis Magos, another important historical tourist spot in Natal.
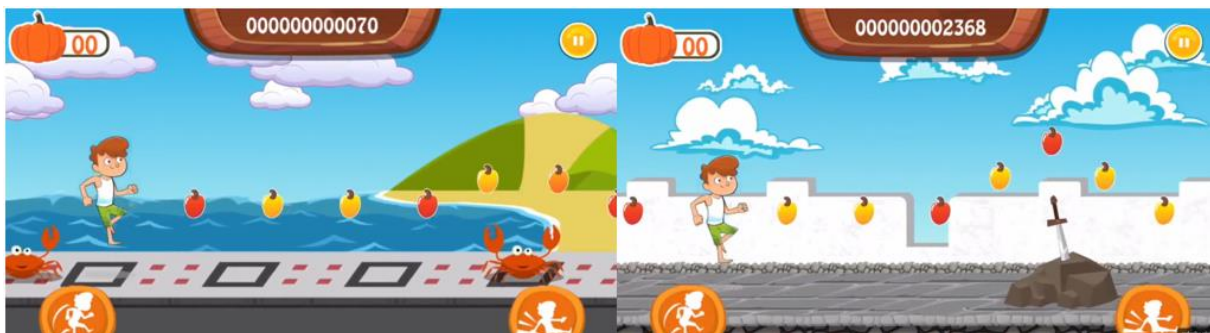

Fig. 6. Play Natal app.

According to Blog Brechando (2017), the Play Natal app, developed by BTB Mobile, was the first game aimed at tourism in Brazil. It was a mobile game available for Android and IOS systems and focused on promoting tourism in the city of Natal. However, as mentioned by advisor 10, the application is no longer available. Another app mentioned was V*isit Natal* (Figure 7). It worked without the need for mobile internet, was bilingual (Portuguese and English) and was available for Android and iOS systems. The application had information about the city's sights, hotels, bus lines, bar and restaurant options and other information about the municipality, aiming to help tourists and citizens to enhance the user experience (Portal G1, 2017), but the app is no longer available.

Fig. 7. Visit Natal app.

The website (Figure 8) and Instagram of the municipality's Department of Tourism (Figure 10) also were mentioned as sources of consultation and availability of information on the Natal destination.
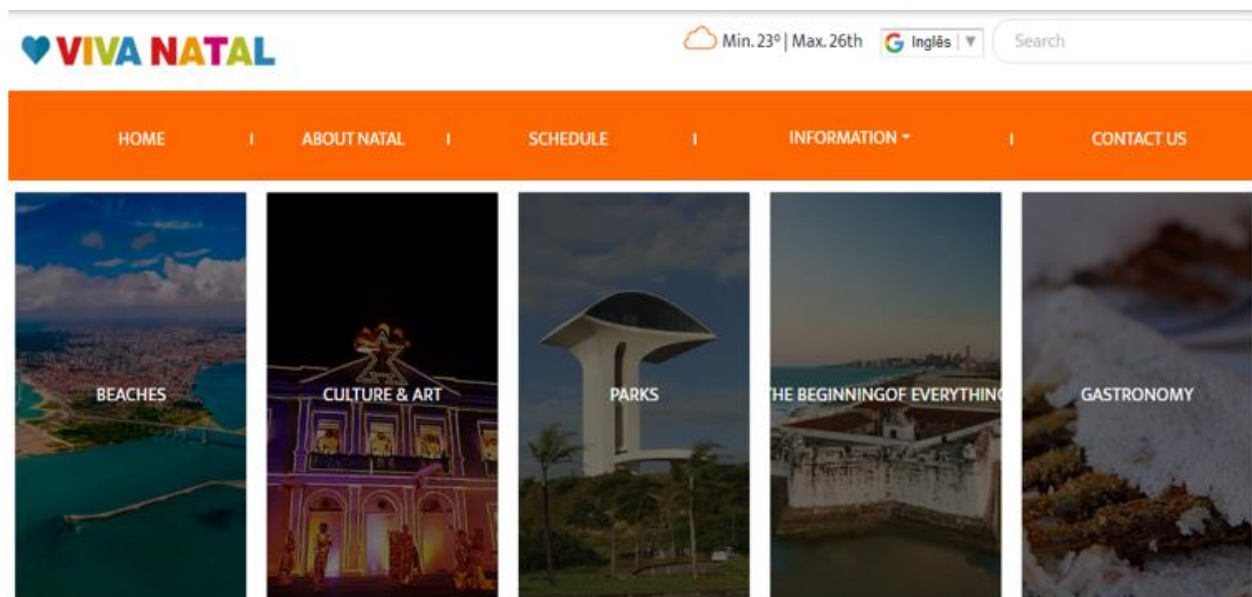

