A COMPARISON OF OFFICIAL TOURISM WEBSITES IN TUSCANY REGION AND ISTRIA COUNTY USING TOPIC MODELLING

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Abstract

Purpose – The aim of this study is to explore the textual and visual contents of official tourism websites of Tuscany Region (Italy) and Istria County (Croatia) to understand how destinations from different countries, but with similar characteristics, promote their tourism offer to an international audience.

Methodology – A total of 185 web pages from the official tourism websites of Tuscany Region (n. 98 webpages) and Istria County (n. 87 webpages) were analysed. To explore the characteristics of tourism offer promoted by the DMOs of both analysed destinations, the Latent Dirichlet Allocation (LDA) model was applied to textual data. Furthermore, more than 1,000 images were analysed to investigate if there exists a correspondence between text and visual contents published on the webpages.

Findings – Eight topics that characterise the tourism offer promoted on Tuscan and Istrian official tourism websites have emerged. The findings reveal differences in the promotion of visual and textual tourism offer, highlighting that destinations focus their communication on different topics. Each destination places greater emphasis on different characteristics that make its territory unique by adopting different communication strategies. Furthermore, for both destinations a correspondence between textual and visual content communication is observed in many topics.

Contribution – The findings shed light on the current state of the art of the tourism offer promoted online supporting Tuscany Region and Istria County in understanding if the current promotion is in line with their communication goals. Furthermore, this study provides inputs to determine if there exists synergy between the promotion of the tourism offer and the development of tourism products in the destination.

Keywords: Tuscany Region, Istria County, LDA model, tourism websites, DMO, visual and textual tourism offer.

INTRODUCTION

Tourism is one of the main drivers of changes in society and the generator of economic growth in destinations where it is present (Alves et al. 2020). On the other hand, the tourism industry is faced with frequent changes, especially changes caused by the emergence of new technologies, increasingly experienced consumers, the appearance of frequent restructuring of the world economy, environmental restrictions and climate change (Poon 1993). However, the growth of tourism in the destination must be accompanied by internet technology which, in the context of tourism, among other things, represents an important marketing tool (Melania and Ellyawati 2018; Lai and Vinh 2013). Tourism destination websites are one of the most important communication

tools used to promote destinations, giving useful information to visitors (Law et al. 2010; Lee and Gretzel 2012; Wu 2018). Given the growing competition in the tourism industry all over the world (Mariani et al. 2014), tourism destinations must strive for a sustainable and innovative tourism offer. Online promotion can be critical in the decision of potential tourists to visit or not a certain tourism destination (Melania and Ellyawati 2018). The importance of tourism promotion via different internet channels was particularly pronounced during the lockdown caused by the COVID-19 pandemic. During the pandemic, tourism destinations had a unique opportunity to assess to what extent and in what time period they could adapt their offer and promotion to the new conditions (Toubes et al. 2021; Donthu and Gustafsson 2020). Also, in order to achieve a good satisfaction level of tourists, and to have satisfied tourists, they need to have a clear picture of the destination (Della Corte et al. 2015). In general, consumers are no longer passive participants in the market, but they want to actively participate in the creation of products or services (Arussy 2002; Della Corte et al. 2015). Because of this, and because of the increasingly competitive tourism market, destination management organisations (DMOs) play an increasingly important role in the creation of the most complete image of the tourism destination (Lončarić et al. 2013).

Over the years the role of DMOs in destination management and promotion has increased (Morrison 2018), as well as the pressures on their 'added value' (Morgan et al. 2012). Developing models and indicators for measuring the performance of DMOs have become not only an institutional, but also an academic, challenge. In the last decade, researchers have developed maturity models to evaluate the level of preparation of DMOs on its processes dedicated to the online communication management (Marchiori et al. 2012; Stokłosa et al. 2019), defined new KPIs to evaluate the marketing strategies adopted (Morgan et al. 2012) and tested different website evaluation models (Law et al. 2010; Žanna and Xuedong 2016).

Given the importance of evaluating websites to make timely changes and attract tourists during the whole year, this paper focuses on an in-depth analysis of the official tourism websites of two DMOs located in two different countries, Tuscany Region (Italy) and Istria County (Croatia). The goal of this research is to evaluate the DMOs' websites, providing a contribution to understanding the online tourism offer and giving new perspectives to be integrated into already tested evaluation models and defining monitoring indicators. The originality and the contribution of this research also lies in the adoption of automated methodologies that allow constant monitoring and replicability of the websites' evaluation in other destinations and over time, given the frequent updating of contents and the large amount of data published online by DMOs.

