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Customer Knowledge Management in social media: application of the SMARTUR Framework for the proposition of smart solutions

La gestión del conocimiento del cliente en la red social: aplicación de la estructura smartur para la propuesta de soluciones inteligentes

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ABSTRACT

This research demonstrates the application of the Smart Management of the Tourist Experience (SMARTUR) framework in the intelligent management of tourist experiences shared on TripAdvisor, so as to propose smart solutions in the city of Florianópolis (Brazil). The study also presents the main results obtained from applying the framework and its contribution to an intelligent management of tourist experiences and consequently the improvement of these experiences through the creation of smart solutions for this purpose. In addition, the application demonstrates the need to remodel the way Destination Management Organizations manage the tourist destination and how SMARTUR can contribute to this. More specifically, as it reveals how tourism managers can plan, collect, process, and analyze tourist experiences through their specific dimensions and thus identify strategic points in each of these dimensions that guide DMOs in proposing smart solutions which are more in line with tourist demands.

Keywords: SMARTUR; social media; Customer Knowledge Management; Destination Management Organization; *TripAdvisor*.

RESUMEN

Esta investigación demuestra la aplicación del marco Smart Management of the Tourist Experience (SMARTUR) en la gestión inteligente de experiencias turísticas compartidas en TripAdvisor, para proponer soluciones inteligentes en la ciudad de Florianópolis (Brasil). O trabalho apresenta também os principais resultados obtidos com uma aplicação do framework e sua contribuição para uma gestão mais inteligente das experiências turísticas y consecuente melhoria destas experiências mediante criação de soluciones inteligentes voltadas para este fim. Además, la aplicación demostró la necesidad de remodelar la forma en que las Organizaciones de Gestión de Destinos gestionan el destino turístico y cómo

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SMARTUR puede contribuir a ello. Especialmente por detallar cómo los gestores de turismo pueden planificar, recopilar, tratar y analizar las experiencias turísticas a través de sus dimensiones específicas y así identificar puntos estratégicos en cada una de estas dimensiones que orienten a los gestores de turismo a proponer soluciones inteligentes más alineadas a las demandas turísticas.

Palabras clave: SMARTUR; Redes sociales; Gestión del conocimiento del cliente; Organización de gestión de destinos; TripAdvisor.

I. INTRODUCTION

Over the years, the tourism sector has been experiencing continuous changes brought by the evolution of Information and Communication Technologies (ICTs) (Ivars-Baidal et al., 2017). These ICTs have allowed tourists more access to diverse Data, Information and Knowledge (DICs) related to tourism products and services and sharing their experiences on social media (Taghizadeh et al., 2017).

One of the possible ways to get to know tourist experiences better is by analyzing what is shared on social media. Because they are more active and eager for information and knowledge, modern tourists seek on these media to know experiences lived by other people and this helps in their future travel decisions (Lončarić et al., 2017).

According to Ivars-Baidal et al., (2016), the use of these media, as well as those specific to tourism (*Booking.com, TripAdvisor, Trivago.com, E-dreams.com, Expedia.com, etc.*) was reinforced by the growing use of mobile devices (smartphones and tablets). And that has changed the way tourist experiences are created, consumed, and shared (Gretzel et al., 2015).

The experiences shared on social media are excellent predictors of future behaviors and a rich tourist knowledge to be used by the Destination Management Organizations (DMOs) to improve tourism products and services (Lončarić et al., 2017).

Molinillo et al. (2018) believe that DMOs must increasingly act on ICT-based strategies in a competitive global environment and with more sophisticated consumers (hyper-connected) with growing needs for greater efficiency on the part of tourist destinations and for greater customer satisfaction.

Ong and Ito (2019) highlight those platforms such as *TripAdvisor, Facebook* recommendations, and evaluations on booking sites have become benchmarks for evaluation by tourism consumers and this has impacted DMO marketing campaigns. Therefore, the premise is that the tourism experiences present in social media can be defined as consumer knowledge assets. And managing this knowledge is a challenge to DMOs, but with great potential to generate organizations' greater efficiency and effectiveness.

In this context, Customer Knowledge Management (CKM) has been increasingly recognized as a fundamental strategy for tourism services and a key issue to improve innovation in this sector (Del Vecchio et al., 2018b; Taghizadeh et al., 2017). However, research involving CKM in the tourism sector is still in its early stages (Khosravi et al., 2017), even though it has been a topic of growing interest in the literature over the past ten years (Gohary and Hamzeli, 2016), in which the joint analysis of CKM, Big Data, and social media has been highlighted (Usugami, 2017).

In convergence with this scenario, Muniz et al. (2021) developed the Smart Management of the Tourist Experience (SMARTUR) tool, structured through the dialogue between theoretical constructs of CKM, Tourist Experience, and Intelligent Tourist Destinations (STDs). SMARTUR presupposes the collaboration and cooperation between DMOs, and stakeholders of the destination (in the creation of smart solutions) based on the search, analysis, and evaluation of the tourists' experiences present on social media (Tourism Big Data). In this context, enriching and improving tourist experiences offered by tourist destinations is also one of the focuses of this framework, which also indirectly contributes to improving the quality of life of the residents at the destinations involved in this management.

In view of this, the article aims to demonstrate the application of the Smart Management of the Tourist Experience (SMARTUR) framework proposed by Muniz et al. (2021). Parallel to this, it also presents the main results obtained with this application of the framework and its effective contribution in the intelligent management of tourist experiences and in the creation of smart solutions aimed at improving those tourist experiences and promoting Smart Tourism Destinations.

For the application of SMARTUR, tourist's experiences shared on TripAdvisor were collected, processed, and analyzed, allowing for the creation of smart solutions in Florianópolis (Brazil) in order to improve future tourist experiences to be offered by the destination. The city of Florianópolis is the capital of the state of Santa Catarina, is in the southern region of Brazil, and is one of the tenth major tourist destinations in Brazil due to its attractions such as beaches, sunny days, culture, entertainment, and its ecosystem of innovation, being the headquarters of international events and a UNESCO City of Gastronomy, attracting both national and international tourists.

II. TOURIST EXPERIENCES AND SOCIAL MEDIA

For Figueredo et al. (2018) tourism has become a product based on the tourist experience, requiring managers to have a deeper and better understanding of what their tourists desire and want to experience. These tourists, in turn, become more and more actively involved in the stages of the life cycle of their experiences (before, during and after the trip) becoming experiential managers, co-creators of value and generator of a large volume of data, information and knowledge (Celdrán-Bernabeu et al., 2018; Boes et al., 2016; Ghaderi et al., 2018).

