



### Key Image Attributes to Elicit Likes and Comments on Instagram

Journal:	<i>Journal of Promotion Management</i>
Manuscript ID	Draft
Manuscript Type:	Original Article
Keywords:	Instagram, SOR Model, Content Analysis, Destination Management Organization, Tourist Destination, Tourism Image

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Manuscripts

This is an Accepted Manuscript version of the following article, accepted for publication in Journal of Promotion Management. Maria Elena Aramendia-Muneta, Cristina Olarte-Pascual & Andrea Olló-López (2021) Key Image Attributes to Elicit Likes and Comments on Instagram, Journal of Promotion Management, 27:1, 50-76, DOI: 10.1080/10496491.2020.1809594. . It is deposited under the terms of the Creative Commons Attribution-NonCommercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

## Key Image Attributes to Elicit Likes and Comments on Instagram

### Abstract

This article spotlights the relationship between likes and comments and the content of tourism photographs on Instagram with the aim of understanding users' behavior and, thus, helping destination management organizations. Based on the stimulus-organism-response model, a content analysis was conducted of 1,094 pictures that received 131,116,800 likes and 2,859,448 comments. The results show that Instagrammers' responses are influenced differently by different picture attributes, resulting in dissimilar behavior with regard to likes and comments. Specifically, likes, as immediate reactions, tend to be driven by content featuring people, views, or common habits. In contrast, comments, which require greater effort on the part of the Instagrammer, are elicited by the topic of festivals or hotels, colors such as cream, green, orange, or yellow, images of water or animals, and images featuring tourist activities, mostly at night. Multi-image or fake pictures negatively impact likes. By analyzing the content of the information provided by the uploaded photographs, a typology of photographic attributes is developed to offer clues for destination management organizations to enhance engagement with potential customers and Instagram users.

**Keywords:** Instagram; SOR Model; Content Analysis; Destination Management Organization; Tourist Destination; Tourism Image

## Introduction

Instagram has more than 1 billion monthly active users and more than 500 million daily active users, with 400 million Instagrammers sharing stories every day (Instagram, 2018). This colossal user network for sharing pictures and connecting people is an extraordinary source of information (Aramendia-Muneta, 2017) and offers new avenues to researchers, especially with regard to the tourism industry. The international tourism industry registered some 1.326 billion tourist arrivals at destinations around the world in 2017, up 7.0% from the previous year, and has a growth forecast of 3.8% per year until 2020 (UNWTO, 2018). Unsurprisingly, this industry has a deep impact on the global economy, where social networks play a major role in customer engagement with destinations.

While there are several studies in the tourism industry about the impact of social networks such as Facebook and virtual collaborative communities such as TripAdvisor, few studies have examined Instagram (Hanan & Putit, 2014). In fact, Instagram is a key factor in destination choice among millennials, and destinations are chosen by how “Instagrammable” they are (Arnold, 2018). The present study thus focuses on Beautiful Destinations, the leader on Instagram and an example of a destination management organization (DMO). With more than 3,100 posts and 4 million followers in 180 countries, Beautiful Destinations has become the world’s largest travel influencer on Instagram, and other DMOs partner with it. Photographs on the @beautifuldestinations Instagram account spread a desire to visit places among users.

Visual images are a powerful tool for tourist destination organizations in all forms of tourism promotion (Jenkins, 2003). The mental image of a destination is a set of characteristics perceived by tourists that defines their behavior (Beerli & Martín, 2004; Yüksel & Akgül, 2007). Moreover, when tourists have limited information about a particular destination, this image can be essential in influencing their choices (Beerli &

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3 Martín, 2004; Yüksel & Akgül, 2007). In this regard, photos posted to Instagram are a  
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5 valuable source of information for DMOs.  
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8 The present study seeks to contribute to the emerging body of literature on Instagram,  
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10 but from a tourism perspective. Because Instagram is one of the largest social platforms,  
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12 marketers are keen to engage its audience and monetize it (DeMers, 2017). DMOs need  
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14 to control tourism destination images, which are a stimulus for Instagrammers, in order  
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16 to influence them through likes and comments (*organism*). In this correlation, DMOs  
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18 could then receive a response from potential tourists. The stimulus-organism-response  
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20 (S-O-R) framework (Mehrabian & Russell, 1974) is thus adapted to Instagram and  
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22 tourism.  
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26 Specifically, the aim is to identify the key destination image attributes (*stimulus*) to  
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28 ensure successful image content and engagement by users in the form of likes and  
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30 comments (*organism*), in order to understand their behavior toward an image. Such an  
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32 understanding would help DMOs create more alluring photographs to attract more  
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34 potential customers and would have marketing implications for DMOs to improve their  
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36 impact on potential customers (*response*).  
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40 The remainder of this paper is organized as follows. The next section discusses the  
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42 theoretical background on Instagram in the tourism industry, the importance of images  
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44 for DMOs, and the relationship between content analysis and destination images. It then  
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46 discusses the attributes that have been used in the literature and were used in the present  
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48 study to formulate the research questions, the main goal of which is to identify the key  
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50 elements linking image with the number of likes and comments received. The subsequent  
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52 sections describe the research methodology, data collection process, and results. The final  
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54 sections consist of the discussion, conclusions, and managerial implications of the  
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56 findings and the limitations and suggestions for future research.  
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## Literature Review

### *Instagram as a Major Source of Information about Tourism Destinations*

Instagram and the tourism industry have attracted the attention of researchers over the last decade. The areas of study have ranged from cities to museums or protected areas. Weilenmann, Hillman, and Jungselius (2013) find that Instagram showcases the value of museums, as part of a destination organization, by allowing visitors to share their experiences and create new ways of narrating their feelings. Consequently, museums can learn from what visitors actually see to recategorize and reconfigure the museum environment. In a study about nature-based experiences in protected areas, Hausmann et al. (2018) find that Instagram can be used to monitor biodiversity and human activities in such places.