For this reason, to advance previous research in this area, within this paper we adopted a topic modelling and web content mining approach to assess the communication by the two Destination Management Organisations (DMOs). In order to deeply investigate and clarify the main characteristics of the tourism offer promoted online by DMOs, we adopted the Latent Dirichlet Allocation - LDA - model (Blei 2012), which also allows us to automatically generate topics to segment the textual tourism offer communicated. Previous studies have highlighted the importance of all data (textual and visual) promoted online and emphasised that different techniques are required to process and compare this data (Balducci and Marinova 2018). Given that websites are a rich source

of information composed of both textual and visual contents, and that photographs are becoming one of the main tourism communication means (Leung et al. 2013; Balomenou and Garrod 2019), this study focused on analysing images to investigate if there exists a correspondence between text and visual contents published on the webpages.

The results of this study contribute to understanding the role of websites in the promotion of tourism offer, as well as suggesting useful information to DMOs on how to improve the effectiveness of their tourism websites. The findings on visual and textual contents provide inputs to determine if there exists synergy between the promotion of the tourism offer, communication strategies adopted and the development of destination tourism products. Furthermore, the results of DMOs located in two different countries could be used for benchmarking purposes in regard to website functionality, supporting DMOs in understanding new communication strategies and models adopted by other countries with a similar tourism offer.

1. LITERATURE REVIEW

1.1. The role of DMOs

According to Koo et al. (2015) the combination of information technology and tourism began in the 1970s, and this connection led to changes in tourism products and services. Gradually, the Information Communications Technologies (ICTs) have assumed an increasingly important role in tourism, travel and the hospitality industry (Bethapudi 2013), as well as an impact on tourist experience in the destination (Wang et al. 2014). In fact, the Internet marks a new era in the tourism sector (Koo et al. 2015). People devote more and more time to planning their free time, which has led to the strengthening of the economic branches of tourism and hospitality (Williams 2006). On the other hand, given that tourism is a service activity, there is the challenge of how the tourism product is presented to the public (Bolan and Williams 2008). There is an opinion that marketing has more importance in the tourism industry compared to other industries (Morgan et al. 2003). As Bethapudi (2013) says, the ICT infrastructure and accompanying applications lead to advantages in the promotion and development of the tourism industry.

Given the complexity of tourism and resources employed in the sector, destinations developed the DMO as an organisation responsible for the development of marketing and management strategies (Buhalis 2000). Over time, the functions of the DMO have expanded and recently have played the most important role in promotion at the destination level, regardless of whether they are working at the city, regional or country level (Morrison 1998). The main purpose of the DMO is to promote the destination, attract visitors, and thus develop the community (Solimar International 2021). The challenge that DMOs face every day when managing a destination is what information to provide and at what time, given the general information overload (Choi et al. 2007). However, in order that information is useful for target audiences, a DMO must be well acquainted with the internet preferences and behaviour of tourists (Choi et al. 2007). Sheehan et al. (2016) call the DMO an "intelligent agent". According to them, the role of the DMO is to analyse the external, competitive environment, and identify opportunities and threats as well as trends. Based on this, the DMO must recognise the

knowledge and weaknesses of the current state of tourism at the level of its own destination. In addition, a successful DMO must base its destination marketing activities on integrated activities and resources, as well as a networking process (Lemmetyinen 2010). The development of tourism in destinations according to the principles of sustainable development is the path that all tourist destinations must follow. Considering the increasing role played by the DMO in the context of tourism, Morrison (2019) assumes that a DMO will be the bearer of promoting sustainable tourism in future, and accordingly also in environmental protection in tourism destinations.

1.2. The DMO official website

DMO websites are official representatives of the tourist destination and the typology of information published can influence the process of selecting a destination for travel (Lončarić et al. 2013). For this, when managing the information available on the websites of the tourism destination, the DMO must take care to provide tourists with the information they need in the current stage of travel planning (Lončarić et al. 2013). The process of attracting tourists to the destination website and persuasion of making a purchase decision became more complex with the increase in competitors who use the internet as marketing platforms (Auger 2005). Therefore, considerable attention should be paid to the type and content published by the DMO website and at the same time to understanding whether the strategic objectives coincide with the content actually promoted.

Over the years, evaluation models were developed and tested to measure the website strategy, presence and quality (e.g., Bauernfeind and Mitsche 2008; Chiou et al. 2010; Rocha 2012; Žanna and Xuedong 2016). To evaluate the websites different criteria pools were defined which measure different attributes, such as the system aspects to monitor the technical aspects of the websites, the service aspects related to the information system and the information aspects to evaluate the information characteristics published. The evaluation criteria can be divided into several categories or sub-categories and vary according to the objective of the research goal. For example, the study of Inversini et al. (2011) was based on five dimensions (content functionalities, graphical user interface, people who administer, people who visit the website, and information market), of the website of the Swiss National Tourism Board and the findings concluded that modernisation and monitoring of technological trends and logical use of online communication channels is the key to the success of online communication between the DMO and end-users (Inversini et al. 2011). Despite the variety of evaluation models, many of these have mainly focused on the functionality and structure of websites. In general, there has been less focus on visual and textual content designed and promoted by DMOs.