Fig. 8. Website of the Secretary of Tourism of Natal

The website presents basic information about the destination, such as the city's history, what to do, where to eat, where to stay, and information about tourist attractions, such as beaches, culture and art, parks, and gastronomy.
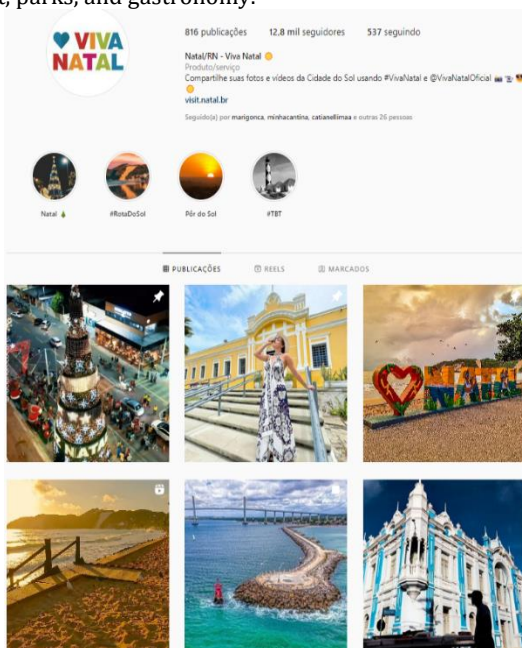

Fig. 9. Viva Natal Instagram.

Therefore, currently the destination does not have an application aimed at the tourist, as a source of data information about the destination - an important fact as advocated by the STD development models.

A STD must meet the necessary conditions to make the traveler confident even before his trip, that through access to applications and websites with information, comments, and shared evaluations. The traveler forms a more concrete expectation of what he can find on his trip, in order to feel more security of the information in the STD (Corrêa & Gosling, 2020).

4.3 Applied Level

4.3.1 Tourism Applications and Solutions

For Ivars-Baidal et al. (2016), ICTs have enabled new services and the reorganization of traditional forms of management in a socioeconomic context that enables greater efficiency in the management of public resources. Regarding the system initiatives for exchanging information and making public administration data available, the respondent 08 emphasize:

We have our website; the city hall has a portal with information about the city hall. And we have the system called Directa Natal, which is from the taxation

department, but which all departments access where there are the processes that we open, all in this system. And Natal has an application aimed at general services, called Natal Digital, where it is possible to file demands with the city hall and has some information, including tourist attractions. (Counselor 08).