As they align with the Experience Economy, Mehmetoglu and Engen (2011) point out that analyzing/studying the tourist experience based on the four dimensions of the Consumer Experience (Aesthetics, Escapism, Education, Entertainment) proposed by Pine and Gilmore (1999), is a good starting point to better understand the tourist, get to know more closely their current and future demands and thus better align what is delivered to travelers by the destinations and their elements. In this sense, Quadri-Felitti and Fiore (2013) see these four dimensions as adequate for understanding the various tourist attractions, products and services associated with tourist destinations.

In addition to these, other studies employ these four dimensions, which have been accepted or adapted by researchers in different tourism contexts (Hosany and Witham, 2010; Mehmetoglu and Engen, 2011; Oh et al., 2007; Quadri-Felitti and Fiore, 2013; Aroeira, 2016). As a result, this research also adopts these dimensions for the analysis and understanding of the tourist experience in its case study. Thus, Table 1 provides a description of each of these

dimensions of the tourism experience. And section V.2 presents more details on the use of these dimensions in applying the framework.

Table 1. Dimensions of the Tourist Experience

Dimensions	Description	References
Entertainment	It is a passive absorption that requires tourist services to hold the attention of tourists. It occurs when tourists passively observe activities and performances (music, theater, presentations, shows, concerts, circuses) that provide fun and pleasure.	Kastenholz et al. (2017); Oh et al. (2007); Mehmetoglu and Engen (2011); Quadri-Felitti and Fiore (2013); Aroeira (2016); Pine and Gilmore (1999).
Escapism	It is an active immersion that involves tourists in what is happening and makes them escape (forget) from their reality. Here, tourists are motivated mainly by the opportunity to experience a character or identity different from their own and feel as if they are creating a place that transports them from their daily life (examples are mountain biking, rafting, casinos, participating in grape harvest, etc.). This dimension is considered fundamental in the experience, since escaping from reality and problems is one of the main pressure factors that lead tourists to travel.	
Education	It is an active absorption that occurs when tourists involve body and mind in the experience and this increases their skills and knowledge (general or specific) creating educational experiences in their mind and/or body (examples are participating in festivals, art galleries, skiing classes, diving classes, wine tasting, getting to know a destination's economic activities, etc.).	
Esthetics	It is an immersion with passive participation resulting from the interaction between environment and individual. The tourist is attracted by the environment and its elements and mainly wants to be in it and have contact with its elements (examples are museums, exuberant landscapes, natural beauty, art gallery, bird watching, etc.).	

Source: Muniz et al. (2021)

From Table 1, the tourist experience is built from the interaction of the tourists with the environment and that subjective aspects of these travelers and their current context influence their experiences and can generate different experiences for each tourist (Aroeira, 2016).

Hwang and Seo (2016) credit the tourism experience with a sequential nature, seeing it as an accumulated and dynamic process that includes tourists' expectations before, during and after the trip, which influence their intentions to revisit a destination or create new expectations for future travel. Given this, these authors understand it as a set of multiple stages, called pre-experience, during experience and post-experience.

In a holistic view of the experience and its production cycle, Su et al. (2016) highlight that in their consumption, tourists autonomously increase their knowledge by actively engaging their mind and body in the experience (Education) and by seeking to avoid their routine, they seek attractive destinations that contribute to Escapism.

Passively, by playing the roles of mere recipients, tourists do not affect what they are experiencing and attend to the Entertainment dimension or are influenced by what they see at the destination, therefore, Aesthetics (Su et al., 2016).

In general, Oh et al. (2007) point out that classifying experiences by dimensions should not be adopted as a strict rule, as the limits between them are amorphous. However, these authors highlight the uniqueness of each dimension and its way of generating experiences and

that, when analyzed in combination, they can produce memorable experiences and improve the practicality of management performed by the DMOs.

Still, regarding this interrelationship between dimensions and the existence of a fine line that separates them, Park et al. (2010) highlight that one of the biggest reasons to travel is to escape from everyday life and stress (Escapism). And this is only felt by the tourist because of the educational, fun, and aesthetic experiences he/she experiences at the destination. This makes Mehmetoglu and Engen (2011) reiterate that even one dimension being more emphasized, the experience in general will be composed of elements from all four dimensions, because when the tourist feels trapped in a destination or attraction, they realize that they have learned something and has the feeling of having fun, he envisions experiencing extraordinary experiences.

Thus, it is up to DMOs to offer experiences in their destinations that encompass all dimensions, even if some in greater intensity than others, since the elements of a destination can influence the dimensions that it most tends to offer. In this regard, Park et al. (2010) state that a single destination or attraction can engage in an experience rich in one dimension, but visitors can engage in experiences beyond this single dimension.

In fact, tourists seek attractive, unique, and memorable experiences in destinations and are influenced by their motivations, past experiences, experiences of other tourists, image of the destination and their expectations (Kastenholz et al., 2017). Thus, it is understood that these experiences are fundamental in understanding tourist behavior and directly impact their satisfaction, being crucial for DMOs and other commercial partners of destinations that seek to deliver personalized products/services such as tourist services (Nascimento et al., 2012). Therefore, collecting this type of customer knowledge to generate new knowledge and add value to the services offered is necessary to keep destinations and partners associated with them more competitive within the sector (Buhalis and Amaranggana, 2015).

In addition, each experience brings parallel information that can help in the management of destinations. Among them, travelers' needs, tourist services, infrastructure of the place and its attractions/sights, accommodation, food, local culture, mobility, health, safety etc. are mentioned (Reinhold et al., 2017).

The literature highlights that the experience can be collected from different sources and ways, such as through questionnaires, on-site interviews, or even online. Vila et al. (2021) cite the existence of three main online sources: the metasearch engines (e.g., *Trivago*), search engines (e.g., *Airbnb*), and social channels (e.g., *Facebook*, *Twitter*, *Instagram*).

A study by Zhang et al. (2020) describes how organizations can use social media as an alignment strategy between consumers and organizations in the process of co-creation (open innovation vision) and in the process of developing new products and services, generating greater value to the business, driven by the organizations' immersion in social media and the business-consumer and consumer-consumer interaction.

Among the media, one can mention *Facebook*, *YouTube*, *Instagram*, *Snapchat*, and *Twitter* as the main ones in the general context, and *TripAdvisor*, *Booking.com*, and *Trivago* in tourism (Fang et al., 2016). The use of *TripAdvisor* as a source of tourism experience is recurrent in research due to its vast collection and usability, as mentioned by Simeon et al. (2017), Kastenholz et al. (2017), Abubakar and Ilkan (2016), among others. According to Simeon et al. (2017), *TripAdvisor* is the largest and best-known media in world tourism, where

tourists share experiences and opinions about all the components of destinations (products, services, etc.). According to Abubakar and Ilkan (2016), every year millions of potential visitors consult what is shared on *TripAdvisor* by other travelers.