In their study of images from Tokyo and New York City, Hochman and Schwartz (2012) use cultural analytics visualization techniques to identify different visual rhythms for each city. New York and Tokyo are portrayed in diverse cultural ways and, thus, have distinctive beats. A replication of the study using the same technique in Tel Aviv revealed a city with diverse social, cultural, and political aspects depending on people's activity (Hochman & Manovich, 2013). Both studies show the relationship between Instagram pictures and the daily life of a city through multiple spatial and temporal scales. Single cities have also been examined through a different line of research. In the case of Macau, Yu and Sun (2019) consider the role of UNESCO Creative City of Gastronomy status as a brand that influences Instagrammers and enhances Macau's image with regard to food.

In addition to DMO facilities and the study of specific cities or places, researchers have used several other methods. Fatanti and Suyadnya (2015) describe modern tourism

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3 promotion, finding that destinations such as Indonesia, Bali, and Malang should use  
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5 Instagram as a communication tool to obtain user-generated content in the form of  
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7 pictures to encourage tourists to visit specific destinations. Paül i Agustí (2018) applies a  
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9 mixed-method approach to determine that tourist destinations should differentiate their  
10  
11 various forms of media and try to avoid overlapping images. Researchers using several  
12  
13 methods have emphasized the medium of Instagram as a remarkable tool for DMOs.  
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17 Instagram is not only a platform for uploading images, but also a medium for  
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19 interaction among Instagrammers. Camprubí, Guia, and Comas (2013) contend that  
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21 images shared on Instagram convey emotions, thoughts, realities, and feelings that cannot  
22  
23 be truly described in words. All of these features are part of the visual communication  
24  
25 about a destination and are included on social-media platforms. Images with many likes  
26  
27 represent interesting places for the whole community and increase the interest of other  
28  
29 users (Mukhina, Rakitin, & Visheratin, 2017). Sharing images and comments on  
30  
31 Instagram is a physical-emotional form of bonding with the destination and impacts the  
32  
33 link between the destination and electronic word-of-mouth (Baksi, 2016). Consequently,  
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35 Instagrammers can create their own tribe and community around a tourist destination.  
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40 In this interconnected process, everyday digital photography from Instagrammers  
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42 provides the audience with a more personal and authentic image of a place (Thelander &  
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44 Cassinger, 2017). Nevertheless, DMOs should control, at least, the impressions that they  
45  
46 themselves wish to show the public to engage actual and potential visitors. In this regard,  
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48 Nixon, Popova, and Önder (2017) examine the process of selecting appropriate images  
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50 and hashtags to promote a destination and improve its image among consumers as part of  
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52 a marketing strategy. This points to the need to know which of the DMO's images have  
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54 a real impact on potential tourists.  
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### ***The Power of Images in the Tourism Industry***

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3 The tourism industry has realized that classical advertising no longer reaches potential  
4 tourists because online innovations affect buying and selling behavior (Aramendia-  
5 Muneta, 2012). Mackay and Couldwell (2004) highlight the power of photographs to  
6 create and communicate images of a destination, noting that they remain vital to success  
7 in the tourism industry. Accordingly, the industry is increasingly turning to social-media  
8 platforms and, in particular, to Instagram to market vacation destinations. It thus  
9 recognizes that the content and likes and comments received by a picture posted to  
10 Instagram by an influencer could be the best approach to attracting potential tourists to  
11 the destination.  
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24 Though no empirical studies have demonstrated how views, likes, content, and  
25 comments about a picture posted on Instagram can be converted into real tourist visits to  
26 a destination, there is evidence suggesting that tourism information presented in the form  
27 of a picture influences potential tourists' choice of a destination (Bell & Davison, 2013;  
28 Choi, Lehto, & Morrison, 2007). In this regard, Decrop (1999) acknowledges that visual  
29 practices are an important part of tourism experiences and influence tourists' decision-  
30 making. Photography creates an image of the purchased service and offers travelers a  
31 specific sight to visit with a sense of authenticity (Pan, Lee, & Tsai, 2014). Gallarza, Gil  
32 Saura, and Calderón García (2002) note that the intangible nature of tourism and travel  
33 services makes it hard for travelers to imagine a destination. These authors emphasize  
34 that photographs are a powerful means of generating booking inquiries and travel  
35 engagement. However, images offered through Instagram allow travelers to acquire  
36 visual knowledge of the place they wish to visit and the services being offered.  
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54 According to Stepchenkova and Zhan (2013), photographs capture reality and provide  
55 an opportunity for travelers to share their experiences with others. In keeping with this  
56 notion, Groves and Timothy (2001) suggest that the integration of mobile technology with  
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3 social media makes it easier and more enjoyable for tourists to share photos, leading to  
4 an increase in the potential audience. On the whole, images are an effective tool for:  
5 promoting, advertising, and distributing goods and ideas; marketing; and providing fast,  
6 accurate, and precise information about destinations to travelers (Dredge & Jenkins,  
7 2003; Garrod, 2009). Yüksel and Akgül (2007) find evidence of a relationship between  
8 postcards and positive emotions, which affect a destination. In this regard, these authors  
9 emphasize the power of images as a key factor influencing travelers' destination choices.  
10 Additionally, online photography in the tourism context makes it easier for destinations  
11 to cultivate a good image in tourists' mind and serves as a symbol of user experience and  
12 reality to tourists.  
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26 The existence of multiple images for a given tourism destination is not always  
27 negative. On one hand, the literature accepts the existence of multi-images as a common  
28 and easily occurring trend, and Pike (2005) observes that DMOs are responsible for  
29 coordinating the tourism industry, in addition to enhancing destination image. On the  
30 other, all tourism agents, particularly private-sector ones (hotels, restaurants, leisure  
31 facilities, etc.), logically project their destination's tourism image from the point of view  
32 of their product. In this context, the DMO must act to properly manage and control image  
33 fragmentation so as to avoid the ensuing negative effects.  
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### 46 ***Destination Images and Content Analysis***