The Directa Portal (Figure 10) and the app (Figure 11) have full support for the fundamental functionalities of processing electronic processes, with the possibility of attaching and downloading files, registering science, consulting Property and Urban Land Tax, carrying out debt negotiation, issuance of bank slips, requests for licenses, visualization, and monitoring of processes from various City Hall agencies that are integrated into the portal. This is used by the public administration for various requests between the secretariats.
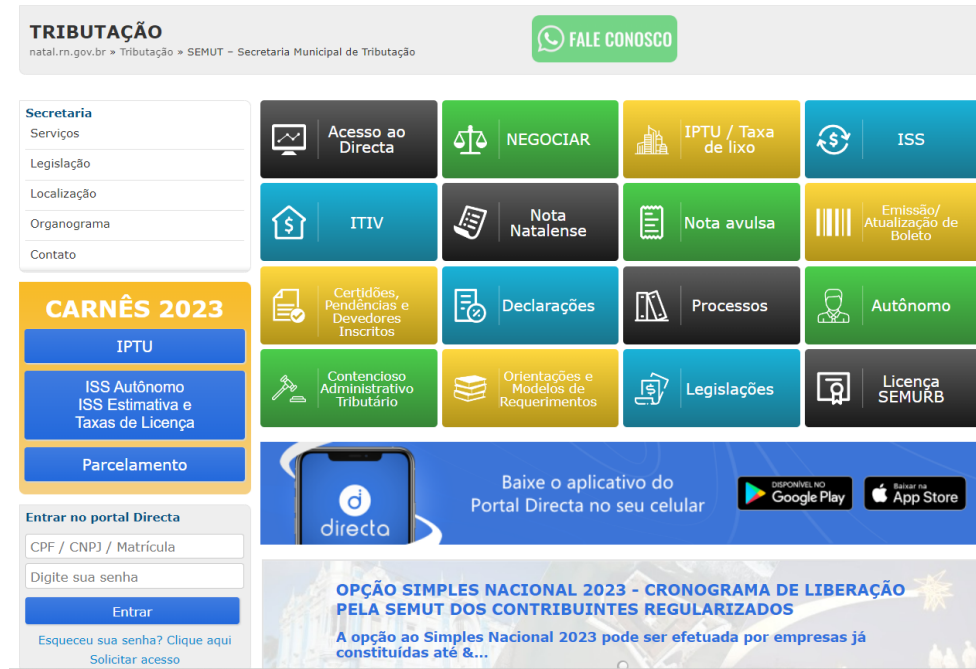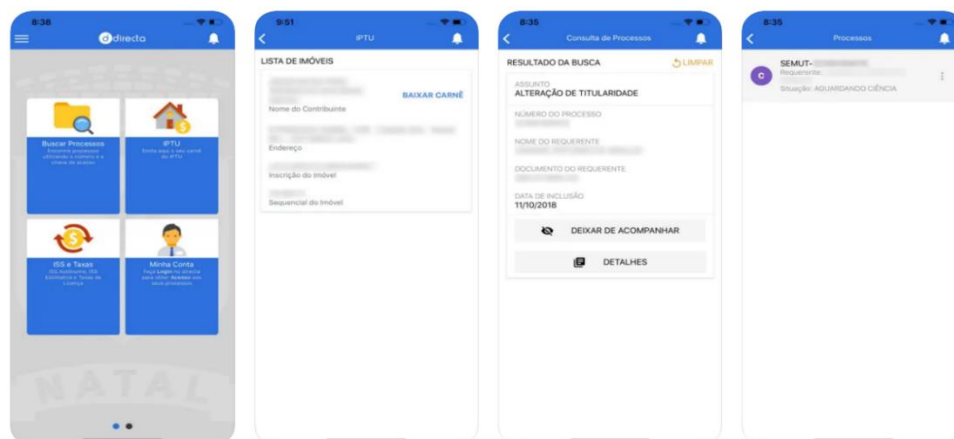

Fig. 10. Directa Portal.

Fig. 11. App Directa Natal.

Councilor 07 pointed out that initiatives such as the Directa Portal make it possible to contribute to public services, as well as integrating tourist information, mainly to understand the income and foreign exchange generated by tourist activity, but it is still possible to encounter resistance in its use.

The systems can contribute to this, but it would need to be more integrated, better communication between all the actors working with tourism. (Counselor 07).

The CMP foresees planning systems that are integrated between the secretariats. The Directa Portal initiative, despite not being exclusively aimed at tourism, has characteristics of a data integration system, since it operates with several secretariats.

Brandão et al. (2016) argue that the incorporation of mobile technologies, such as sensors, labels, codes, and systems to the tourism destination has the potential to enrich the tourist experience of visitors and improve the competitiveness of the destination. From this point of view, we sought to understand how interviewees perceive the importance of ICTs for the development of new products, services, and promotion of tourist experiences.