In this context, Del Chiappa and Baggio (2015) state that social media facilitate the explanation of tourist experiences, and this has been growing in recent years and makes Del Vecchio et al. (2018a) highlight the importance of *Big Data* in tourism. In accordance with this, Simeon et al. (2017) consider that social media are useful and rich sources of tourist experiences, especially *TripAdvisor*, a fact that justifies its use as a source of experience in this research.

III. CUSTOMER KNOWLEDGE MANAGEMENT

Knowledge has long been recognized as a major value generator for innovative companies, and client knowledge is seen as an important element for organizations competitive advantage and a key asset in this century's economy (Khosravi et al., 2017). Its importance grows as organizations recognize its potential to generate value and reveal consumer behaviors and requirements (Wu et al., 2013).

As for its conceptualization, the literature presents a variety of concepts, at certain times converging between some authors, this plurality being due to the fact that each study adopts its own analysis lens. In view of this, this research adopts the concept mentioned in Muniz et al. (2021) and extracted from Gebert et al. (2003). In this way, customer knowledge is seen as the dynamic combination of experience, value, scenario information, and necessary specialized knowledge, created and absorbed in the interaction between customers and organizations.

As for the categorization of customer knowledge, three classic types are found in the literature (*from, for, about*) and more recently there is still the knowledge "*with*" customer. Table 2 shows this categorization.

Table 2. Categorization of Customer Knowledge

Categorization	Concept	References
<i>Knowledge for Customer</i>	is knowledge about products, services, prices, suppliers, and distributors, which contributes to the customization of pre-purchase, purchase, and post-purchase transactions and allow customers to get to know organizations better	Gohary and Hamzeli, 2016
<i>Knowledge about Customer</i>	in addition to including basic information about customers (name, contacts, demographic data, etc.), reveals preferences of customers or groups of them, such as languages and methods of communication most used	Taghizadeh et al., 2017
<i>Knowledge with Customer</i>	refers to knowledge co-created with the customer through the bilateral relationship between organization and customer to generate value for both	Khoshavi et al., 2017; Taghizadeh et al., 2017
<i>Knowledge from Customer</i>	represents ideas, recommendations, preferences, trends, expectations, suggestions, and experiences with products and services consumed	Daneshgar and Parirokh, 2012; Taghizadeh et al., 2017

Source: Muniz et. al. (2021)

As a means of dealing with customer knowledge, CKM gained prominence in the early 21st century with Gebert et al. (2003), Gibbert et al. (2002), and Garcia-Murillo and Annabi

(2002). It has objectives such as developing companies focused on knowledge and its efficient management; create stable and long-term relationships with customers to make them active business partners (Attafar et al., 2013); and capture, share, transfer, and monitor customer knowledge to obtain organizational benefits (Chua and Banerjee, 2013).

As for its concept, the literature mentions that there is no single and universally accepted definition due to the various purposes for which each study or definition is intended. In view of this and based on an extensive review of the literature, we adopted the concept defined by Muniz et. al. (2021). These authors understand CKM as “*A continuous and bilateral process derived from Knowledge Management and Customer Relationship Management that consists of processes and activities for Acquisition (Capture, Collection, Creation), Storage (Conversion, Coding, Classification), Sharing (Dissemination, Distribution, Transfer), and Use (Utilization, Application, Implementation, Verification, Validation, Testing) of customer knowledge, categorized into “for”, “about”, “from”, and “with”, which aims to generate value, innovation, and other benefits for customers and organizations*”.

In addition, Del Vecchio et al. (2020) say that the process of acquisition, creation, dissemination, sharing, representation, storage, and use of customer knowledge is defined as CKM, which is therefore a merger between Knowledge Management (KM) and Customer Relationship Management (CRM).

IV. THE SMART MANAGEMENT OF THE TOURIST EXPERIENCE - SMARTUR

The use of CKM in tourism can be seen as a guide for destination managers to better manage the tourism experience (knowledge from customers) and promote the development of smart solutions, given that CKM's processes present convergence with the objectives pursued by destination managers such as the search for adding value to their products and services and benefits to all stakeholders involved.

In this sense, Muniz et al. (2020) structured a framework, called SMARTUR, through a joint and detailed analysis of literature involving customer knowledge management and tourism. In addition, the framework underwent a validation process with DMOs and researchers dealing with tourism. More details about the framework structuring and validation can be found in Muniz et al. (2020).

In general, SMARTUR has four dimensions and eight processes aimed at helping managers of tourist destinations to deal with tourists' knowledge (their experiences), especially those present on social media.

The first dimension, **Planning**, has a more strategic bias and its two processes (*Strategic Experience Planning* and *Experience Collection Planning*) are aimed at this purpose. Thus, these two processes prioritize the analysis of the destination, its elements, and sources of customer knowledge, as well as they seek to structure an Experience Protocol containing details of all the planning done and the actions to be developed in the following processes of the framework.

The second dimension, **Acquisition**, has a single very operational process (*Experience Collection*) that focuses especially on the collection and treatment of experiences in order to make them suitable for analysis by managers in the following processes.

The third dimension, **Intelligence**, contains two processes (*Analysis of Experiences* and *Design of Smart Solutions and Benchmarking*) that together foster new knowledge that helps to create smart solutions in the destinations. Both processes demonstrate that the union of ICTs with activities and tools aimed at creativity can improve the analysis of experiences and contribute to the generation of ideas and identification of opportunities through inference of new knowledge and smart solutions.

The combination of these processes is justified in the arguments of Thomaz et al. (2017) when mentioning that ICT and its tools are not able, by themselves, to automatically extract and create knowledge from a data set, being necessary the combination between these technologies and human analysis to improve the creation of new knowledge and smart solutions in tourism.