Finally, it is important to point out that, considering the increasing role of DMOs in the development of sustainable tourism in the destination (Wagenseil et al. 2022) and the importance of websites in the promotion of sustainable tourism, products and behaviours, academics paid attention to evaluating the sustainability of communication through the analysis of websites' contents published by destinations (d'Angella and De Carlo 2016; Marchi et al. 2021; Elizondo Saltos et al. 2021; Tanković and Mušanović 2022). Previous

studies highlighted that tourism organisations lack an appropriate online approach oriented towards sustainability and that in some cases the tourism organisations do not fully utilise their websites to motivate customers to behave more sustainably (Garbelli et al. 2017; Villarino and Font 2015; Ghanem and Elgammal 2017).

2. METHODOLOGY

2.1. Case study

This study focuses on the analysis of the Tuscan Region and Istria County, two destinations located in different countries (respectively in Italy and Croatia) and of different geographical dimensions. Despite this, their versatility is an element that unites both destinations, thanks to their location on the Mediterranean Sea, being crossed by mountains, and the presence of characteristic hills and cities of art to visit. This makes Tuscany and Istria two 'distant' but very similar territories from the tourist offer point of view.

2.1.1. Tuscany Region

Tuscany is a region located in the heart of Italy covering 22,985 square kilometres and a population of about 7 million inhabitants, that is, 6.2% of the population of Italy (IRPET, 2023). The Region is bordered by the Mediterranean for over 633 kilometres and is crossed by major mountain chains.

The tourism industry in Tuscany generates significant economic benefits for the region, with tourism accounting for approximately 12% of the regional GDP and employing around 140,000 people (Istat 2020). According to data from the Tuscany Region (2023), in 2022 there were over 42.7 million overnight stays, with 51% made by foreign visitors and the remaining 49% by Italians. Additionally, there were 15.2 million arrivals, of which 49% were foreign and 51% Italian. (Tuscany Region 2023).

Tuscany is known throughout the world for its scenic beauty, art, culture, food and wine, and spas. According to the official tourism portal of Tuscany, the region boasts 7 UNESCO sites, 10 nature reserves, 121 museums, 10 historic parks and gardens and 29 archaeological sites. The most popular destinations for tourists in Tuscany are Florence, followed by Pisa, Siena, Lucca, and Arezzo. These cities are well known for their cultural and artistic heritage, which is a major draw for visitors. However, even smaller towns such as San Gimignano, Volterra, and Cortona attract many tourists due to their beauty and charm. Aside from the cultural attractions, Tuscany is also known for its natural beauty, such as the hills of Chianti, the Val d'Orcia, and the Maremma. These areas attract tourists looking for outdoor activities, such as hiking, cycling and horseback riding. Thanks to its natural beauty, clear waters and sandy beaches, the Tuscan coast has become a popular destination for beach tourism. The Tuscany region is also rich in its culinary tradition and high-quality wines, based on simple and genuine ingredients, such as olive oil, bread and cheese. Tuscany's enogastronomic offerings have attracted a large number of visitors over the years and, to respond to this demand, Tuscany Region

organises various food and wine festivals, including the "Chianti Classico Expo" in Greve and the "Truffle Fair" in San Miniato. Additionally, there are numerous other cultural events developed during the year, such as the Carnival of Viareggio and the Palio of Siena.

2.1.2. Istria County

Istria is the largest Adriatic peninsula, with a total area of 3,476 square kilometres. Parts of Istria peninsula are in Italy, Slovenia and Croatia. The Istria County covers the largest part of the Istrian peninsula, i.e., 2,820 km2, making up 4.98% of the total area of the Republic of Croatia, and is located in the westernmost part. The total length of the coast of Istria is 445 km. The Spatial Plan of the Istria County defines three basic landscape units of Istria: White Istria, Grey Istria and Red Istria (Istria County).