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50 Visual images of tourist destinations are an under-used but powerful qualitative research  
51 instrument (Haywood, 1990). Content analysis is the most well-known and widely used  
52 way of taking advantage of this tool among tourism researchers. It is the most frequently  
53 used method in tourism research of visual images (Kümpel, Karnowski, & Keyling,  
54 2015). It can also be used to assess and identify the motivations driving tourism industry  
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3 players to post travel photos as interactive media (Skalski, Neuendorf, & Cajigas, 2017).  
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5 In general, content analysis provides an empirical basis to compare and contrast features  
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7 within a large data set (Albers & James, 1988).  
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10 Several postcard studies have used content analysis to obtain their results. In a  
11  
12 qualitative content analysis of portrayals of Berlin, Milman (2012) finds a lack of  
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14 depictions of contemporary Berlin. In their research on scenic postcards as items for the  
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16 spatial analysis of the Savoy region, Foltête and Litot (2015) find that postcards have a  
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18 dual location, namely, in the landscape or at the site and at the point of sale.  
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21 Researchers' contributions have also been highly diverse in terms of their  
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23 methodology. In a study of visitor-employed photography combining content analysis  
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25 and quantitative statistical techniques, Garrod (2009) proposes that photography and  
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27 tourism are intrinsically linked through multiple forms of media, such as postcards,  
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29 television commercials, and brochures.  
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33 Content analysis is used for several purposes. Camprubí (2015) compares the online  
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35 image fragmentation of two capital cities (Paris and New York). Stepchenkova and Zhan  
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37 (2013) construct maps representing projected and perceived images of Peru. Similar  
38  
39 structural features can be found in the pictorial analysis of Portugal on Instagram by  
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41 Kuhzady and Ghasemi (2019). In a study of Australian newspaper travel sections (non-  
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43 news journalism), Hanusch (2011) uses visual content to document travel stories. Finally,  
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45 tourists have a specific role in the hermeneutic circle of the representation of a destination,  
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47 with the power to create a specific circle of tourism consumption (Masip Hernández,  
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49 Camprubí, & Coromina, 2018).  
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## 58 **Formulation of the Research Questions**

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### *S-O-R Model for Instagram and tourism*

How to attract more tourists is a key issue for DMOs, especially how to control the social-media environment due to its increasingly central role in the tourism industry (Fatanti & Suyadnya, 2015). Unlike traditional environments, the social-media environment enables interactivity between the information provider and users (Gatautis, Vitkauskaite, Gadeikiene, & Piligrimiene, 2016) and fosters new forms of interaction with and relating to customers (Sawhney, Verona, & Prandelli, 2005). Hence, if they are early adopters of this approach, DMOs will be pioneers in attracting new consumers (Aramendia-Muneta, 2012).

In this environment, Laroche (2010) finds that the stimulus-organism-response (S-O-R) paradigm is the most useful for explaining online consumer behavior, as the Internet is a universal medium and there is more experience and research in this field. That author adds that the S-O-R model is the most likely to provide productive solutions with regard to how online consumers behave.

To use this model, it is necessary first to look deeper into the theory of S-O-R. Mehrabian and Russell's (1974) S-O-R paradigm suggests that there is a sequential correlation between stimulus, organism, and response and asserts that environmental psychology is one of the harder areas for researchers to explore due to the subjective nature of the data (e.g., reactions to color). Stimuli are factors that trigger inner emotional and cognitive reactions (Kim, Lee, & Jung, 2019). Drawing on this framework, this study is an initial attempt to begin to understand which stimuli (i.e., tourism image attributes) are the most appropriate and have the greatest impact on Instagrammers' behavior in the form of likes and comments (organism). If DMOs act on these findings, the resulting measures could elicit a response from potential tourists, not only enhancing the destination's image, but also increasing the number of tourists. Other researchers (e.g.

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2  
3 Gatautis et al., 2016; Kim et al., 2019) have adapted the Mehrabian and Russell (1974)  
4  
5 model to the online environment.  
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8 In the present study, the S-O-R model is adapted to Instagram and DMOs, where the  
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10 stimulus is image attributes, the organism is Instagrammers' likes and comments, and the  
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12 expected response is to improve the destination image and attract more tourists (Figure  
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17 [Figure 1 near here]  
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### 24 ***Tourism Destination Image Attributes (Stimulus)***