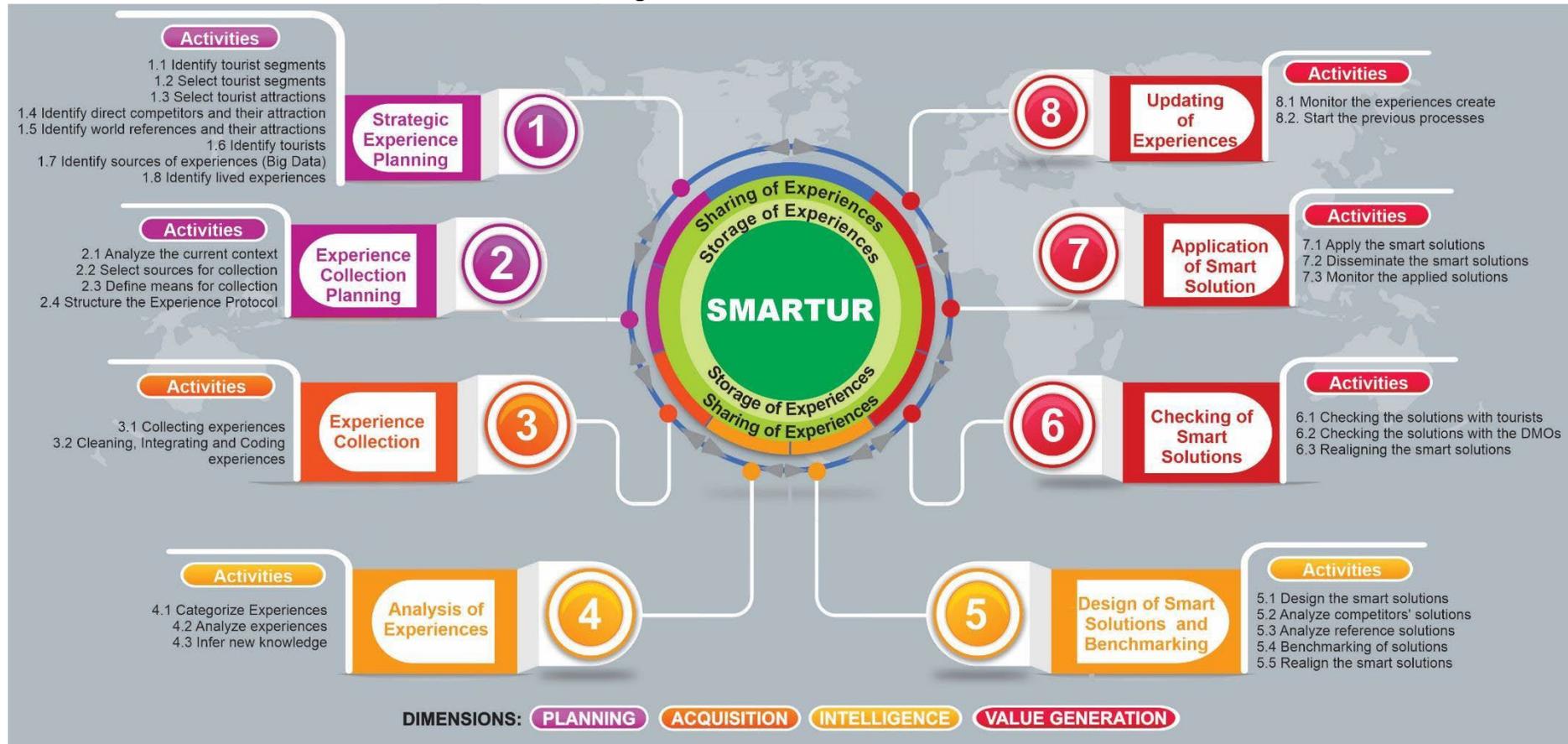
The **Value Generation** dimension represents the framework's goal of adding more value to the tourist services and products offered by pursuing to implement smart solutions proposed by applying its three processes (*Checking of Smart Solutions*, *Application of Smart Solutions*, and *Updating of Experiences*). The main idea here is to make the destination and its attractions more competitive as the solutions improve tourist products and services of the destinations, keeping their managers updated on the demands of their tourists.

This dimension encourages the co-creation of knowledge and experiences between tourists and managers while seeking to bring them together to check if the proposed solutions are valid and can generate benefits to stakeholders by verifying these solutions with tourists themselves, managers and with residents who live in the destination and its attractions. This converges well with the objectives of customer knowledge management by proving that the collection, analysis, and use of customer knowledge can generate improvements and innovations in the products and services delivered by the organizations and in their processes.

Similar findings are noticed in tourism when authors highlight that the use of *Big Data* and *Social Big Data* provide data, information, and knowledge from travelers, which contribute directly to the improvement of destinations and their attractions (Del Vecchio et al., 2018a; Del Vecchio et al., 2018b; Abubakar and Ilkan, 2016).

Figure 1 presents SMARTUR and its composition.

Figure 1 . SMARTUR Framework



Source: Muniz et al. (2021)

4.1. Methodological Procedures for Application of SMARTUR

The application of the framework took place in the city of Florianópolis through a dialogue between researchers and two DMOs of the destination, one from the Municipal Secretariat of Tourism, Technology, and Economic Development of Florianópolis and the other from the State Tourism Development Agency of Santa Catarina (SANTUR). The first DMO represented the City Superintendence of Tourism and the second the State Board of Studies and Innovation. At the time, they had respectively 22 and 18 years of experience and performance in the national tourism sector and especially in the state of Santa Catarina.

The application of the framework was carried out by implementing the first five SMARTUR processes shown in Figure 1. The first two processes executed in the application were “Strategic Experience Planning” and “Experience Collection Planning”. Both conducted through meetings with DMOs guided with question scripts defined in the framework.

Initially, a previous analysis was carried out on TripAdvisor about the main tourist attractions of the destination and the amount of shared experiences on the “Sun and Beach” tourist segment. Based on a survey carried out in December 2019 via TripAdvisor (open data), it was possible to collect 50,935 reports of tourist experiences on 37 beaches in Florianópolis, which culminated in the selection of the Barra da Lagoa attraction for analysis and management of the experiences, in addition to better knowing the destination, its attractions, main tourist segments, tourists, and their experiences, that is, to know the main characteristics of the destination and its elements.

For the execution of the second process, “*Experience Collection Planning*”, the researchers, together with the DMOs involved in the application, created the “*Experience Protocol*”. A guiding document that describes the result of the analysis carried out in the first process and the planning designed to collect the experiences so that all those involved know what the next steps will be executed. The Experience Protocol is being exposed in Table 3.

Table 3. Experience Protocol

Element under Analysis	Decision
Tourism Segment	Sun and Beach
Attraction	Barra da Lagoa Beach
Collection Method	Text Mining
Source of Experiences	<i>TripAdvisor</i>
Collection Period	From 11/25/2019 to 12/01/2019
Data, Information and Knowledge to be collected	Tourist Experiences Experience Date Tourist Origin Experience Evaluation
Languages of Experiences	Without restriction
Time Interval of Experiences	From January/2017 to November/2019

The authors

For the execution of the third process, “*Experience Collection*”, a set of techniques and methods from Knowledge Discovery in Databases (KDD) and Text Mining were applied, as explained below.