Istria County had 195,237 inhabitants in 2021 (CBS 2021), living in 10 cities and 31 municipalities (Istria County). According to the official tourism statistics in Istria County in 2021 3,500,149 arrivals were realised, or 23,534,894 overnight stays in total. During 2022, growth was achieved, resulting in a total of 4,709,074 arrivals and 29,507,116 overnight tourist stays in Istria County (ITB 2023). The tourist development of Istria County is primarily based on coastal tourism. There are more than 248 beaches along the coastal part of Istria (Istria County 2018). Also, Istria County has rich historical and cultural attractions. In Poreč is the Euphrasian Basilica, which is under the protection of UNESCO; in addition, some of the most important cultural and historical attractions in Istria are the Arena, which is located in the largest Istrian city, Pula. Also, throughout Istria, and especially in central Istria, there are many castles and walls that had a defensive function in the past. There is an exceptional wealth of natural resources in Istria. The territory of Istria County includes 67 areas of the ecological network - NATURA 2000 areas (Istria County 2023), and there are numerous protected areas of different categories that can be visited. Some of the most famous ones are Motovun Forest, Lim Fjord and Jama Baredine. In the southern part of Istria is a national park, Brijuni Islands, and in the eastern part is Učka Nature Park, which is also the highest point of Istria (Istria County). The previously mentioned natural, cultural and historical heritage, including favourable climatic conditions during almost the entire year, have influenced the increasingly significant development of outdoor sports in Istria County. In addition to the above, Istria is also an increasingly well-known gastronomic destination, and for many years it has been visited by tourists for whom gastronomy is one of the most important or the most important reason for their trip (CNTB). The speciality of the Istrian cuisine is the combination of continental and Mediterranean cuisine, and the most prominent gastronomic products in Istria are certainly olive oil, wine, Istrian ham, truffles, honey and others. During the year, many gastronomic fairs are held in Istria, like the international fair of wine and winemaking equipment - Vinistra in Poreč, the International Pršut Fair - ISAP in Tinjan, Zigante Truffle Days in Livade, Days of Young Olive Oil in Vodnjan etc.

2.2. Data collection

To investigate the communication promoted by Tuscany Region and Istria County, this study focuses on a textual and visual content analysis of their websites written in English.

Firstly, the research identified Tuscany (https://www.visittuscany.com/en/) and Istria (https://www.istra.hr/en) tourism websites recognised as official sources for promoting the destinations. Unstructured data of each website was collected through a scraping procedure, which is an automatic web data extraction procedure that navigates through each destination website and extracts data without needing user interaction (Singrodia et al. 2019). A total of 185 web pages from the official tourism websites of Tuscany (n. 98 webpages) and Istria (n. 87 webpages) emerged (data collected in January 2023).

Textual contents were analysed through an automated model which allowed us to identify the main topics used by the destinations to promote their online tourist offer. Furthermore, in the last decades, tourism research has favoured textual data over visual data (Picazo and Moreno Gil 2017; Balomenou and Garrod 2019), despite the visual content being recognised as the main tool to make a good first impression (Bell and Davison 2013), easier to remember and remain impressed in the mind of the customer (Picazo and Moreno Gil 2017). For this reason, this study also focused on the images to understand if there exists a correspondence between text and visual contents published on the webpages.

2.3. Textual and visual data analysis

Following the creation of the database, the study focused on analysing textual data through text mining techniques to automatically process and extract meaningful patterns and new insights from unstructured text data (Balducci and Marinova 2018). To advance previous research in this area, the study adopted a topic modelling and web content mining approach to assess the communication of Tuscany and Istria.

In order to deeply investigate and clarify the main characteristics of the tourism offer promoted online by DMOs, we adopted the Latent Dirichlet Allocation - LDA model, which allows us to automatically generate topics to segment the tourism offer communicated. The LDA model is a generative statistical process that explains how text documents could be generated probabilistically from a mixture of topics, where each topic has a distribution over words (Blei 2012). It is an unsupervised type of machine learning (based on text mining techniques) that automatically extracts hidden semantic structures in documents from analysing text. Firstly, the model determines the number of topics K - in the training phase - then - in the running phase - the model provides the probability of the distribution of words under each topic and the probability of the topic corresponding to the document.

In this study, the LDA model was performed using the Knime Data Analytics Platform on the total database as a unique corpus. Eight topics were estimated as the optimal number of topics calculated through the perplexity score. The model extracted and generated automatically topics with the most important words (weighted) for each topic.

The model does not name topics, and for this reason researchers analysed and labelled each topic based on the identification of logical connections between the words that emerged for each dimension (topic). The eight topics are: "Emotions and feelings" (T1), "Types of tourism" (T2), "Historical & cultural heritage" (T3), "Rural and mountain offer (T4), "Food & wine" (T5), "General information" (T6), "Landscape" (T7) and "Seaside offer" (T8).

The definition of these topics that characterise the tourism offer was used as the basis for exploring the visual contents of the 'destinations' web pages. To understand if there is a match between textual and visual contents, the researchers manually labelled 1,066 images based on the topics.

Each photo was carefully analysed, evaluated and categorised. The study focused on the standardised criteria for measuring the image identified in literature (Picazo and Moreno-Gil 2017), which pivots on three dimensions. The first dimension analyses the contextualisation of the physical space, which we carried out on the bases of the eight topics identified. For example, an image depicting the beach with its crystalline sea has been labelled as ""Seaside offer"", or an image relating to a glass of wine has been included in ""Food & wine"". The second dimension is related to the subjects depicted in the image. We observed the presence or absence of people in the visual content. Finally, we analysed the dimension related to the activities performed. Following the classification proposed by Buzinde et al. (2006) and Edelheim (2007), this study analysed the active (those that require a physical effort such as biking, running or hiking) and passive (those that involved leisure activity such as tastings or sunbathing) actions.