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28 A review of the literature points to eight main tourism destination image attributes: the  
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30 main theme; centrality; time of day; colors; people; water; animals; and repetition. The  
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32 following paragraphs explain each of these attributes and its characteristics. A summary  
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34 of the attributes is provided in Table 1.  
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38 The pictorial images from the sample were categorized into eight subcategories based  
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40 on the results of a preliminary data analysis of the visual information (Choi et al., 2007;  
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42 Dadgostar & Isotalo, 1996; Stabler, 1988; Timothy & Groves, 2001). Moreover, Lai and  
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44 To (2015) find that destination images on social media feature two main subjects: cultural  
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46 heritage, on the one hand, and hotels and entertainment facilities, on the other. The eight  
47  
48 subcategories were: historic buildings and heritage; parks and gardens (places to take a  
49  
50 break from city life); tourism facilities and infrastructure (transportation, facilities, hotels,  
51  
52 etc.); panoramic view of cities or villages or views of natural scenery (e.g., mountains,  
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54 lakes, national parks, beaches, the sea); special events (e.g., festivals); restaurants and  
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56 dining facilities; entertainment and leisure; other photographic subjects (e.g., roads).  
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3 Another variable was a “centric” theme or centrality. Tussyadiah and Fesenmaier  
4 (2009) propose four different “centric” categories: activity-centric, self-centric, site-  
5 centric, and other centric. When a picture features a place without showing any activity  
6 or people, offers a tourist perspective, and affords viewers a view of a place of interest, it  
7 is categorized as *site-centric*. The category *other centric* refers to special or foreign events  
8 or activities such as habits, lifestyles, or simply the subway. *Activity-centric* refers to  
9 photos featuring the different kinds of activities tourists can do at a destination, including  
10 images featuring people playing, biking, partying, etc. Finally, the *self-centric* category,  
11 rather than being generic, offers the audience an expression of the photographer’s self-  
12 image.  
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26 The time of day, especially, sunset, reveals emotions related to the sky and colors,  
27 which ultimately have a positive impact on the viewer (Fiallos, Jimenes, Fiallos, &  
28 Figueroa, 2018). In fact, sunsets are a favorite subject among users over the age of 50  
29 (Han et al., 2018) and are a frequent setting, as the light at dusk is good for taking pictures  
30 (Boy & Uitermark, 2015). Hunter (2016) describes four main times of day for depicting  
31 an image: in daylight, at sunset, at night, and at night with fireworks. However, for the  
32 purposes of this study, only three times were used: daylight, sunset, and night.  
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42 Singh (2006) defines color as an important source of information for marketing  
43 purposes, because more than 60 percent of customer assessments are based on colors.  
44 Darker colors have been found to enhance the functionality of social media (Kietzmann,  
45 Hermkens, McCarthy, & Silvestre, 2011). Conversely, Bakhshi and Gilbert (2015)  
46 highlight the value of red, purple, and pink in promoting dissemination on social media,  
47 while finding that green, blue, black, and yellow have the opposite effect. For color-based  
48 features, the color space most closely related to human vision is used (Au-Yong-Oliveira  
49 & Pinto Ferreira, 2014; Ferwerda, Schedl, & Tkalcic, 2015) in order to understand the  
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3 influence of color. Thus, color-centric features can affect the audience's response. To this  
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5 end, twelve colors were used: blue, black, brown, cream, gray, green, orange, red, rose,  
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7 violet, white, and yellow.  
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10 Photographs can feature people prominently in order to be more successful and  
11  
12 achieve a certain level of impact. According to Ferwerda et al. (2015), images that include  
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14 people (e.g., selfies) elicit a greater response in terms of the number of likes and  
15  
16 comments than those showing mostly things. Bakhshi, Shamma and Gilbert (2014) and  
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18 Souza et al. (2015) report similar findings. Moreover, including images of the  
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20 photographer him or herself, whether just parts, such as a hand or foot, or the whole body,  
21  
22 generates self-testimony and increases his or her credibility as the main actor personally  
23  
24 documenting and sharing lived experiences (Nunes, 2017). Likewise, selfies attract more  
25  
26 attention from Instagrammers, thereby boosting engagement (Souza et al., 2015).  
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30 Environmental variables such as water can play a main role in pictures to emphasize  
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32 nature and give the photograph an added outdoor-recreation value for viewers (Arriaza,  
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34 Cañas-Ortega, Cañas-Madueño, & Ruiz-Aviles, 2004; Martín-López, García-Llorente,  
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36 Peri, Lencinas, & Martínez Pastur, 2015). When audiences notice the presence of water,  
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38 the perceived visual quality increases (Arriaza et al., 2004). Furthermore, the reflection  
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40 of light on water amplifies the existence of colors (Singh, 2006) and may thus be more  
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42 engaging for viewers. The presence of the water could thus be an alluring factor for users.  
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46 The presence of animals may also be related to the number of likes and increases in  
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48 followers (Jang, Han, & Lee, 2015). Although there is very little literature on this aspect,  
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50 it has been included for the purposes of this study as the presence of animals in an image  
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52 could have a higher impact on Instagrammers.  
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55 Not only does each stakeholder in the tourism industry have its own image of a given  
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57 destination, so does each tourist. Therefore, different images may be projected at the same  
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3 time through induced information sources, such as social media or brochures and other  
4 promotional material (Camprubí, 2015). Such differences (or dysfunctions) are often used  
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6 to present the reality of a destination, selectively highlighting certain aspects, while  
7  
8 ignoring others that might provide a more global image (Camprubí, 2015; Govers & Go,  
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10 2004). In these cases, the dysfunction occurs when tourism images are mutually  
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12 inconsistent, because they ignore different aspects of the destination reality (Camprubí,  
13  
14 2015). Image dysfunction will thus be negative when a multi-image results from  
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16 inconsistent images that do not depict the reality of the destination, such as multi-image,  
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18 due to information overload or information similarity or ambiguity confusion (Mitchell,  
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20 Walsh, & Yamin, 2005).. The variable *multi-image* was thus also considered.  
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[Table 1 near here]

### 33 ***Research Questions***

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37 The purpose of this study is to identify the key attributes (stimulus) to boost success  
38 among Instagrammers (organism) and help DMOs improve their Instagrammer  
39 engagement and attract more potential tourists (response). Therefore, the research  
40 questions focus on the interconnection between likes, comments, and attributes as  
41 follows:  
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49 *RQ1.* What are the key destination image attributes (stimulus) influencing the number of  
50 likes (organism)?  
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54 *RQ2.* What are the key destination image attributes (stimulus) influencing the number of  
55 comments (organism)?  
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## Methodology

### *Research Design*

According to Hunter (2008) and Choi et al. (2007), among others, a qualitative content analysis approach is suitable for research on visual images. In this specific field, Albers and James (1988) describe the method of dividing the image into single parts, quantifying the results into frequencies, and applying distributions. In the present study, this research approach made it possible to identify common themes in the available data with a view to shedding light on how DMOs use Instagram. The use of a qualitative approach supports the presentation of a typology, in addition to diverse forms of expression by users. Typology analysis, in turn, has made it easier to reflect the impact of new technologies such as Instagram for influencing tourists' interests. A qualitative approach has also been used to facilitate the assessment of consumer preferences for the tourism-influencing tools offered by Beautiful Destinations (Flick, 2009).