As an open data social media, *TripAdvisor* allows collecting data, information, and knowledge from its domain, especially knowledge “*about*” tourists (username, city, state, and country of origin, number of contributions on the media, etc.) and knowledge “*from*” tourists (lived experiences and their summary, dates of the experience and its sharing, evaluation of the experience, language, etc.).

The collection took place in December 2019, and shared experiences were extracted from January 2017 until that date to cover the last three summers of the destination and thus not create an analysis bias, based on only one year under analysis. All of them were translated into Portuguese aiming to create a common base of analysis. Natural Language Processing (NLP) techniques were also applied for pre-processing and cleaning (tokenization, removal of stopwords, and normalization), and Machine Learning techniques for integration and codification of the experiences.

To remove stopwords, grammars from the software itself were initially used, but complemented with a file containing a larger set of stopwords extracted from the libraries of Ranks NL (<https://www.ranks.nl/stopwords/portuguese>) and Tartarus (<http://snowball.tartarus.org/algorithms/portuguese/stop.txt>), as well as terms specific to the collected experiences.

In the fourth process, the “*Experience Analysis*” was carried out with the aid of the Orange Version 3.24 software as it contains an analysis interface block aimed at text mining. In this process, classification of texts was used, adopting as analysis classes each one of the four dimensions of the tourist experience (Aesthetics, Escapism, Education, and Entertainment). For each class, a set of initial training data was created by extracting elements, characteristics, and terms from the literature for each dimension of the experience.

To estimate the probability of classifying experiences into each of the four classes of the tourist experience (dimensions), the research tested four classifiers (logistic regression, neural networks, Bayesian networks, and the K-Nearest Neighbors (KNN) method) and the holdout strategy was also used. After training and testing, it was found that the classifier by neural networks obtained the greatest assertiveness among the methods, with precision and accuracy above 90%, thus it was selected for use in all the classification and analysis of those experiences.

In addition to the classification, thematic analysis was applied to identify latent themes and categories in the classified experiences, allowing a better analysis and proof of the feasibility of using the framework. Its use is justified by the fact that text mining techniques, by themselves, are not able to automatically extract knowledge from a set of data and, on top of its results, a human analysis is needed to improve this extraction (Thomaz et al., 2017).

In the fifth process, “*Design of Smart Solutions and Benchmarking*”, joint discussions were held with DMOs to check if the analyses performed in the previous processes contributed to the generation of smart solutions. These discussions took place through meetings guided by the framework's own roadmaps. In addition, the discussions and

answers obtained were recorded, but not transcribed *ipsis litteris*, instead they were short-handed and interpreted, and the main results of the application are exposed in the following section. From these discussions, a set of intelligent pre-solutions were identified for Barra da Lagoa, aiming to improve future tourist experiences as described.

V. MAIN RESULTS AND DISCUSSIONS

Barra da Lagoa is a beach with crystalline open sea waters that has vast natural beauty. In addition to its charms, it offers a variety of attractions such as diving places, hiking trails, natural pools, contact with maritime life, historical monuments, sports places, etc.

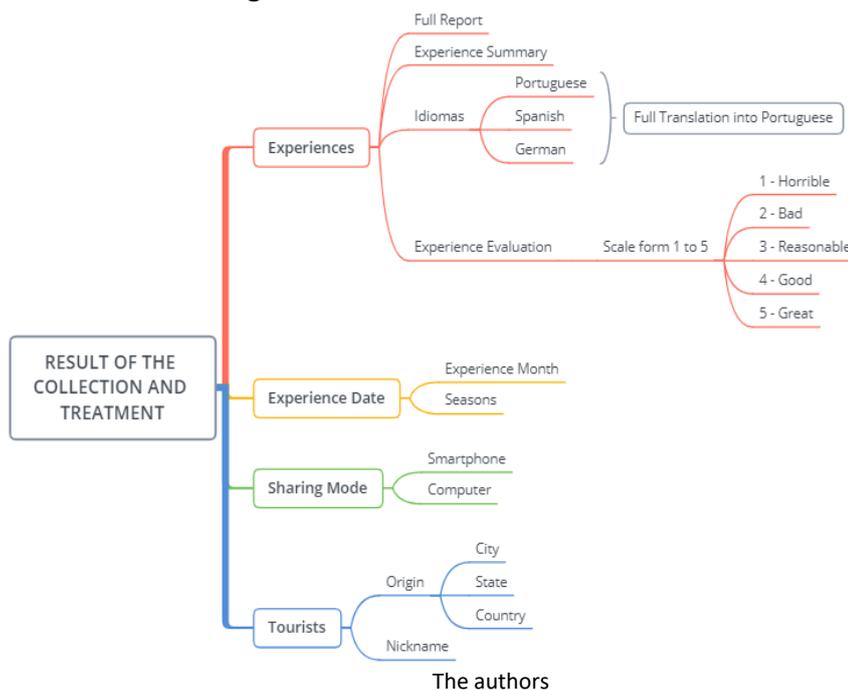
Besides that, it has a good infrastructure of bars, restaurants, and inns, and it houses the largest fishing colony on the island of Santa Catarina, which retains striking features of the Azorean culture.

It is noteworthy that the attraction was chosen because it best represents one of the main tourist segments of Florianópolis, the “Sun and Beach Tourism”. But it is currently one of the attractions with the greatest number of problems to be solved; however, the DMOs emphasize that it has a greater diversity of attractions for travelers, which further drives its attractiveness and demand.

As a coastal destination, Florianópolis has its high season in the summer months (December to March), usually extending to April. In view of this, researchers and DMOs chose to collect experiences shared about the summers of 2017, 2018, and 2019.

The third process (*Experience Collection*) was carried out throughout November 2019 and collected 646 experience reports, totaling 17,892 words distributed into four languages (mostly in Portuguese, followed by Spanish, English, and German). Figure 2 illustrates the main groups of DICs collected on *TripAdvisor*.

Figure 2. Result of the Collection and Treatment



For each group, the information was cross-checked and the joint analysis of all collected DICs was made, helping researchers and DMOs to better understand the profile and behavior of tourists and assisting in decision making.

5.1. Knowledge about tourists

As for the analysis of knowledge *about* tourists, it was found that 56.03% of them were Brazilian, 17.18% foreign, and the rest unidentified. Among international tourists, Argentinians had the highest representation (9.8%), followed by tourists from Europe and the USA.