3. RESULTS

3.1 Textual contents on Istrian and Tuscan web pages

Using LDA analysis, the study identified eight main topics that characterise the tourism offer promoted on the official tourism websites of Tuscany and Istria (figure 1). The most recurrent topic is "Landscape" (T7), which appears in 21.1% of the web pages. This theme focuses on promoting the natural beauty of the regions, including picturesque villages, colourful hills and charming countryside. The websites also strongly communicate the historical and cultural heritage of the regions (T3), which appears in 19.5% of the web pages. This includes promoting churches, museums, cathedrals, and monasteries, which are essential resources for tourism worldwide and contribute to the competitiveness of destinations. The emotional value of the destinations (T1) appears in 18.9% of the web pages. This theme emphasises the emotional and intellectual experiences that visitors can have in the regions, using words like "enjoy," "beautiful," "relax," "romantic," "adventure," and "unique." Other topics include "Types of tourism" (T2) (12.4%), which promotes activities and events that can diversify the tourism offer, such as wellness, health, spa, and folkloristic carnivals. "Food & wine" (T5) (9.2%) is another important theme, which showcases the opportunity to preserve local traditions while diversifying tourism by promoting local products. The main words which emerged are related to wine, followed by olive-oil, truffles and honey. Given the geographical conformation of the regions bordering the Mediterranean Sea, a specific topic emerges

for the promotion of the seaside offer (T8) (8.1%), which emphasises not only the beaches and crystal-clear water but also sporting and recreational activities that can be carried out along the coast through available trails or by bike. At the same time, a detailed topic related to the "Rural and mountain offer" (T4) (7%) highlights activities that can be enjoyed in the rural and mountain areas, such as walking or skiing, and emphasises the natural features that characterise these environments, such as forests, woods, and slopes. Finally, the last topic that emerged with a low percentage is related to communicating "General information" (T6) (3.8%), which provides information to potential tourists about the destinations.

Table 1: **Topics identified by LDA and top 10 relevant words weighted based on Tuscan and Istrian official tourism websites**

Topic	Top 10 relevant words (weighted)
(T1) Emotions & feelings	enjoy (74), experience (47), beautiful (40), relax (30), explore (27), discover (35), romantic (26), adventure (23), unique (20), ideal (20)
(T2) Types of tourism	winter (46), January (22), spa (22), event (20), carnival (19), season (18), wellness (16), thermal (16), celebrate (15), health (12)
(T3) Historical & cultural heritage	town (139), church (69), century (63), museum (58), cathedral (47), monastery (42), art (41), medieval (39), marble (39), historical (32)
(T4) Rural and mountain offer	road (36), mountain (34), forest (27), walk (23), ski (16), wood (16), slopes (14), travel (13), path (11), snow (11)
(T5) Food & wine	wine (163), olive-oil (37), truffle (31), sweet (25), honey (24), pastry (19), taste (19), cheese (19), ingredient (18), production (15)
(T6) General information	tourist (46), information (32), service (29), activity (17), carry (15), public (13), connect (13), manage (13), development (12), system (10)
(T7) Landscape	villages (56), hill (51), territory (42), home (42), landscape (36), land (32), garden (29), valley (24), countryside (32), trees (21)
(T8) Seaside offer	sea (70), trail (62), beach (47), island (38), park (32), coast (31), bike (26), Mediterranean (25), protect (13), water (12)

Source: Authors

The findings of this study highlight the different strategies adopted by Tuscany and Istria. Tuscany gives greater prominence to its "Landscape" (38%), "Historical and cultural heritage" (26.3%), and "Rural and mountain offer" (11.6%), while Istria focuses more on "Emotions and feelings" (35.6%), "Types of tourism" (14.4%), and "Food and wine" (16.1%). The t-test indicates that the most significant differences in the communication approach between the two destinations concern the topics of "Landscape", "Emotions & feelings", and "Seaside offer" (p < 0.05).

Figure 1: **Topics in Tuscany and Istrian websites (%)**
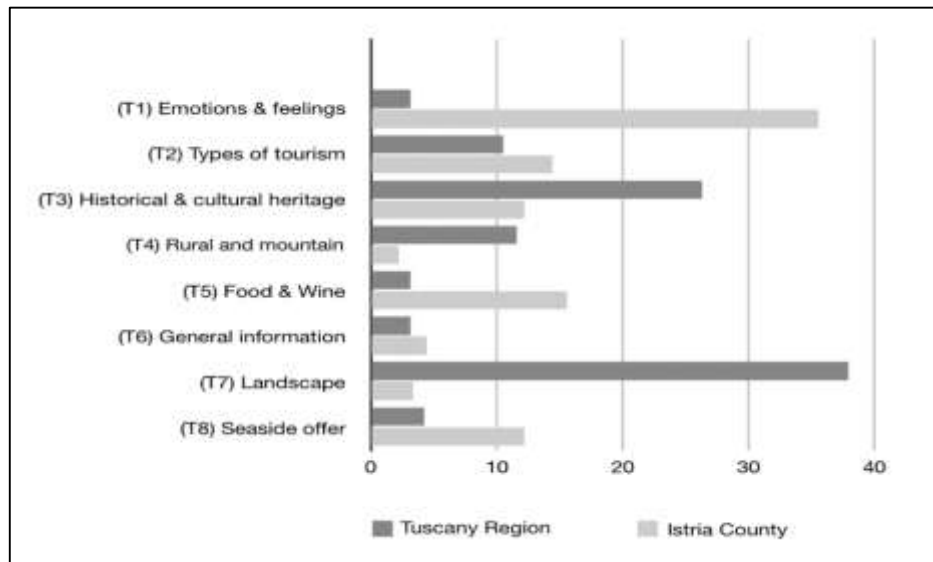
Source: Authors