The present study consists of a qualitative content analysis to investigate the impact of Instagram on the tourism industry in the case of Beautiful Destinations. The main aim of using this method is to identify the links between image content and the numbers of follower likes and comments about the pictures shared through the Beautiful Destinations Instagram account. This method is used not only to study the features of the image content through a systematic classification process, but also to draw inferences about the responses of the communicators, i.e., the followers, in order to identify themes or patterns (Hsieh & Shannon, 2005; Zhang & Wildemuth, 2009). The use of content analysis also offers insight into the use of communication indicators, in this case, Beautiful Destinations, to enhance tourism industry performance.

### *Sampling and Coding Process*

First, a copy of each image from the @beautifuldestinations Instagram account was downloaded, and a preliminary sample with the number of comments and likes, country, and place was created. This primary data collection process yielded a final sample of 1,094 images (with a total of 131,116,800 likes and 2,859,448 comments). Two independent coders (one analyst and one judge) were then used to ensure reliability as described in Küster (2006). Both were required to have experience in Instagram and tourism, as well as experience living abroad as part of a multicultural reality to ensure a broader perspective in their approach to the content analysis. Additionally, a convenience sample of 50 images was used to provide specific training on the accurate identification of the attributes. A third trained coder was responsible for validating the resulting classifications and settling disagreements to reach a final consensus. Intercoder reliability is a method used by researchers to establish consistency within a coder's own coding process (Wimmer & Dominick, 2011). At 93.5%, the intercoder reliability for the present data was greater than 0.9 and thus acceptable according to Neuendorf (2002).

### *Statistical Analysis*

The data were analyzed using ordinary least squares (OLS) models due to the nature of the variables in order to assess the relationship between the photographs' attributes and the number of likes (Model 1) or comments (Model 2). The quantitative dependent variables were the number of likes and comments. The independent variables were the photograph attributes, specifically: main theme, centrality, time of day, colors, people, water, animals, and, as a disruptive attribute, repetition. Out of these eight attributes, main theme, centrality, time of day, and colors were categorical variables, for which a nominal



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3 scale was used that differed for each attribute (eight, four, three, and twelve categories,  
4  
5 respectively). In contrast, people, water, animals, and repetition were dichotomous  
6  
7 variables, for which a nominal scale of two was used, indicating only the attribute's  
8  
9 presence or absence. The OLS models were estimated using SATA 14 software to  
10  
11 measure which image attributes might influence the number of likes and comments  
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13 received. Table 2 summarizes the technical details of the research.  
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21 [Table 2 near here]  
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### 28 ***Sample Description***

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32 The sample of 1,094 images received a total of 131,161,800 likes, with a mean of  
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34 119,850.8 (standard deviation (SD) of 15,229.65), and a total of 2,859,448 comments,  
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36 with a mean of 2,613.755 (SD 1,432.44). Of the total number of images, 44.1% received  
37  
38 an above-average number of likes, while 39.9% of the pictures received an above-average  
39  
40 number of comments. The number of likes received ranged from 65,400 to 210,000, while  
41  
42 the number of comments ranged from 376 to 9,286.  
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46 Table 3 shows the descriptive data for each attribute. With regard to the attribute *main*  
47  
48 *theme*, at nearly 60%, panoramic views were the predominant perspective, showing  
49  
50 tourism destinations as a whole. They were followed by historic buildings and heritage  
51  
52 (15.72%) and tourism facilities and infrastructure (6.58%). As for the second attribute,  
53  
54 *centricity*, the characteristic *site-centric*, featuring a view of the destination as a place of  
55  
56 interest, was identified in 40.49% of the cases, while the other three characteristics were  
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58 all identified in around 20% of the cases (activity-centric: 22.76%; self-centric, 19.01%;  
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3 other centric: 17.43%). In terms of the time of day, *in daylight* (60.97%) was predominant,  
4 followed by *at sunset* (24.86%), and *at night* (14.17%). The most frequently registered  
5 color was green (20.57%), followed by a second group, found in around 10% of the cases,  
6 consisting of blue, cream, gray, and orange, and a third group of less common colors  
7 (black, brown, red, rose, violet, white, and yellow) identified just under 10% of the time.  
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9  
10 People (present in 41.32% of the images) and water (present in 69.29%) were key  
11 elements in the pictures, while animals (present in 4.11%) were not. Finally, the variable  
12 *multi-image*, implying that a consecutive image of a country is shown as a disruptive  
13 attribute, was identified in around 36% of cases.  
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[Table 3 near here]