Among domestic tourists, there was a predominance of those from the state of São Paulo, with 16% of experiences, followed by residents of Florianópolis, and tourists from the neighboring state of Rio Grande do Sul.

In view of this, it was defined that the knowledge *about* tourists will help DMOs in directing their advertising campaigns to promote Barra da Lagoa in the groups of tourists already known and to create demands to come from the regions not identified in the analysis, to mention the Northern, Central-Western, and Northeastern regions of the country.

Also, it was found that 51% of the experiences are shared on a computer and 49% of them on a smartphone. However, in the last two years (2018 and 2019) there has been an increase in the use of mobile devices when compared to 2017. This increase is justified by the fact that tourists are more connected to the internet using smartphones and tablets.

This result reinstates and converges with the literature, when it states that tourism is the sector that most experiences continuous changes over time (Del Vecchio et al., 2018b; Femenia-Terra et al., 2018; Celdrán-Bernabeu et al., 2018). The internet, mobile devices, social media, and Big Data are some of the main elements of ICTs responsible for these changes (Ivars-Baidal et al., 2017).

To reinforce this evidence, the research analyzed the average lead time (ALT) for sharing experiences (average time in days between experiencing and sharing the experience). From the analysis, it is noticed that the ALT has been decreasing over the years and the sharing of experiences occurring on the same day they are lived.

This result, although limited to the analysis of one tourist attraction of Sun and Beach in Florianopolis, converges with the arguments of Femenia-Serra and Neuhofer (2018) when they highlight that intelligent tourist experiences in destinations, smart or not, tend to be increasingly shared in real time due to the increased use of social media and available technologies. This further contributes to strengthening the co-creation of new experiences based on this open knowledge.

5.2. Knowledge from tourists

The analysis of experiences (knowledge *from* tourists) was developed based on their dimensions (Escapism, Education, Aesthetics, and Entertainment).

It was found that 52% of the tourists who shared their experiences pointed to the aesthetic dimension, 29.1% entertainment, 13.0% escapism, and 5.9% education as striking characteristics of the attraction. The greater concentration on Aesthetics is justified by the attraction to draw attention for its natural beauty and for the diversity of leisure and fun options, which reinforces Entertainment to occupy the second place.

To infer new knowledge in each of the dimensions, the researchers and DMOs made use of thematic analysis, which allowed the emergence and identification of the main groups of tourists' needs in Sun and Beach tourism. Because they represent the voice of the tourist, these groups of needs were here called tourists' requirements, in reference to the concept of customer requirement of ISO 9001:2015 (Associação Brasileira de Normas Técnicas, 2015), which defines them as declared needs or expectations, usually implicit or mandatory, and may thus represent the interests of customers who in some way may affect or be affected using a product or service.

Tables 4, 5, 6 and 7 present some of the main requirements obtained, with their respective identified positive and negative points. By bringing the experiences to a more technical and standardized language, this breakdown of experiences into requirements has helped DMOs and researchers in how to deal with them. And it allowed a better discussion of smart solutions to be added to Barra da Lagoa to improve the experiences offered, considering as smart solutions the ideas generated or opportunities identified, with greater or lesser degree of technology, which can improve the fundamental aspects of tourism management in traditional and smart destinations (Ivars-Baidal et al., 2017).

According to Ivars-Baidal et al. (2017), these solutions should benefit fundamental aspects of management, such as electronic government and administration; communication and marketing in tourism; quality of the destination, its accessibility, innovation, and smartness; sustainability; demanders' loyalty; development of products and services and creating new tourist experiences.

Table 4 addresses the seven main requirements identified in the aesthetic dimension. From the requirement "to have clean water", for example, it is noted that the color and cleanliness of the sea water enhances the aesthetic dimension, as tourists can contemplate not only the water, but all its surroundings (swimmers, marine life), making the image the most beautiful attraction in the memory of tourists. According to excerpts from the experiences "*the water is calm and excellent for swimming*"; "*The water is very green, crystal clear, and full of small fish*"; "*The water is delicious and very clear*".

Table 4. Aesthetics dimension requirements

Positive Points	Tourists' Requirement	Negative Points
Crystalline water.	To have clean water	Oil stains in the water. Swimmers' garbage.
Wide strip of sand.	To have a wide sand strip	Too many booths and kiosks on the sand reduce the width and beauty of the beach.
Good diversity of natural beauties.	To have views/landscapes (beautiful, exuberant, incredible)	
Great for families with children.	Be a quiet place to rest	Music is too loud. Crowded place.
Tamar Project ¹ Actions.	To be a place concerned with nature	Residents/tourists' garbage.
	To have parking places	Few free parking spaces. Abusive prices in paid parking spaces. Poor accessibility.
Number of garbage bins.	To be clean	Garbage on the beach. Lack of education and caring of residents and tourists about cleaning.

The authors

This can be an opportunity to boost Barra da Lagoa's attractiveness and invite managers to further explore these elements in their advertising campaigns. As for the negative points, oil stains and garbage from tourists in the water should be mentioned: although not much mentioned, these aspects deserve great attention because they have a great impact on the image and beauty of Barra da Lagoa and are an alert regarding the environmental preservation of the beach.

Table 5 shows that Barra da Lagoa meets the best of Entertainment dimension by bringing a broad range of recreational activities and having a fishing community that displays a rustic and attractive atmosphere to tourists. As with the requirement *"Having options for fun"*, the reports of the experiences highlight that *"here, fun is not lacking [...]"*; *"[...] I sharpened my spirit of adventure"*; *"There is a lot of fun here and I will always come back [...]"*; *"Complete structure for those who want to spend a day full of fun"*; *"Many possibilities according to the taste of each one"*.

As a negative point, there are few nightlife options, as many establishments close at dusk, forcing tourists to seek entertainment elsewhere in the city.

¹ A Brazilian Project for Conservation and Care of Sea Turtles

Table 5. Entertainment dimension requirements

Positive Points	Tourists' Requirement	Negative Points
Many options for different audiences (trails, natural pools, hiking, boat trips, surfing, diving, the Tamar Project, etc.).	To have options for fun	Few nightlives options.
Very good service in the establishments. Preservation of local habits and customs.	To be well served	Constant and insistent approach by the waiters. Too many street vendors.
	Should not be crowded	Constantly crowded. Loud noise and music. A lot of traffic; too many street vendors.
Diversity of recreational options.	To have fun options for children	
Characteristic architecture (fishermen's village, bridge, the Barra Lighthouse).	To have architectural beauties	
Diversity in the structure (inns, hotels, flats, restaurants, bars, local commerce).	To have a good structure for tourists	Accommodations with simple structures. Few parking places. Width of public roads.
The attraction has a strong fishing activity that brings a charm to the place.	To have leisure options associated with the local culture of the place	

The authors

A requirement that was not expected by the DMOs and very stressed by the experiences was that of "having fun options for children". Among the reports are: *"Good for children and adults [...]"; "[...] excellent structure for those who are going with family, and a variety of activities for children"; "[...] perfect family environment for me and my family"; "I went with my 3-year-old son and it was perfect [...] without great danger and concern for me"; "My kids loved it and can't wait to return"*.