3.2 Textual and visual contents on Tuscany and Istrian web pages

More than 1,000 images are included in the official tourist websites analysed. The images were mainly contained in web pages that have previously been labelled as "Landscape" (33.3%), "Historical & cultural heritage" (28.5%) and "Emotions & feelings" (14.5%). The topics related to the "Seaside offer" (7.9%), "Types of tourism" (7%), "Food & wine" (5%) and "Rural and mountain offer" (3.3%) have a lower percentage than the previous ones, while the web pages dedicated to communicating general information contained a very low number of images (0.5%).

The manual labelling of the visual contents underlined a prevalence of images that depict aspects relating to the "Historical & cultural heritage" (35.6%) and to the "Landscape" (35%). These are followed by images containing aspects of "Rural and mountain offer" (9.6%), "Types of tourism" (7%), "Seaside offer" (6.7%) and "Food & wine" (6.1%). We underline that the "Emotions & feelings" (T1) and "General information" (T6) aspects have not been identified due to the difficulty in capturing these elements in the images.

Figure 2: **Images labelled in Tuscany and Istrian websites (%)**
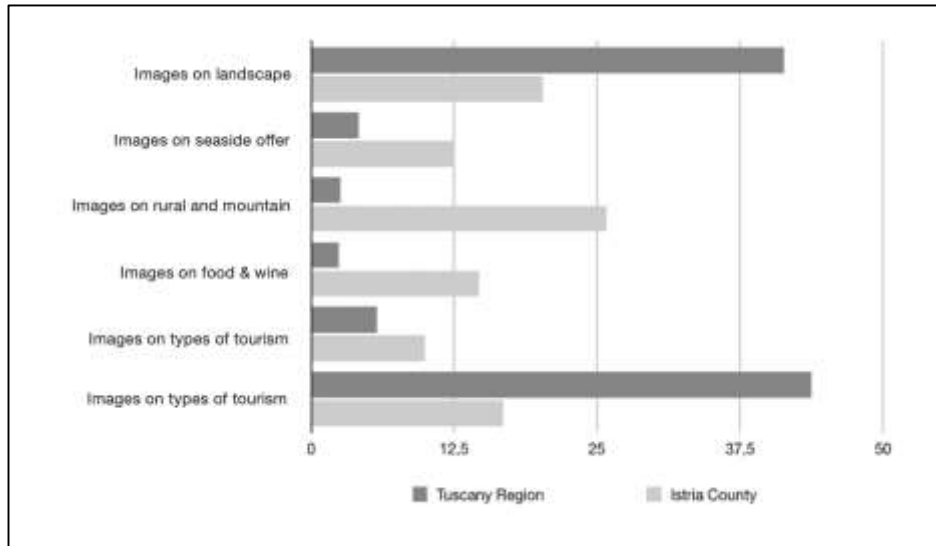
Source: Authors

Figure 2 shows the type of images depicted on each web page, emphasising the adoption of a different visual communication strategy adopted by the two destinations. The Tuscany Region mostly features images of artistic and cultural heritage (43.8%) and landscapes (41.3%), which is consistent with the LDA-generated results. In contrast, Istria County predominantly showcases offers in rural areas (25.7%), landscapes (20.2%), and cultural heritage (16.8%) in their images.

Out of the total 1,066 images analysed, 169 (15.9%) include people. On the Istria website, people are depicted in 39% of the total images, whereas in the Tuscan ones, only 6% feature people. Almost half of the images with people on the Istria destination's website are mainly used to promote web pages labelled as "Emotions & feelings," "Seaside offer" (22.4%), and "Types of tourism" (17.6%). In the Tuscan destination, people are mainly depicted to communicate in web pages labelled as 'Types of tourism" (31.8%) and "Landscape" (22.7%).

A detailed analysis conducted in this research on people's activities showed that 72% of subjects in Istria engaged in active actions, mainly related to bicycle use, while the remaining 28% engaged in passive activity, such as wine tasting. In Tuscany, people engage in both passive (47.7%), especially on the beach, and active (52.3%) actions.