## 32 Results

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36 Table 4 provides the estimated results assessing the relationship between the photo  
37 attributes and the number of likes and comments received by means of multivariate  
38 analysis (OLS). For the dichotomous variables, OLS treats the absence of the feature as  
39 a dummy variable. Conversely, when the categorical variables had more than just a yes  
40 or no option, as with the attributes *main theme*, *centricity*, *time of day*, and *colors*, a  
41 dummy variable had to be ascribed. This variable was called the reference group. In these  
42 cases, the reference groups were: *festivals* for *main theme*, *self-centric* for *centricity*, *night*  
43 for *time of day*, and *red* for *colors*. Each specific characteristic was compared to the  
44 reference group attribute. A positive regression coefficient meant that success, as  
45 measured by likes or comments, was higher for the specific characteristic than for the  
46 reference group dummy variable, while a negative regression coefficient meant the  
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3 opposite. If the regression coefficient was statistically significant, the success, as  
4 measured by likes or comments, of the reference group attribute was also statistically  
5 significant.  
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10 With 1,094 observations, the comments model (Model 2) had a higher level of model  
11 fit than the likes model (17.96% vs 4.88%). The statistical solution shows the attributes  
12 with the greatest impact in each column. On the whole, more image attributes seem to  
13 have an effect on comments than on likes (4 vs 6), while in both models attributes were  
14 important factors to consider in explaining success in terms of likes and comments. In  
15 fact, the constant (-cons) was significantly different from zero at  $p < 0.001$ .  
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24 In the likes model (Model 1), attributes such as *main theme*, *time of day*, *water* and  
25 *animals* did not have a statistically significant effect on the number of likes. In contrast,  
26 photographs featuring people (coefficient 3557.665,  $p < 0.01$ ) received more likes than  
27 those that did not, while multi-images (coefficient -1926.837,  $p < 0.05$ ) received fewer  
28 likes than those that did not have a disruptive effect. As for the *centricity* attribute, site-  
29 centric photos (coefficient 4340.232,  $p < 0.01$ ) and other-centric photos (coefficient  
30 5182.604,  $p < 0.001$ ) attracted more likes than self-centric ones, whereas the effect of  
31 activity-centric photos did not differ from that of self-centric ones. The color rose had a  
32 positive effect (coefficient 6502.314,  $p < 0.10$ ), and cream, a negative one (coefficient -  
33 4460.684,  $p < 0.10$ ). Rose attracted more likes, and cream fewer likes, than the red  
34 baseline.  
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49 With regard to the number of comments (Model 2), more attributes seem to have an  
50 effect on Instagrammers. Specifically, photographs featuring water and animals received  
51 more comments than those that did not (coefficient 89.876,  $p < 0.001$ ; coefficient  
52 357.699,  $p < 0.001$ , respectively), while the attributes *people* and *multi-images* did not seem  
53 to impact the number of comments. With regard to the *centricity* attribute, activity-centric  
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3 (coefficient 161.428,  $p < 0.05$ ), other-centric (coefficient 332.848,  $p < 0.05$ ) and site-centric  
4  
5 (coefficient 290.664,  $p < 0.10$ ) photos received more comments than self-centric ones.  
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7 Time of day also had an effect on the number of comments. Photographs showing images  
8  
9 at sunset (coefficient -306.261,  $p < 0.05$ ) received fewer comments than photos taken at  
10  
11 night. The attribute *color* also impacted the number of comments. Compared with  
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13 photographs in which the main color is red, those in which the predominant color was  
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15 cream (coefficient 282.460,  $p < 0.01$ ), green (coefficient 530.339,  $p < 0.05$ ), orange  
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17 (coefficient 206.484,  $p < 0.001$ ), rose (coefficient 794.446,  $p < 0.05$ ), or yellow (coefficient  
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19 602.306,  $p < 0.05$ ) received more likes, whereas the effect of the rest of the analyzed colors  
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21 did not differ from that of red. Finally, the attribute *main theme* also affected the number  
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23 of comments. Compared to the main theme of festivals, photos in which the main theme  
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25 was entertainment (coefficient -1019.205,  $p < 0.01$ ), a panoramic view (coefficient -  
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27 1120.642,  $p < 0.01$ ), or restaurants (coefficient -545.613,  $p < 0.001$ ) received fewer  
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29 comments. In contrast, those primarily featuring a hotel (coefficient 337.092,  $p < 0.001$ )  
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31 received more comments than those depicting a festival.  
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40 [Table 4 near here]