These reports, associated with the presence of lifeguards on the beach, bring families peace of mind in being in the attraction with their children and a feeling of happiness to experience those moments, which makes the experiences memorable and super fun, converging directly with the Entertainment objectives.

The Education dimension of the tourist experience (Table 6) is characterized by the acquisition of new knowledge from the experience and the development of new personal skills (as in rural tourism, where travelers learn to milk cows, produce cheese, regional food, etc.).

Table 6. Education dimension requirements

Positive Points	Tourists' Requirement	Negative Points
Many learning options (local culture, cuisine, traditions, stories, etc.). The Tamar Project passes on knowledge about environmental preservation and marine life.	To learn new knowledge	
The diversity of activities invites tourists to improve their personal skills. The presence of many foreign tourists drives the learning of other languages, especially Spanish.	To improve my skills	

The authors

Its analysis revealed two main requirements, both with positive points, as tourists reported that the available recreational activities help in the acquisition of new knowledge, especially from the Tamar Project, which heals injured or sick turtles and returns them to the sea. In addition, it is reported that the presence of the fishing village and the possibility of interaction with its residents provides an exchange of knowledge with them.

From the reports that prove that, it is mentioned: *"Ask [...] to explain to you how the whole process of oyster cultivation is, it is fantastic"; "We were able to take surf lessons"; "We trained Spanish a lot with the 'hermanos'"; "The Tamar Project has great structure and knowledge for adults and children"; "[...] it is a beach that has the culture and the local people very present and accessible"; "[...] excellent opportunity to meet the real 'manezinhos' [how the island residents are called] of the island"; "Great for learning to surf and other water sports".*

And finally, the Escapism dimension (Table 7) seeks to get the tourist out of his daily life and travel through time, history, and culture and imagine being someone else at the destination. This dimension is stronger in experiences associated with museums, parks, and historical centers. However, this does not mean that several other attractions and destinations cannot offer it. In Barra da Lagoa, its natural and architectural elements contribute to this escape from reality.

Table 7. Escapism dimension requirements

Positive Points	Tourists' Requirement	Negative Points
Multiple attractions take the tourist out of their reality. Safety of the place. Cordiality, education and helpfulness of residents and establishments.	To escape from everyday life	Heavy traffic to reach the place. Many street vendors. Waiters' insistence.
Presence of the fishermen's village. A glimpse of a different lifestyle.	To escape from reality	Disorganization of the place. Lack of parking lots. Conditions of the public roads. Traffic jams.
Marine life and nature. Fishermen's village. Local stories and traditions. Residents' way of life.	To stop and travel through time	Overcrowding.

The authors

The analysis shows that Barra da Lagoa is an ideal place for the "escape from every day" requirement, by having several attractions for fun and relaxation with family or friends. The experiences mention *"[...] we could swim in the sea, in the river, to go fishing, kayaking, riding boats, and enjoy a beautiful sunset"; "The Tamar Project is something sensational, magical, and unforgettable, I recommend 100% to go there and travel in that world"*. As for the negative points, the experiences highlight the lack of parking places, overcrowding, difficulty in accessing the place, width and conservation of the roads, invasive approach by waiters and street vendors, among others.

5.3. Solutions

After analyzing the tourists' requirements and the pointed positive and negative points, it was possible to start a set of discussions to identify points where improvements (smart solutions) could be designed, as well as identify actions already implemented in the attraction and that were not having a positive effect on the experiences lived.

Table 8 summarizes the smart solutions created by researchers and DMOs' in order to improve the experiences on the Barra da Lagoa. It is important to note that Table 8 showed some of the smart solutions created but not all of them.

Table 8. Overview of Smart Solutions created

Tourist Experience's Dimension	Situation	Smart Solution
Aesthetic	To reduce overcrowding	To create an Action Plan to direct tourists in high season to other beaches in the destination, such as Jurerê Internacional, Canasvieiras and Ingleses.
	To improve travelers' comfort	To reintroduce mobile showers and implement in them new technologies like use of application by reading a QR Code
	Street vendors (vendors without permits)	To create partnerships with the State Military Police and the Municipal Guard of Florianópolis to plan joint actions that control these informal vendors
Entertainment	Family Tourism	To create more specific options for the family audience
	Prices practiced	To create detailed study to identify factors that influence these low prices and to replicate them in other attractions on the destination
	To have leisure options associated with the local culture	<p>To explore and develop cultural attractions of Barra da Lagoa and other attractions of the destination and the state of Santa Catarina as a whole</p> <p>To explore all the elements of the attraction, not just limiting the obvious (Sun and Beach segment tourism)</p> <p>To create actions like those performed by Airbnb (Experience Module)</p> <p>To create experiences in partnership with residents of the attraction (exploring the attraction's daily life, its culture, and related habits)</p> <p>To create, especially in the low season, of boat trips where tourists could view, from the sea to the land, of the architecture, buildings, and geography of the Barra and other attractions in the destination</p> <p>To create evening boat trips to see the lights turn on at Christmastime, for example.</p>

Education	Knowledge Exchange	To create activities aimed at the economic activities of the attraction (Fishing, Cooking, Crafts etc.)
	Gaining new knowledge	To create partnerships with local entities to practice sports in sand and water (volleyball, beach soccer, swimming, surfing, etc.)
	Gaining new skills	To extend the creation of partnerships to other attractions in the destination
Escapism	Situations listed above	Other proposed solutions directly contribute to this dimension To explore and learn more about this dimension

The authors

For the aesthetic dimension, we noticed that over time, for Barra da Lagoa and other attractions in Florianópolis, DMOs prioritize actions only for the high season period. This can characterize a greater management problem in the destination, as it is known that tourists visit the attractions of Florianópolis in all seasons of the year, but with different objectives. To cite the whale watching on the coast in winter, for example.

As for the improvement of tourists' comfort, especially the re-plantation of mobile showers with new technologies, it calls our attention and surprises DMOs that this solution (implemented in 2019) was not mentioned in the experiences collected. Which, according to one of the DMOs, may indicate a need to review this action and whether it really brings benefits to the tourist experience.