Figure 3: **Correspondence analysis between the topics identified through LDA modelling of textual data and the images labelled on each web page in Tuscany and Istria destinations (%)**
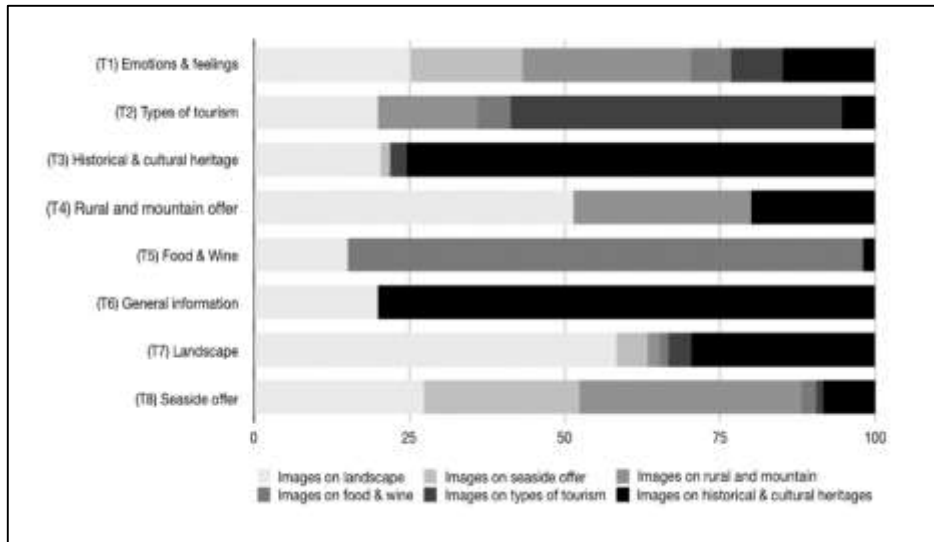
The y-axis displays the topics emerging from the LDA model, while the x-axis represents the percentage of images labelled that correspond to each topic.

Source: Authors

The visual contents were subjected to a comparative analysis with the textual ones in order to assess the degree of coherence between the two data sources displayed on the same webpage. The images were then analysed with reference to the topics that emerged from the LDA model, thereby providing insights into the use of online sources and communication strategies adopted by each destination (figure 3). The results indicate a high degree of correspondence (83%) between textual and visual contents in the webpages labelled "Food & wine", where images mainly depict typical products of the destination such as oil, wine, cheese, truffles, and honey. A similar trend is observed for the "Historical & cultural heritage" topic, where over 75% of images promote cultural elements such as churches, statues, or monasteries. These findings are also supported by the "Landscape" topic, with 58.3% of images portraying the natural and built environment of the destination, and for "Types of tourism" with 53.3% of visual contents focusing on thermal tourism or events. The analysis of the web pages labelled as "Seaside offer" (T8) and "Rural and mountain offer" (T4) reveals a lower level of correspondence between visual and textual content. The proportion of images related to the identified topics is lower compared to other labelled pages.

4. DISCUSSION

The results of this study provide valuable insights into the online communication strategies adopted by the Tuscany Region and Istria County to promote their tourist destinations. The findings suggest that both destinations prioritise promoting natural beauty, cultural heritage, and emotional value to create a connection with potential tourists. The emphasis on promoting natural beauty is consistent with previous studies that highlight the importance of landscape and scenery as significant tourism resources (Timothy 2014; Mazanec et al. 2007). The promotion of cultural heritage, including churches, museums, cathedrals, and monasteries, is also essential in enhancing the competitiveness of destinations. Additionally, emotional value plays a key role in creating destination brands (Jabreel et al. 2017), highlighting the importance of creating emotional connections with potential tourists. Furthermore, the promotion of different types of tourism, such as wellness, health, folkloristic events, and food & wine, can help diversify the tourism offer and attract a wider range of visitors. The promotion of seaside and rural offers is also crucial, given the natural features of the regions, and the availability of recreational and sporting activities can help attract a wider range of visitors.

A more detailed analysis highlights that Tuscany and Istria adopt different strategies to promote their tourism offer online. Tuscany's emphasis on landscape and cultural heritage is consistent with its reputation as a region known for the quality of its landscape, which led to the development of the first Italian region's landscape plan (Agnoletti and Santoro 2018). In contrast, Istria focuses on creating an emotional connection with visitors, recognising the importance of emotions in shaping the overall image of a destination (Alcañiz et al. 2009; Huertas and Marine-Roig 2016).