Technology in tourism brings new possibilities. It enables the tourist to visit the place even before the physical visit, in addition to the practicality of experiencing the experiences at the destination, through technologies such as QR Code, augmented reality, virtual reality, which can enhance the experience of the tourist at destination. (Counselor 05).

Councilor 07 pointed out the initiative from the tourism office to disseminate and promote the tourist experience through new technologies (Figure 12):

I think technology is very important, as it adds a lot. For example, we have augmented reality technology with Camara Cascudo and some characters from World War II, when we take it to events, it is very successful. This playful issue of technology is very important, and the tourist likes it. We have QR Code in some parts of the city as historic

buildings, and we are in the implementation phase in other parts of the city. We have implemented five places with QR Code, where there is text and audio that will also be accessible in Braille. (Counselor 07).
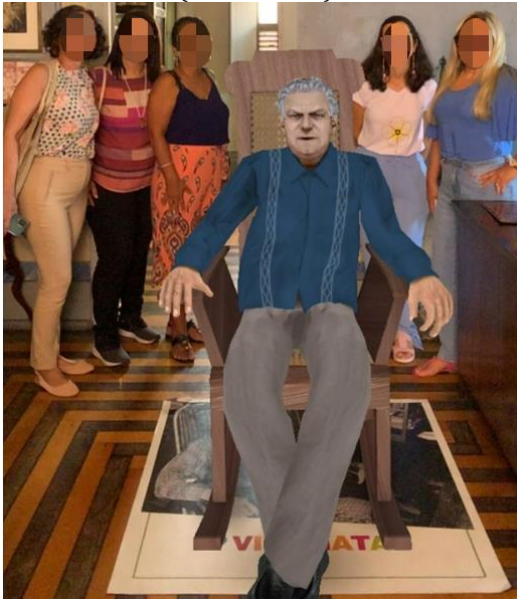

Fig. 12. Cascudo in Augmented Reality.

Luis da Câmara Cascudo was a historian considered one of the greatest Brazilian folklorists. Since 2022, when visiting the Câmara Cascudo Institute, place that operates in the residence where Cascudo lived for much of his life, it is possible to experience an Augmented Reality experience developed by @mobbyapps, which makes it possible to take photos with Cascudo in your own home. The initiative works through the institute's Instagram Stories filter (Ludovicus, 2023). The Secretary of Tourism of Natal partnered with the Institute to take the initiative to events and fairs aimed at promoting the destination.

5. Conclusion

With regard to the documental analysis, it was possible to identify that the City Master Plan of Natal encompasses STD elements present in the three levels of the theoretical model proposed by Ivars-Baidal et al. (2016). At the Strategic-Relational Level, which encompasses the dimensions of governance, sustainability, and innovation, it was possible to perceive that the regulatory framework of Natal presents important guidelines, such as the creation of a democratic, transparent, and participatory planning system, ensuring the participation of the population, public power and organized civil society. The results of the content analysis of the interviews show that the destination Natal faces some difficulties in the sustainability dimension, mainly about the axes of accessibility, urban mobility, infrastructure, and security, which reflects the need for efforts to improve this dimension. However, despite presenting difficulties in the axes, such topics are frequently discussed at board meetings, mainly being raised by representative entities of the segment that supervise and demand initiatives from the public authorities.

At the Instrumental Level, which comprises the dimensions of information systems and the dimension of connectivity and sensoring, the CMP has guidelines that cover the data integration platform axis, since it requires the city to have an electronic planning system that be integrated among all the City Secretariats and allow transparency with the city's reading data, becoming an essential planning tool. And with the interviews, initiatives were identified that comprise axes such as the Rio Grande do Norte Tourist Smart System (Sírio), as an important source of open data and information integration, because it is fed by several sources

and aims to generate smart information for decision making (Buhalis & Amaranggana, 2014).

Finally, the Applied Level, which concentrates the dimension of tourist applications and solutions and is focused on the concrete application of intelligent solutions developed by the other levels (Strategic-Relational and Instrumental). It was possible to perceive with the results of the interviews initiatives such as apps, smart systems, open and electronic administration, but they are not contemplated in the City Master Plan.