In this context, the research results reinforce the literature on several points. One of them, presented by Dos Santos and Gândara (2016) when they mention the importance of breaking away from traditional models of destination management and prioritizing the use of Big Data tourism from tourists. Something not explored in the context of traditional tourism when compared to the current Intelligent Tourism proposed by Gretzel et al. (2015).

In support of this, Lončarić et al. (2017) state that in addition to offering experiences, DMOs should continually analyze experiences shared in the media, as they are excellent predictors of future behavior and a rich knowledge to improve tourism products/services.

When analyzing the solutions in the Entertainment dimension, the importance of monitoring shared experiences (Tourism Big Data) is also seen. For this dimension, DMOs report surprise when they discover that Barra da Lagoa is sought after by tourists with families, especially with children. This result is contrary to what DMOs believed and based their decision making.

This result reinforces the statements proposed by Thomaz et al. (2017) when they state that it is essential for DMOs to be present in social media, collecting, analyzing, and interacting with tourists, to reformulate their business models, develop new tourism products/services and manage knowledge.

Also in this dimension, the importance of co-creation of experiences linked to the culture and daily life of the attraction's residents can be seen. Since, involving tourists and residents, it facilitates the co-creation of so-called intelligent experiences. Which, according to Kastenholz et al. (2016) and Buhalis and Amaranggana (2015) are the key to

success and fundamental product of Intelligent Tourism and essential to the management and competitiveness of destinations.

In this sense, DMOs note that the attraction has potential for this type of tourist activity,

As for the Escapism dimension, the managers claim that they did not know it, which makes it difficult to propose solutions. However, they attest that exploring and creating new solutions for the other three dimensions directly contribute to improving Escapism. This, in turn, converges with the arguments exposed in section II, especially regarding the existence of a fine line between the dimensions of the experience (Park et al., 2010).

And it converges with Mehmetoglu and Engen (2011) when they state that even a given dimension being more emphasized than the others, the experience will be composed of elements from all four dimensions. That said, the statement proposed by Oh et al. (2007) for more than a decade, that classifying experiences by dimensions should not be a rigid rule, remains valid and verified in this research.

Finally, DMOs attest that the analysis carried out with SMARTUR demonstrates that attraction has strong elements to enrich the Escapism dimension. However, the excess of negative points identified in all dimensions gains weight in the tourist's view, according to their reports on TripAdvisor, and directly impacts the tourist experience in general, which should be a point of attention by the management and prioritized in future actions.

VI. CONCLUSIONS

Through the application of Smart Management of the Tourist Experience (SMARTUR) and the presentation of some of its main results, it can contribute so that Destination Management Organizations can manage customer knowledge (tourist experiences caught from social media) to improve this management and provide the creation of new experiences based on smart solutions that will be set up and implemented.

In the context of smart solutions, obtaining them really depends on the creation of an ecosystem of cooperation and collaboration between managers and other stakeholders, where knowledge co-production is something present, because each of these actors could bring their own vision about the destination and consequently the knowledge they have about it. Thus, points hitherto not observed by managers could emerge and allow innovative solutions and better management that benefit everyone involved, from residents to tourists.

The application of SMARTUR also made it possible to see the need to remodel the way in which managers handle improvements in their destination attractions, as currently they are often directed only to the high season and in a palliative and non-preventive way. However, the results of the application demonstrate that Barra da Lagoa, for example, has the potential for tourist attractiveness at all times of the year, if it undergoes the implementation of solutions that enhance all dimensions of the tourist experience and not only Aesthetics and Entertainment, today considered by managers the major ones.

As for the tourist experiences collected on *TripAdvisor*, the application of SMARTUR shows evidence that their analysis provides a rich knowledge base that generates insights for creating smart solutions to improve the first two stages of the tourist experience, that is, before and during their experience, because the identification of tourists' requirements

allows the creation and/or improvement of increasingly smart products and services, which, in turn, add more value to the experiences.

Based on all that has been exposed, it is concluded that the SMARTUR framework can assist managers and their stakeholders in the smart management of experiences shared on social media and that they constitute knowledge essential in improving destinations and their elements. The application of the framework demonstrated its potential for use and alignment with the current demands of the tourism industry, especially when combining elements and characteristics of Knowledge Management with the touristic experience and developing a guide to manage it, something that has not yet been explored in the field of scientific research but has been demanded by managers who deal with this type of knowledge.

Research linking tourism experience and smart tourism, especially smart destinations, and tourism, does not emphasize how they can be managed and focuses only on the development of new technologies that can reshape them. Thus, this research contributes to eliminating or reducing this research gap by providing the scientific community with a framework for the smart management of these experiences, as well as helping in reducing the managers' need for structures aimed at this purpose.

The way the tourist experience was analyzed by SMARTUR and the results it generated, especially the identification of tourists' requirements, can be replicated for other scenarios besides tourism and this highlights the flexibility of using the framework. For example, it can be used to raise and identify customer requirements needed for new product and service development processes through the analysis of customer shared experiences.

That said, it is concluded that the general objective of this research, that is, to present the results of the application of the SMARTUR framework in the management of tourist experiences shared on *TripAdvisor* for the creation of smart solutions in Florianópolis has been achieved.

6.1. Limitations

The bias that the application of SMARTUR to a single attraction can bring out and the need for new applications are recognized. And it is also pointed out the non-application of all eight SMARTUR processes, which is necessary and already programmed for future research.

6.2. Theoretical and practical contributions

In the theoretical field, this research directly contributes to filling gaps in Knowledge Management and Tourism literature, especially by bringing practical and applied work. This becomes more visible when Customer Knowledge Management is used to explore and manage in a clever way the tourist experiences present on social media and widespread in smart tourism. However, it is extraordinarily little explored as to its management in that scenario and in the academy.

When mentioning this, it is found that the exploration of CKM and Tourism Experience contributes to the theory by opening new paths for the exploration, use, and dissemination of CKM in the Tourism literature, especially when dealing with the tourist experience being the link between Knowledge Management and Tourism.

Among the practical contributions, we highlight the exploration and use of the customer knowledge (tourist experience) in scenarios beyond the organizational context. The SMARTUR application shows the potential for using the framework as a driver for organizations and DMOs that recognize the potential of customer knowledge to improve competitiveness.

Because it can be used as a driver or guide in the management of tourist experiences, SMARTUR directly contributes to the change in mentality of DMOs regarding the management of tourist destinations, especially when showing and stressing that they should invest in initiatives that deal with the tourists' knowledge (experiences).

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