### 41 42 43 **Discussion, Conclusions, and Managerial Implications**

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46 With the increasing use of the Internet and growing corporate interest in accessing various  
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48 social-media sites such as Beautiful Destinations, there is immense scope to enhance  
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50 tourist industry performance by attracting tourists and catering to their individual needs  
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52 (Wessels, 2014). In the current technology-driven era, the impact of using an Instagram  
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54 account, e.g., Beautiful Destinations in the case of the tourism industry, is clear and will  
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56 likely become even more prominent with continuous promotion on the Internet (Wally &  
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58 Koshy, 2014). Moreover, photographs are a powerful medium for promoting a tourism  
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3 destination (Hunter, 2008), and the key attributes of those photos can be a means of  
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5 engaging more tourists.  
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8 The present research makes several contributions to the literature on Instagram in  
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10 relation to the tourism industry and is one of the first attempts to unify the attributes of a  
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12 destination image and its influence on Instagram user responses as measured by likes and  
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14 comments. The first significant finding, following the initial speculation regarding the S-  
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16 O-R paradigm (Mehrabian & Russell, 1974), is that some attributes (stimulus) do seem  
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18 to influence the number of likes and comments from users (organism). Therefore, DMOs  
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20 could leverage this research to improve the final response by tailoring their projected  
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22 destination image to attract more potential tourists. As Laroche (2010) predicted, the use  
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24 of the S-O-R model is helpful and provides a productive solution for how Instagrammers  
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26 behave with regard to certain photo attributes.  
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31 Another contribution of this research is related to the first research question and the  
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33 key destination image attributes influencing the number of likes on Instagram. Although  
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35 the present study focuses on the attributes of photos posted to Instagram proposed in the  
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37 literature (e.g., Choi et al., 2007; Timothy & Groves, 2001), the results show that there  
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39 are indeed differences among the types of attributes. Some attributes have a greater  
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41 impact on the number of likes than others. The presence of people in a picture, an  
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43 argument previously supported by Ferwerda et al. (2015), Bakhshi et al. (2014), and  
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45 Souza et al. (2015), encourages more Instagrammers to hit the like button, while repetition  
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47 of the same country in a disruptive way has the opposite effect due to the resulting multi-  
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49 image, which can cause various types of confusion in the Instagrammer (Mitchell et al.,  
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51 2005): overload confusion (too much information about the same country), similarity  
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53 confusion (too much similar information about the same country), or ambiguity confusion  
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55 (too much ambiguity about the same country). This, in turn, can lead to a state of doubt  
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3 regarding which image the user likes most. The *centricity* attribute proposed by  
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5 Tussyadiah and Fesenmaier (2009) shows that a photograph featuring a view of a place  
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7 of interest or a special or foreign event or activity receives more likes than an image  
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9 offering an expression of the photographer him or herself. Finally, the color rose, which  
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11 was considered a deterrent to promoting dissemination on social media by Bakhshi and  
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13 Gilbert (2015), positively impacted the number of likes in the present study, while the  
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15 color cream had a negative impact.  
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19 As regards the second research question, another notable contribution is the finding  
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21 concerning the number of attributes influencing the number of comments on Instagram.  
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23 On one hand, leaving a comment requires more effort, commitment, and time from the  
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25 Instagrammer; therefore, the number of comments is always lower than the number of  
26  
27 likes. In fact, the number of likes and comments can be used to distinguish whether  
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29 engagement on Instagram with the audience is one-way and related to self-presentation  
30  
31 (likes) or two-way involving feedback from Instagrammers (comments) (Russmann &  
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33 Svensson, 2016). On the other, the attributes with the greatest influence on the number of  
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35 comments provide more detail, as if images required a higher degree of complexity with  
36  
37 regard to their content. Thus, the inclusion of environmental factors such as water or the  
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39 presence of animals ensures an increase in the number of comments, which is consistent  
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41 with previous research regarding the presence of water (Arriaza et al., 2004) and animals  
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43 (Jang et al., 2015). However, the present study focused on Instagram. Furthermore, colors  
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45 such as cream, green, orange, rose, and yellow were more likely to increase success in  
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47 terms of comments than red. With regard to this variable, the results were slightly  
48  
49 different from those reported by Bakhshi and Gilbert (2015), who assert that green and  
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51 yellow have a negative impact, and Kietzmann et al. (2011), who finds that dark colors  
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53 enhance the functionality of social media. Tussyadiah and Fensemaier's (2009) *centricity*  
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3 attribute had a strong impact on comments. All the characteristics in this attribute – the  
4 view of a place, special or foreign events, and various types of tourist activities – were  
5 more likely to elicit comments than the expression of self-image by the photographer.  
6  
7 However, the results for the *time of day* attribute show that photos taken at sunset elicited  
8 fewer comments than photos taken at night. Finally, with regard to the main theme, hotels  
9 and tourist infrastructure were more likely to receive comments than festivals, and  
10 entertainment, panoramic views of places, and restaurants were less likely to receive  
11 comments.  
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21 This study has several practical implications for the marketing practice of DMOs in  
22 terms of creating a better destination image and promoting tourist visits. The disparities  
23 between photograph likes and comments suggest that these two areas should be managed  
24 separately in order to serve the DMO's ultimate purpose and avoid the negative impact  
25 of disruptive photographs. Several destinations in the sample repeated the same historical  
26 building or panoramic view of a place three or more times in a row from different  
27 perspectives. This results in information overload for the user. Likewise, many presented  
28 different places from the same country or city constantly, leading to ambiguity and  
29 similarity confusion among Instagrammers. Depending on the content of the image, all  
30 the previous conclusions are worth implementing to ensure successful photographs for  
31 DMOs in terms of likes and comments, such as predominance of the color rose or the use  
32 of site-centric and other-centric images. To increase likes, photos should depict people  
33 and avoid using predominantly cream colors, whereas to increase comments, featuring  
34 water and/or animals is basic to engaging users, as is focusing on a hotel. Colors such as  
35 cream, green, orange, and yellow and activity-centric photos can also be useful on  
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## Limitations and Future Research

This study makes an important contribution to destination image literature, but it has some limitations. In particular, three points bear mentioning. First, the study focused on only one Instagram account and only one year. To ensure greater rigor and control the measure, the sample was very varied; Beautiful Destinations showcases pictures from numerous places on Instagram, which is the account's main attraction for Instagrammers and researchers. Second, while the research analyzed the content of the photographs, it did not take into account the content of the comments left on each image. This was largely due to the fact that more than fifty different languages were identified in the comments and the consequent difficulty of unifying words across such a large volume of comments (nearly three million). Finally, more information about the users, their identity (e.g., their age or gender), and their internal motivations might have clarified some trends with regard to like and comment behavior.

De Bruyn and Lilien (2008) demonstrate that certain characteristics of online reviews written by other users can decrease or increase tourist visits and develop consumers' expectations regarding a tourism destination. As a new line of research, emoticons left in comments have been found to be an important source of information for connecting the emotions triggered by a specific destination and could be examined in greater depth in the future. Additionally, similar research could be undertaken using a mixed approach, wherein the qualitative as well as the quantitative results are explored and analyzed to derive suitable study outcomes and draw conclusions. In that case, future research could focus on the influence of the individual characteristics of the Instagrammer as a user.