In this perspective, the main barriers faced in the Natal destination from the perspective of a STD are related to infrastructure, accessibility, security, connectivity and sensoring. As strong points, the role of governance that is active in the destination, and which already has knowledge of the methodology of smart destinations, as well as the role of the master plan, since it includes guidelines that aim to raise the level of smart city and therefore, the destination.

Thus, we can consider Natal as a hub of technological innovation in the state of Rio Grande do Norte and in the Brazilian northeast, as it fosters initiatives and management systems, such as the case of Sírio, which enable effective management and corroborates the principles of smart destinations. However, when evaluating other axes inherent to a smart destination, the city still faces some problems, mainly linked to governance aspects, such as low investment and stakeholder involvement, as well as urban problems.

As a theoretical contribution of the study, the update of the literature on the theme of smart tourism destinations stands out since the review of the main models of development and evaluation of STD is carried out. This research is a starting point to destinations willing to implement a smart tourism initiative, learning from mistakes and successes from the case study carried out in the destination Natal. As a practical contribution, it is expected that the study can contribute to the destination to understand its weaknesses, and from then on, it can establish goals and actions for the development of the dimensions and axis identified as deficient, serving the present study as a guiding document for such decisions, not only for the tourism board, but all managers and actors in the tourism chain.

Among the limitations found in the research, the focus only on the members of the Natal City Tourism Council stands out. As a recommendation for future studies, it is suggested to expand the participants to capture the perception of other managers, especially including state and federal managers. Another suggestion is to carry out studies of a quantitative nature for comparison purposes with the qualitative results of this study. In the same way that it is recommended to explore specific themes in relation to models for the development and evaluation of smart destinations, being analyzed by thematic axes of the pillars that form a STD.

Considering that the tourism sector has been undergoing continuous transformations, mainly after the COVID-19 pandemic, and to keep up with technological advances and the emergence of new devices and means of communication, as well as the change in the consumer profile, it becomes increasingly necessary for destinations to invest in initiatives that support sustainable, creative, and innovative development to achieve competitiveness, especially in the use of technologies to solve urban problems with greater efficiency, favoring the quality of life of residents and as a chain, tourism also benefits, since the experience lived by tourists becomes more complete and enriching.

Declaration of competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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References

Albuquerque, T. V., Soares, R., & Mendes Filho, L. (2022). Turismo e Big Data: Um olhar para o Sírio à luz das Teorias de Destinos Turísticos Inteligente. *Revista Rosa dos Ventos, 14*(3), 866-891.

Blog Brechando. (2017). Primeiro Game voltado para turismo no Brasil, usando Natal como cenário, é lançado. Retrieved from https://brechando.com/2017/03/13/primeiro-game-voltado-para-turismo-no-brasil-usando-natal-como-cenario-e-lancado/

Borges-Tiago, T., Veríssimo, J., & Tiago, F. (2022). Smart tourism: A scientometric review (2008-2020). *European Journal of Tourism Research, 30*, 3006-3006.

Brandão, M., Joia, L. A., & Teles, A. (2016). Destino turístico inteligente: um caminho para transformação. *Anais do Seminário da ANPTUR.* Retrieved from https://www.anptur.org.br/anais/anais/files/13/451.pdf

Buhalis, D. (2020). Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article. *Tourism Review, 75*(1), 267-272.

Buhalis, D., & Amaranggana, A. (2014). Smart tourism destinations enhancing tourism experience through personalisation of services. In *Information and communication technologies in tourism 2015* (pp. 377-389). Cham: Springer.

Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research. *Tourism Management, 29*(4), 609-623.

Brazil Lab. (2020). Ranking connected smart cities 2020 aponta São Paulo como a cidade mais inteligente do País. Retrieved from https://brazillab.org.br/noticias/ranking-connected-smart-cities-2020-aponta-sao-paulo-como-a-cidade-mais-inteligente-do-pais#

Cavalheiro, M. B., Joia, L. A., & Cavalheiro, G. M. d. C. (2020). Towards a smart tourism destination development model: Promoting environmental, economic, socio-cultural and political values. *Tourism Planning & Development, 17*(3), 237-259.