The visual contents in the webpages contribute to analysing the insight about the role of contents published on tourism official websites. The two destinations adopt different methods to attract visitors on their website, with Tuscany Region focusing mainly on promoting cultural heritage and the landscape images, while Istria County promotes the outdoor activities, landscape, and cultural heritage images. Furthermore, the results revealed differences in the use of images depicting people and people's activities. Unlike the results which emerged from the study conducted by Edelheim (2007) on a polysemic reading of an Australian tourist brochure, where it was observed that two-thirds of all the pictures portrayed people as passive, in Tuscany and Istria the results underline a higher presence of people who practice actions. This could be linked to the fact that Tuscany and Istria are destinations with a wide offer that ranges from the sea and other outdoor activities in rural areas and the city with the possibility of practicing different types of activities. DMOs are therefore encouraged to enhance the different activities of the destination, contributing to its diversification and intercepting different tourist targets. In line with the study of Choi et al. (2007), despite the significant amount of visual information on heritage, leisure and entertainment activities, very few images on websites emphasise the tourist experience through the depiction of local people.

Finally, the textual and visual content analysis provides an insight into the communication strategies adopted by the destinations, allowing you to understand whether or not there is a correspondence between the text and the images. The findings

revealed a partial correspondence between the communication modes for both destinations. In particular, a high correspondence between textual and visual content was found in the "Food & wine" and "Historical & cultural heritage" categories. However, a lower correspondence between textual and visual content was found in the "Seaside offer," and "Rural and mountain offer" categories. These results are consistent with previous studies that have found a low correspondence between the textual and visual content communication in the destination image represented on the websites of Macau (Choi et al. 2007). Despite this, these findings suggest that the communication strategy of these destinations may need improvement to enhance the coherence and effectiveness of the visual and textual contents on their web pages.

CONCLUSIONS AND IMPLICATIONS

Today, websites, search engines and social networks are the main sources of information. In particular, official websites are the most powerful tool for attracting tourists (Vyas 2019). Access to information therefore plays a crucial role in trip planning and this is the motivation that needs to drive governments, DMOs and tourist stakeholders to understand the quality and quantity of information required by tourists. This study has contributed to the academic and institutional debate on the role of Destination Management Organisations (DMOs) in promoting tourism through their websites.

The findings of this study have important implications for both researchers and practitioners. From theoretical implications, this study has provided new perspectives on the evaluation of tourism websites, going beyond traditional models that mainly focus on the functionality and structure of websites. By adopting an automated approach based on topic modelling and web content mining, this research attempts to overcome the limits of non-automated methods adopted to date and to understand the use of different contents (textual and visual) on websites. The results can be used as inputs for the integration of evaluation models and the definition of monitoring indicators that take into account the effectiveness of the communication strategy, as well as the coherence between the textual and visual contents published.

From a managerial point of view, this study suggests useful information to DMOs on how to evaluate and improve the effectiveness of their tourism websites communication. Overall, Tuscany Region and Istria County tend to present a well-rounded image of their destination by giving importance to different tourism offerings focused on the main characteristics of each territory.

Despite the versatility of the destinations that, thanks to their territorial conformation, could offer different experiences to tourists - from the sea to the mountains - some topics are under-represented in online communication. This imbalance could be perceived by tourists as synonymous with poor attention to the destination and scarce offer of such a product. For this reason, policy makers could revise their communication strategy to ensure a balance of tourist offer by communicating products that enhance the territory but are not promoted online. To maximise the efforts made to promote the destination, the DMOs are called to constantly monitor the online communication to support the management of the image of the destination. This study provides inputs to determine if

there exists synergy between the promotion of the tourism offer and the development of tourism products in the destination. The findings shed light on the current state of the art of the tourism offer promoted online, supporting Tuscany Region and Istria County in understanding if their promotion is in line with their communication goals.

Furthermore, the visual and textual content analysis provide useful managerial implications to DMOs. For example, the high presence of people portrayed in the images, especially local subjects, could suggest that managers adopt communication more focused on the daily life of people who live in those territories. Markwick (2001) in his study, underlined the tourist's desire to experience a common every day and authentic life of the local population. For this reason, DMOs could include visual content that depicts the community responding to a desire for an authentic perspective (Stepchenkova and Zhan 2013). In addition, as suggested by Edelheim (2007), DMOs could include in their images, for example, people with disabilities promoting a more inclusive vision of society and accessibility of the destination for all.

LIMITATIONS AND FUTURE RESEARCH: Several limitations were noted that could provide useful guidance for further research. First, the study was confined to a small sample of website contents. Future research could consider the online communication adopted by other destinations located in different geographical and social contexts. Secondly, the constant updating of websites makes data collected quickly obsolete and not fully representative of the destination. We focused the analysis of data extrapolated in January 2023 and the results could mainly represent the activities that could be practiced in that period, rather than offering a more detailed overview of the total offer. For this reason, to have a more representative image of the destinations, it would be advisable to analyse the contents inserted by the DMOs in several time periods. Finally, in future studies it could be interesting to compare the online communication of DMOs and local operators (such as hotels, tour operators or travel agencies) with the aim of understanding whether there is a single communication used by the various stakeholders in the tourism sector.

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