Finally, applying the S-O-R model to other social media or to Instagram and another industry could also be an avenue of research worth pursuing. Similarly, continuing to



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3 focus on the tourism sector, researchers could perform a cluster analysis of each country's  
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5 strategies and measure their success.  
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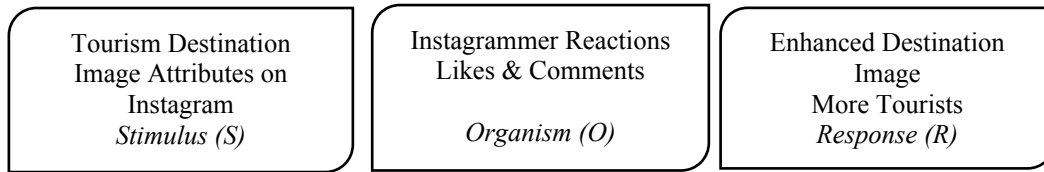
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**Table 1**  
Attribute Categories

<b>Attribute category</b>	<b>Author(s)</b>
<b>Main theme</b>	Choi et al. (2007); Dadgostar & Isotalo (1996); Stabler (1988); Timothy & Groves (2011)
<b>Centricity</b>	Tussyadiah & Fesenmaier (2009)
<b>Time of day</b>	Fiallos et al. (2018); Hunter (2016)
<b>Colors</b>	Bakhshi & Gilbert (2015); Kietzmann et al. (2011); Singh (2006)
<b>People</b>	Bakhshi et al. (2014); Ferwerda et al. (2015); Souza et al. (2015)
<b>Water</b>	Arriaza et al. (2004); Martín-López et al. (2015)
<b>Animals</b>	Jang et al. (2015)
<b>Multi-image</b>	Camprubi (2015)

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**Figure 1.** S-O-R model for Instagram & DMOs (adapted from Mehrabian & Russel (1974).

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**Table 2.** Technical details of the research

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<b>Objective</b>	Instagram images
<b>Case</b>	@beautifuldestinations
<b>Reference period</b>	2015
<b>Sample size</b>	1,094 images
<b>Likes</b>	131,116,800 likes
<b>Comments</b>	2,859,448 comments
<b>Methodology</b>	Content analysis
<b>Statistical analysis</b>	Ordinary least squares

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**Table 3.** Main descriptive data of dependent and independent variables

Attribute	%	
Main theme	Historic	15.73%
	Entertainment	3.56%
	Panoramic view	59.14%
	Festival	2.74%
	Hotel	6.58%
	Other	7.40%
	Park	3.20%
Centricity	Restaurant	1.65%
	Activity-centric	22.76%
	Other centric	17.74%
	Self-centric	19.01%
Time of day	Site-centric	40.49%
	Daylight	60.97%
	Night	14.17%
Colors	Sunset	24.86%
	Black	4.02%
	Blue	10.69%
	Brown	4.48%
	Cream	10.42%
	Gray	11.15%
	Green	20.57%
	Orange	13.16%
	Red	4.84%
	Rose	2.74%
People	Violet	4.48%
	White	5.22%
	Yellow	8.23%
	Present	41.32%
Water	Present	69.29%
Animals	Present	4.11%
Multi-image	Present	36.65%

**Table 4.** Relationship between attributes and likes and comments

	Model 1: Likes			Model 2: Comments		
	Coefficient		SD	Coefficient		SD
Historic	-2140.008	ns	3157.095	-1162.369	ns	275.772
Entertainment	-1126.133	ns	3798.324	-1019.205	***	331.783
Panoramic view	-2383.540	ns	3017.962	-1120.642	***	263.619
Festival <sup>a</sup>						
Hotel	-1536.138	ns	3496.847	337.092	****	305.449
Other	-864.753	ns	3397.469	-1139.409	ns	296.769
Park	-3261.310	ns	3886.089	-1074.843	ns	339.450
Restaurants	1117.506	ns	4653.827	-545.613	****	406.511
Activity-centric	1988.519	ns	1629.243	161.428	**	142.314
Other centric	5182.604	****	1585.032	332.848	**	138.452
Self-centric <sup>a</sup>						
Site-centric	4340.232	***	1374.430	290.664	*	120.056
Daylight	-233.573	ns	1576.944	-125.769	ns	137.746
Night <sup>a</sup>						
Sunset	-1530.443	ns	1643.556	-306.261	**	143.565
Blue	-669.872	ns	2585.968	766.150	ns	225.884
Black	-3887.116	ns	3241.251	445.999	ns	283.123
Brown	-1052.431	ns	3005.320	-37.803	ns	262.515
Cream	-4460.684	*	2553.587	282.460	***	223.056
Gray	-1308.595	ns	2516.674	269.944	ns	219.831
Green	-2986.816	ns	2371.403	530.339	**	207.144
Orange	-952.703	ns	2481.733	206.486	****	216.779
Red <sup>a</sup>						
Rose	6502.314	*	3474.003	794.446	**	303.454
Violet	-2179.451	ns	3040.471	318.416	ns	265.585
White	-3491.518	ns	2927.779	409.205	ns	255.741
Yellow	-1682.291	ns	2695.252	602.306	**	235.430
People	3557.665	***	1155.294	627.743	ns	100.915
Water	-1352.489	ns	1114.890	89.876	****	97.386
Animals	2567.985	ns	2392.428	357.699	****	208.978
Multi-image	-1926.837	**	969.608	-210.202	ns	84.695
_cons	121195.600	****	3790.586	2878.189	****	331.107
N		1094			1094	
R <sup>2</sup> (%)		4.88%			17.96%	

\*p < .10; \*\*p < .05; \*\*\*p < .01; \*\*\*\*p < .001; ns: non-significant; <sup>a</sup> Dummy variables