Colabora. (2022). Brasil tem 85% da sua população vivendo em grandes centros urbanos. Colabora. Retrieved from https://projetocolabora.com.br/ods11/brasil-tem-85-da-sua-populacao-vivendo-em-grandes-centros-urbanos/

Corrêa, S. C. H., & Gosling, M. (2020). Destinos turísticos inteligentes na avaliação de pesquisadores e de profissionais do turismo nos setores público e privado. *Revista Hospitalidade, 17*(2).

Empresa Potiguar de Promoção Turística - EMPROTUR. (2022). Natal está em 3º lugar como destino mais procurado para as férias de verão. Retrieved from https://emprotur.setur.rn.gov.br/.pages/noticias/noticias-emprotur.php?idex=300

Femenia-Serra, F., & Ivars-Baidal, J. A. (2021). Do smart tourism destinations really work? The case of Benidorm. *Asia Pacific Journal of Tourism Research, 26*(4), 365-384.

Femenia-Serra, F., Perles-Ribes, J. F., & Ivars-Baidal, J.A. (2019). Smart destinations and tech-savvy millennial tourists: hype versus reality, *Tourism Review, 74*(1), 63-81.

Gretzel, U. (2022). The Smart DMO: A new step in the digital transformation of destination management organizations. *European Journal of Tourism Research, 30*, 3002-3002.

Gretzel, U., Ham, J., & Koo, C. (2018). Creating the City Destination of the Future: The Case of Smart Seoul. In: Wang, Y., Shakeela, A., Kwek, A., Khoo-Lattimore, C. (eds) *Managing Asian destinations. Perspectives on Asian tourism*. Singapore: Springer. https://doi.org/10.1007/978-981-10-8426-3_12

Gretzel, U., Werthner, H., Koo, C., & Lamsfus, C. (2015a). Conceptual foundations for understanding smart tourism ecosystems. *Computers in Human Behavior, 50*, 558-563.

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015b). Smart tourism: Foundations and developments. *Electronic Markets, 25*(3), 179-88.

INVAT.TUR - Instituto Valenciano de Tecnologías Turísticas. (2015). Manual Operativo para la configuración de destinos turísticos inteligentes. Retrieved from https://www.thinktur.org/media/Manual-de-destinos-tur%C3%ADsticos-inteligentes.pdf

Ivars-Baidal, J., Celdrán-Bernabeu, M. A., Femenia-Serra, F., Perles-Ribes, J. F., & Giner-Sánchez, D. (2021). Measuring the progress of smart destinations: The use of indicators as a management tool. *Journal of Destination Marketing & Management, 19*, 100531.

Ivars-Baidal, J., Celdrán Bernabéu, M. A., & Femenia-Serra, F. (2017). Guía de implantación de destinos turísticos inteligentes de la comunitat Valenciana. *Agencia Valenciana de Turismo-Invat.tur.*

Ivars-Baidal, J., Solsona Monzonís, F. J., & Giner Sánchez, D. (2016). Gestión turística y tecnologías de la información y la comunicación (TIC): El nuevo enfoque de los destinos inteligentes. *Documents d'anàlisi geogràfica.*

Lee, P., Zach, F. J., & Chung, N. (2021). Progress in smart tourism 2010-2017: A systematic literature review. *Journal of Smart Tourism, 1*(1), 19-30.

Lima, D. S. d. M., Mendes Filho, L., Corrêa, C. H. W., & Mayer, V. F. (2021). Análise da cidade de Natal/RN como Destino Turístico Inteligente a partir do modelo INVAT. *TUR. Marketing & Tourism Review, 6*(1), 1-39.

López de Ávila, A., & García, S. (2015). Destinos turísticos inteligentes. Economía Industrial, 395, 61-69.

Ludovicus. (2023). Instituto Câmara Cascudo. Retrieved from https://www.cascudo.org.br/biblioteca/

Mehraliyev, F., Chan, I. C. C., Choi, Y., Koseoglu, M. A., & Law, R. (2020). A state-of-the-art review of smart tourism research. *Journal of Travel & Tourism Marketing, 37*(1), 78-91.

Mendes Filho, L., Mayer, V. F., & Correa, C. H. W. (2022). Dimensões que influenciam a percepção dos turistas sobre Destinos Turísticos Inteligentes. *Revista Brasileira de Pesquisa em Turismo, 16*, e-2332.

Monzoni, M., & Nicolletti, M. (2014). A cidade para os cidadãos: mobilidade, energia e agricultura urbana. *Caderno FGV projetos–Cidades Inteligentes e Mobilidade Urbana(24)*, 88-94.

Neiva, D. N., Costa, H. A., & Ruas, R. (2021). Destinos turísticos inteligentes (DTI): a visão de atores chaves do turismo em Brasília (DF, Brasil). *Revista Turismo & Desenvolvimento, 36*(1), 451-464.

Nunes, R. F., Medaglia, J., & Stadler, A. (2020). Destinos turísticos inteligentes e gestão do conhecimento: possíveis convergências. *AtoZ: novas práticas em informação e conhecimento, 9*(1), 61-73.

Otowicz, M. H., Macedo, M., & Biz, A. A. (2022). Dimensions of smart tourism and its levels: An integrative literature review. *Journal of Smart Tourism, 2*(1), 5-19.

Panrotas. (2021). Natal e Campos do Jordão estão entre os destinos em alta de 2021. Retrieved from https://www.panrotas.com.br/destinos/pesquisas-e-estatisticas/2021/01/natal-e-campos-do-jordao-estao-entre-os-destinos-em-alta-de-2021_179324.html

Park, S. (2021). Big data in smart tourism: A perspective article. *Journal of Smart Tourism, 1*(3), 3-5.

Pereira, L. D. C. (2021). A governança do turismo na região do extremo sul catarinense sob a ótica dos destinos turísticos inteligentes [Master's Dissertation]. Federal University of Santa Catarina.

Portal G1. (2017). Prefeitura de Natal lança aplicativo que facilita a vida de turistas. Retrieved from https://g1.globo.com/rn/rio-grande-do-norte/especial-publicitario/prefeitura-do-natal/natal-a-nossa-cidade/noticia/prefeitura-de-natal-lanca-aplicativo-que-facilita-a-vida-de-turistas.ghtml

Prefeitura do Natal. (2015). Prefeitura assina parceria com a UFRN no programa Natal Cidade Inteligente e Humana. Retrieved from https://www.natal.rn.gov.br/news/post/22475

Shafiee, S., Ghatari, A. R., Hasanzadeh, A., & Jahanyan, S. (2019). Developing a model for sustainable smart tourism destinations: A systematic review. *Tourism Management Perspectives, 31*, 287-300.

Sigala, M. (2018). New technologies in tourism: From multi-disciplinary to anti-disciplinary advances and trajectories. *Tourism Management Perspectives, 25*, 151-155.

Soares, J. C., Domareski Ruiz, T. C., & Ivars Baidal, J. A. (2022). Smart destinations: a new planning and management approach? *Current Issues in Tourism, 25*(17), 2717-2732.

Soares, J. C., Semião, V. M. R., Marques, S. F. L., & Conceição, R. B. (2017). A governança do turismo em um município do nordeste brasileiro: uma análise em base ao conceito de Destinos Turísticos Inteligentes. *Actas del Seminario Internacional Destinos Turísticos Inteligentes.*

Soares, R., Albuquerque, T. V. d., Mendes-Filho, L., & Alexandre, M. L. (2023). Revisão sistemática da produção científica brasileira sobre turismo e tecnologia da informação e comunicação (TIC). *Revista Brasileira de Pesquisa em Turismo, 16*, e-2629.

TripAdvisor. (2022). Travelers choice – 2022. Retrieved in: https://www.tripadvisor.com.br/TravelersChoice-Destinations

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